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FINAL ENVIRONMENTAL IMPACT REPORT for the Alpine County Park Project

State Clearinghouse (SCH) #2021030196

Volume 3

2026 Final Environmental Impact Report Appendices

Lead Agency:

County of San Diego
Department of Parks and Recreation
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November 2026

Appendix A
Notice of Preparation

County of San Diego

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NOTICE OF PREPARATION of a DRAFT ENVIRONMENTAL IMPACT REPORT for the ALPINE COUNTY PARK PROJECT

INTRODUCTION

Publication of this Notice of Preparation (NOP) initiates the County of San Diego, Department of Parks and Recreation's environmental review and analysis of the Alpine County Park Project (project or proposed project) pursuant to the California Environmental Quality Act (CEQA). The NOP is the first step in the CEQA process. It describes the proposed project and is distributed to responsible agencies, trustee agencies, involved federal agencies, and the general public. As stated in State CEQA Guidelines Section 15375, the purpose of the NOP is "to solicit guidance from those agencies as to the scope and content of the environmental information to be included" in the Environmental Impact Report (EIR). The NOP provides an opportunity for agencies and the general public to comment on the scope and content of the environmental review of a proposed project.

PROJECT LOCATION

The project site is located in the eastern portion of San Diego County, California, approximately 1 mile south of the center of the unincorporated community of Alpine, and approximately 1 mile south of Interstate 8 (I-8) (Figure 1, *Regional Map*). The project is located adjacent to the Backcountry Land Trust's (BCLT) Wright's Field Preserve located to the north of South Grade Road and east of Tavern Road. The project site encompasses approximately 98 acres. The proposed project will involve construction of approximately 25 acres of active park space and implementation of a Habitat Conservation Plan and long-term monitoring and management of the 73-acre Alpine Park Preserve.

PROJECT DESCRIPTION

The County of San Diego Department of Parks and Recreation (DPR) acquired approximately 98 acres of undeveloped land within the unincorporated community of Alpine in east San Diego County. The proposed project will be located on the DPR-acquired property, which is adjacent to BCLT's Wright's Field Preserve located north of South Grade Road and east of Tavern Road, and south of Alpine Boulevard (see Figure 2, *Project Vicinity*). The County is proposing the development of an approximately 25-

acre active park and will conserve the remainder of the DPR-acquired property as open space.

The proposed project falls within the area covered by the Alpine Community Plan. The project site is subject to the General Plan Rural Lands Regional Category, with an Open Space-Conservation (OS-C) land use designation in the western portion and a Semi-Rural Residential (SR-2) land use designation in the eastern portion. Zoning for the site is A70, Limited Agricultural Use, and S80, Open Space.

The property Assessor's Parcel Numbers (APNs) for the park and preserve are: 404-171-12 and a portion of 404-170-61. The property is currently closed to the public. Access to the project site would be provided from two proposed driveways located along South Grade Road. The primary park entrance would be located on the eastern side of the property at a new intersection leg of the South Grade Road and Calle de Compadres intersection and it would operate as an all-way stop-controlled intersection. The second driveway will be a new intersection located at the southern end of the property and it will operate as a side-street stop-controlled intersection. Both driveways will allow for full access to the project site.

County Park: The proposed project would involve the development of an approximately 25-acre active park that would include amenities such as potential multi-use turf areas, baseball field, all-wheel area, bike skills area, recreational courts (i.e., basketball pickleball, game table plaza), fitness stations, leash-free dog area, restroom facilities, administrative facility/ranger station, equestrian staging with a corral, nature play area, community garden, volunteer pad, picnic areas with shade structures, picnic tables, game table plaza, and trails. The proposed project would also include a parking area capable of accommodating approximately 250-275 single vehicle spaces, 10 ADA spaces that would be available near the primary entrance and administrative building, and in the eastern portion of the site, along South Grade Road. Volunteer pad parking spaces, an equestrian staging area (vehicle parking), and corrals would be located in the northern portion of the project site (please see Figure 3, *Proposed Park Plan*). For utilities, the project proposes to connect to the existing sewer system or include a septic system to serve the restroom facilities, administration facility/ranger station, and volunteer pad. Stormwater retention basins will be located throughout the part.

The proposed project would be open to the public from sunrise to sunset. Dogs on leashes would be allowed within all areas of the park, and dogs off leash would be permitted within the designated leash-free dog area. During operation, "No Parking" signs may be installed along the shoulder of South Grade Road, if deemed necessary by the Department of Public Works (DPW) Traffic Division, to prevent potential overflow parking on South Grade Road. The proposed project would involve one employee, and one volunteer stationed at the project site for a total of one onsite ranger, two maintenance staff, and one volunteer. The volunteer would live on site full time to help with maintenance and management of the property.

Habitat Conservation Plan and Trails: The project includes implementation of a Habitat Conservation Plan and long-term monitoring and management of the approximately 73-acre Alpine Park Preserve. This will include restoration/habitat enhancement for the Quino checkerspot butterfly, maintenance of approximately 1.0 miles of existing trails, and trail closure activities along approximately 3,300 linear feet of existing, informal use trails.

ENVIRONMENTAL CONSIDERATIONS

The EIR will analyze the following potential environmental effects of the proposed project: aesthetics, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population/housing, public services, recreation, transportation and traffic, utilities/service systems, wildfire and other potential impacts identified during the NOP process. The EIR will also address feasible mitigation measures and a reasonable range of alternatives, as well as the additional mandatory sections required by CEQA. The County Department of Parks and Recreation will also prepare a mitigation monitoring and reporting program to address the potential significant impacts of the proposed project.

COMMENTS

The NOP is available for a public review period that starts on **Monday, March 8, 2021, and ends at 5:00 p.m. on Wednesday, April 7, 2021**. Written comments will be accepted until 5:00 p.m. on Wednesday, April 7, 2021. Comments regarding the scope and content of the environmental information that should be included in the EIR and other environmental concerns should be sent to:

County of San Diego
Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, CA 92123

or emailed to CountyParksCEQA@sdcounty.ca.gov.

For questions regarding this NOP, please contact Lorrie Bradley, Environmental Planner at (619) 455-7721 or by email at lorrie.bradley@sdcounty.ca.gov.

ATTACHMENTS

Figure 1: Regional Map
Figure 2: Project Vicinity
Figure 3: Proposed Park Plan

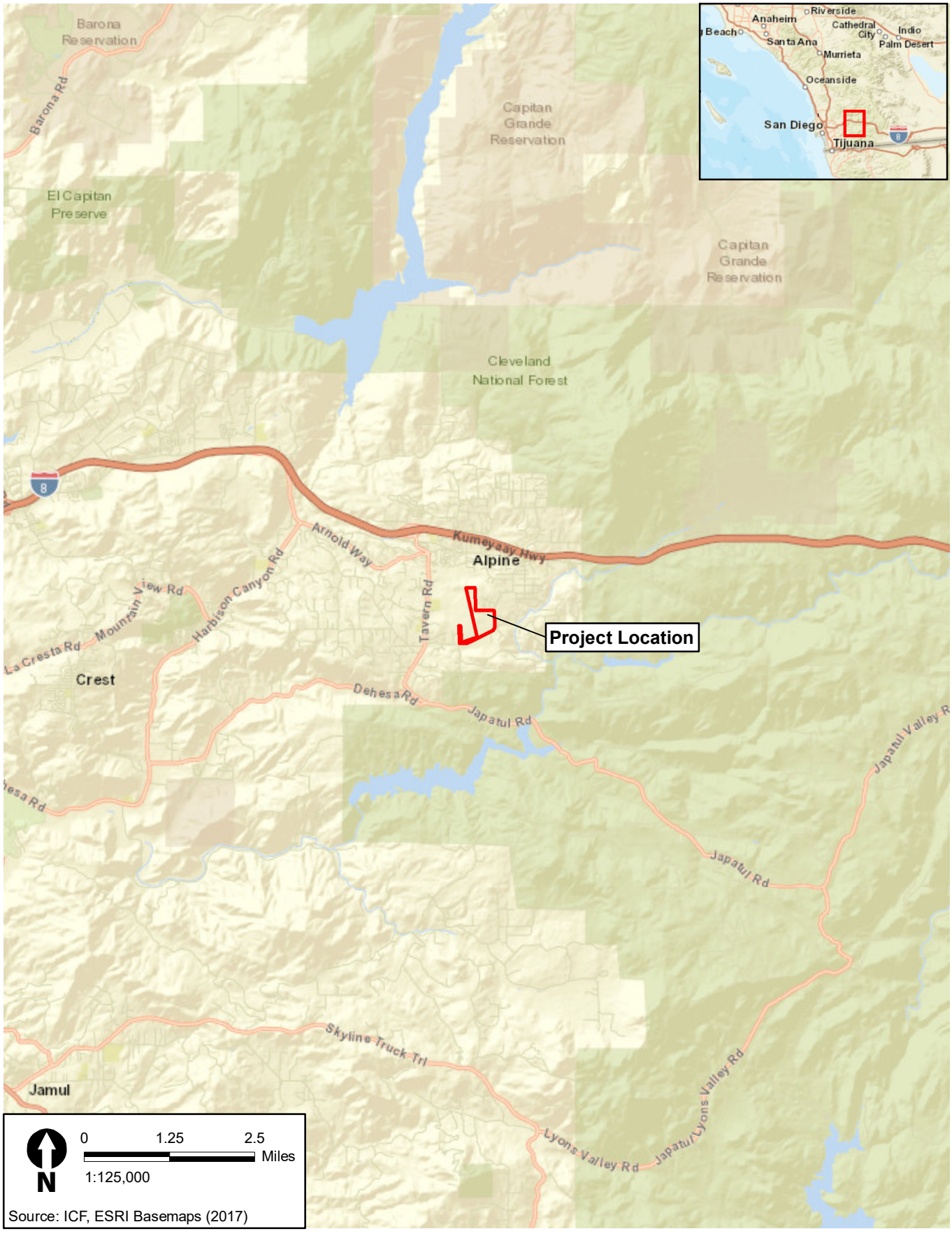

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Figure 1
Regional Location Map
Alpine Park Project

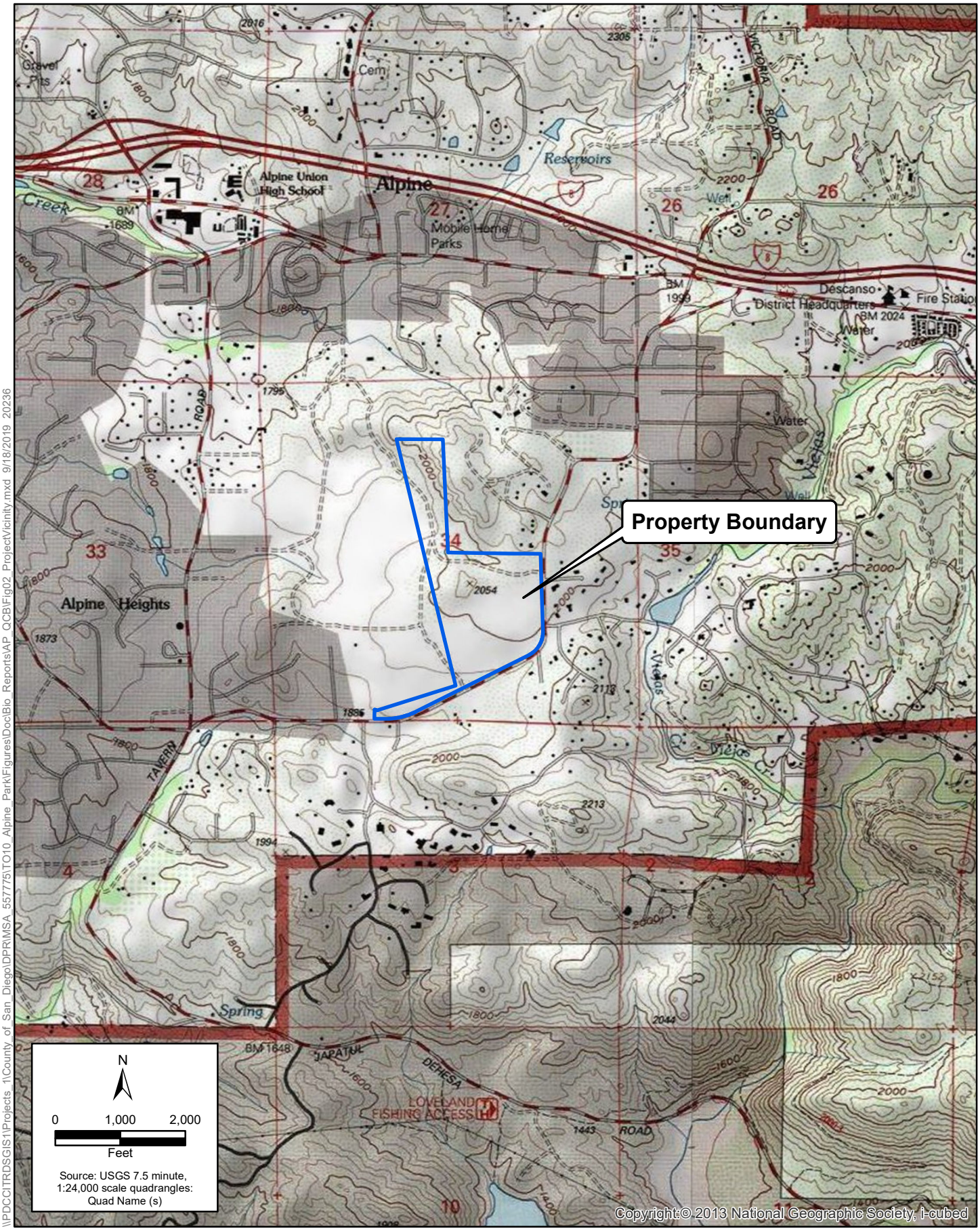

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Figure 2
Project Vicinity
Alpine Park Project



SITE ELEMENT KEY

1 MULTI-USE TRAIL
2 ADMIN/RESTROOM
3 RESTROOM
4 SHADE PAVILION
6 SHADE SHELTER
6 SHADE SAIL
7 ADA PARKING
6 ALL-WHEEL PARK GATEWAY
9 COMMUNITY GARDEN
10 GARDEN STORAGE
11 NATURE PLAY AREA
13 2-5 PLAY AREA
13 VOLUNTEER PAD
14 PICKLEBALL COURTS
15 BASKETBALL COURT
16 GAME TABLE PLAZA
17 PICNIC AREA
18 CORRAL
19 EQUESTRIAN STAGING
20 DROP-OFF/PICK-UP
21 BIKE PARK
22 ALL-WHEEL PARK
23 BASEBALL FIELD
24 MULTI-USE TURF AREA
23 SECONDARY PARK ENTRANCE
26 PRIMARY PARK ENTRANCE
27 PARKING
20 DOG PARK
29 EXISTING TRAIL
20 EXISTING TREES
31 BERMED LANDSCAPE SCREEN
32 PARK MONUMENT SIGN
23 NATIVE PLANTS
34 FITNESS STATIONS
35 ENGINEERED WOOD FIBER
36 TRASH ENCLOSURE
37 RETENTION BASIN
35 EXISTING LANDSCAPE/TERRAIN
39 EXISTING FENCE

PARKING SUMMARY

250	STANDARD SPACES
10	ADA SPACES
2	VOLUNTEER PAD SPACE
11	EQUESTRIAN STAGING SPACES
273	TOTAL SPACES

DPR DIRECTOR SIGNATURE/APPROVAL DATE

0' 40' 80' 160'
NORTH SCALE 1" = 80'

NOVEMBER 3, 2020

Figure 3.
PROPOSED PARK PLAN

ALPINE COMMUNITY PARK

COUNTY OF SAN DIEGO
PARKS AND RECREATION

Appendix B

Notice of Preparation Comment Letters

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

April 7, 2021

Ms. Lorrie Bradley
Environmental Planner
County of San Diego, Department of Parks and Recreation
Lead/Public Agency
5500 Overland Avenue, Suite 410
San Diego, CA 92123
Lorrie.Bradley@sdcounty.ca.gov

Subject: Alpine County Park Project (PROJECT), Notice of preparation (NOP) of a Draft Environmental Report (DEIR), SCH #2021030196

Dear Ms. Bradley:

The California Department of Fish and Wildlife (CDFW) received a NOP of a DEIR from the County of San Diego (County) Department of Parks and Recreation (DPR) for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.

Thank you for the opportunity to provide comments and recommendations regarding the activities involved in the Alpine County Park Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW Role

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State [Fish & G. Code, §§ 711.7, subdivision (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines, § 15386, subdivision (a)]. CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (Id., § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect state fish and wildlife resources.

CDFW is also submitting comments as a Responsible Agency under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW may need to exercise regulatory authority as provided by the Fish and Game Code, including lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" (see Fish & G. Code, § 2050) of any species protected under the California Endangered Species Act (CESA; Fish & G. Code, § 2050 et seq.) or the Native

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Plant Protection Act (NPPA; Fish & G. Code, §1900 et seq.), CDFW recommends the Project proponent obtain appropriate authorization under the Fish and Game Code.

CDFW also administers the Natural Community Conservation Planning (NCCP) program, a California regional habitat conservation planning program. The County participates in the NCCP program by implementing its approved Subarea Plan (SAP) under the County Multiple Species Conservation Plan (MSCP). The Project site is located with the boundaries of the County's approved MSCP covering southwestern San Diego County. Although the MSCP is permitted under both the California NCCP and federal Habitat Conservation Plan (HCP) programs, the MSCP did not provide take coverage for the Quino checkerspot butterfly (*Euphydryas editha quino*), a federal endangered species that has been identified onsite. Impacts are therefore being addressed by the U.S. Fish and Wildlife Service (USFWS) under a separate HCP.

PROJECT DESCRIPTION SUMMARY

Proponent: County DPR

Objective: The Project site is in the area covered by the Alpine Community plan. The site is subject to the General Plan Rural Lands Regional Category, with an Open Space-Conservation land use designation in the western portion of the property and a Semi-Rural Residential land use designation in the eastern portion. The Project site encompasses 98 acres. Twenty-five acres will be developed and turned into an active park and the 73 acres that will not be developed will be designated as open space and managed as part of the MSCP Preserve. The 25-acre active park will include: multi-use turf areas, baseball field, all-wheel area, bike skills area, recreational courts (i.e., basketball, pickleball, game table plaza), fitness stations, leash-free dog area, restroom facilities, administrative facility/ranger station, equestrian staging with a corral, nature play area, community garden, volunteer pad, picnic areas with shade structures, picnic tables, game table plaza, and trails. Included in the Project boundary will be a parking area with 250-275 single vehicle spaces. There will be two entrances to the parking area located on South Grade Road. The Project site will be open to the public from sunrise to sunset. Dogs are allowed on leashes in the Project boundaries and off-leash in the designated dog area. As stated above, the 73 acres that will not be developed will be called the Alpine Park Preserve (Preserve), and monitored and managed by the County. This management will include maintenance of one mile of existing trail and closure of informal use trails. The HCP will also include restoration and habitat enhancement for the Quino checkerspot butterfly.

Location: The Project site is in eastern San Diego County, one mile south of Interstate 8, and approximately one mile south of the center of the town of Alpine. Alpine is an unincorporated community in the eastern portion of the County and is approximately 25 miles east of downtown San Diego. The Project site is north of South Grade Road, east of Tavern Road, and adjacent to the Backcountry Land Trust's (BCLT) Wright's Field Preserve. Residential and rural communities surround the 98-acre site.

COMMENTS AND RECOMMENDATIONS

CDFW offers the following comments and recommendations to assist the County in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.

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Specific Comments

1) Consider Alternative Location(s). Due to the presence of highly sensitive habitats (clay soils, native grassland) and species on and/or adjacent to conserved areas of Wright's Field, CDFW recommends that the forthcoming DEIR include an alternative location or locations that would meet the needs of the community yet avoid or minimize impacts while not reducing the remaining acreage of the large block of habitat encompassing the Wright's Field conservation area.

2) Biological Baseline Assessment. CDFW recommends that the DEIR provide a complete assessment and impact analysis of the flora and fauna within and adjacent to the Project site, with emphasis upon identifying endangered, threatened, sensitive, regionally and locally unique species, including any Covered Species under the County's approved MSCP, and sensitive habitats. Impact analysis will aid in determining any direct, indirect, and cumulative biological impacts, as well as specific mitigation or avoidance measures necessary to offset those impacts. CDFW recommends avoiding or minimizing impacts to any sensitive natural communities found on or adjacent to the Project. The DEIR should include the following information:

    a) Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region [CEQA Guidelines, § 15125(c)]. The DEIR should include measures to fully avoid and otherwise protect Sensitive Natural Communities from Project-related impacts. Project implementation may result in impacts to rare or endangered plants or plant communities that have been recorded adjacent to the Project vicinity. CDFW considers these communities as threatened habitats having both regional and local significance. Plant communities, alliances, and associations with a state-wide ranking of S1, S2, S3, and S4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by visiting https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities#sensitive%20natural%20communities;

    b) A complete floristic assessment within and adjacent to the Project area, with particular emphasis upon identifying endangered, threatened, sensitive, and locally unique species and sensitive habitats. This should include a thorough, recent, floristic-based assessment of special status plants and natural communities.

    c) A complete, recent, assessment of the biological resources associated with each habitat type onsite and within adjacent areas that could also be affected by the Project. CDFW's California Natural Diversity Database (CNDDB) should be reviewed to obtain current information on any previously reported sensitive species and habitat. CDFW recommends that CNDDB Field Survey Forms be completed and submitted to CNDDB to document survey results. Online forms can be obtained and submitted at http://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp;

    d) CNDDB indicates the occurrence of several special status species within the Project vicinity. The DEIR should have a complete, recent, assessment of rare, threatened, and endangered, and other sensitive species onsite and within the area of potential

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effect, including California Species of Special Concern and California Fully Protected Species (Fish & G. Code, §§ 3511, 4700, 5050 and 5515). Species to be addressed should include all those which meet the CEQA definition of endangered, rare or threatened species (CEQA Guidelines, § 15380). Seasonal variations in use of the Project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with CDFW and the USFWS; and,

e) A recent wildlife and rare plant survey. CDFW generally considers biological field assessments for wildlife to be valid for a one-year period, and assessments for rare plants may be considered valid for a period of up to three years as long as there was not a prevailing drought during the time of the botanical survey. Some aspects of the proposed Project may warrant periodic updated surveys for certain sensitive taxa, particularly if build out could occur over a protracted time frame, or in phases.

3) Management Plan. A site Resource Management Plan (RMP) for the 73-acre Preserve should be completed before any trails are opened to the public. A discussion is needed on the impacts of the designated trails that will be located throughout the Preserve and the cumulative impacts that will result from an increase in human activity. The RMP will need to address how these impacts will be monitored and managed in the Preserve.

4) Listed Species and California Species of Special Concern (SSC). CNDDB indicates that State rare (SR), CDFW Watch List (WL), CDFW fully protected (FP), SSC, or California Endangered Species Act (CESA)-listed (i.e., State Endangered (SE) or State Threatened (ST)) or federal Endangered Species Act (ESA)-listed (i.e., federal Endangered) (FE) or federal Threatened (FT) or a candidate for federal listing (FC)) are known in and adjacent to the Project area. Also indicated below are species which are covered by the South County (i.e., existing/approved) MSCP (SC) and species which are preliminarily proposed for coverage under the forthcoming East County MSCP (EC)).

   a) Sensitive plant species known in the Project area include (but are not limited to): Cuyamaca larkspur (*Delphinium hesperium* ssp. *cuyamacae*, SR); Dehesa beargrass (*Nolina interrata*, SE, SC); Dunn's mariposa lily (*Calochortus dunnii*, SR, SC); Encinitas baccharis (*Baccharis vanessae*, FT, SE, CS); Gander's ragwort (*Packera ganderi*, SR, EC); Mexican flannelbush (*Fremontodendron mexicanum*, FE, SR); and San Diego thorn-mint (*Acanthomintha ilicifolia*, FT, SE, SC).

   b) Sensitive amphibians and reptiles include (but are not limited to): arroyo toad (*Anaxyrus californicus,* FE, SSC, SC, EC); Blainville's horned lizard (*Phrynosoma blainvillii,* SSC, EC, SC); California glossy snake (*Arizona elegans occidentalis*, SSC); coast patch-nosed snake (*Salvadora hexalepis virgultea*, SSC, EC); coast range newt (*Taricha torosa*, SSC, EC); coastal whiptail (*Aspidoscelis tigris stejnegeri*, SSC); Coronado skink (*Plestiodon skiltonianus interparietalis*, WL, EC); orange-throated whiptail (*Aspidoscelis hyperythra beldingi*, WL, EC, SC); red-diamond rattlesnake (*Crotalus ruber*, SSC, EC); silvery legless lizard (*Anniella pulchra,* SSC, EC); southwestern pond turtle (*Actinemys pallida*, SSC, EC, SC); two-striped gartersnake (*Thamnophis hammondii*, SSC, EC); and western spadefoot (*Spea hammondii*, SSC, EC).

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c) Sensitive bird species include but are not limited to: Bell's sparrow (*Artemisiospiza belli*, WL); coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis,* SSC, EC, SC); coastal California gnatcatcher (*Polioptila californica,* FT, SSC, SC); Cooper's hawk (*Accipiter cooperii*, WL, SC); golden eagle (*Aquila chrysaetos*, WL, FP, EC, SC); least Bell's vireo (*Vireo bellii pusillus,* FE, SE, EC, SC); southern California rufous-crowned sparrow (*Aimophila ruficeps canescens,* WL, EC, SC); southwestern willow flycatcher (*Empidonax trailii extimus,* FE, SE, EC, SC); Swainson's hawk (*Buteo swainsoni*, ST, SC); tricolored blackbird (*Agelaius tricolor*, ST, EC, SC); and yellow-breasted chat (*Icteria virens*, SSC).

d) Sensitive invertebrates include (but are not limited to): Hermes copper butterfly (*Lycaena hermes*, FC, EC) and Quino checkerspot butterfly (FE, EC).

e) Sensitive mammals include but are not limited to: American badger (*Taxidea taxus*, SSC, SC); Dulzura pocket mouse (*Chaetodipus californicus femoralis,* SSC); northwestern San Diego pocket mouse (*Chaetodipus fallax*, SSC); San Diego desert woodrat (*Neotoma lepida intermedia*, SSC); San Diego black-tailed jackrabbit (*Lepus californicus bennettii,* SSC, EC); pallid bat (*Antrozous pallidus*, SSC, EC); pocketed free-tailed bat (*Nyctinomops femorosaccus*, SSC); big free-tailed bat (*Nyctinomops macrotis*, SSC); Townsend's big-eared bat (*Corynorhinus townsendii*, SSC, EC); western mastiff bat (*Eumops perotis californicus*, SSC); western red bat (*Lasiurus blossevillii*, SSC); and western yellow bat (*Lasiurus xanthinus*, SSC).

5) Quino Checkerspot Butterfly. The Project Description indicates the presence of Quino checkerspot butterfly onsite. This butterfly is federally endangered and a County Group 1 species. This species is found only in western Riverside County, southern San Diego County, and northern Baja California, Mexico (USFWS 2003). The DEIR should make provisions to avoid the occupied area: however, further discussion should be included in the final document to address indirect impacts to the species.

a) Direct impacts to Quino checkerspot butterfly could result from Project construction and activities (e.g., equipment staging, mobilization, and grading); ground disturbance; vegetation clearing; and trampling or crushing from construction equipment, vehicles, and foot traffic. Indirect impacts could result from fugitive construction dust coating foraging habitat, and other edge effects associated with landscaping and fencing.

b) CEQA provides protection for CESA- and ESA-listed species. Quino checkerspot butterfly is federally endangered and CDFW considers impacts to federally threatened species a significant direct and cumulative adverse effect without implementing appropriate avoidance and/or mitigation measures.

6) Vernal pools. The Project site is adjacent to the BCLT Wright's Field Preserve which has vernal pools present. The Project Site has species present that are associated with vernal pools such as western spadefoot and contains high levels of clay soil which are known to support vernal pools and sensitive species. Vernal pools are considered a rare resource, as it is estimated over 95% of vernal pools in California have been destroyed (USFWS 1998). CDFW considers the loss of these pool complexes to be regionally and biologically

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significant. To fully avoid impacts to vernal pools and depressions, the entire sub-watershed that supports the hydrology of the pool/depression should be avoided and conserved.

7) Biological Direct, Indirect, and Cumulative Impacts. Due to the proximity of the Project site to the Alpine Park Preserve and BCLT's Wright's Field Preserve, it is essential to understand how the open space and biological diversity within it may be impacted by Project activities. CDFW recommends providing a thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts. The following should be addressed in the DEIR:

    a) A discussion regarding indirect Project impacts on biological resources, including resources in nearby public lands, open space, adjacent natural habitats, riparian ecosystems, and any designated and/or proposed or existing reserve lands (e.g., preserve lands associated with an NCCP (NCCP, Fish & G. Code, § 2800 et. seq.). Impacts on, and maintenance of, wildlife corridor/movement areas, including access to undisturbed habitats in adjacent areas, should be fully evaluated in the DEIR;

    b) A discussion of potential adverse impacts from lighting, noise, temporary and permanent human activity, and exotic species and identification of any mitigation measures;

    c) A discussion on Project-related changes on drainage patterns downstream of the Project site; the volume, velocity, and frequency of existing and post-Project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-Project fate of runoff from the Project site. The Project includes plans for an underground parking structure; therefore, the discussion should also address the proximity of the extraction activities to the water table, whether dewatering would be necessary, and the potential impacts on the habitat (if any) supported by the groundwater. Mitigation measures proposed to alleviate such Project impacts should be included;

    d) An analysis of impacts from land use designations and zoning located nearby or adjacent to natural areas that may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the DEIR; and,

    e) A cumulative effects analysis, as described under CEQA Guidelines section 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

8) Sensitive Bird Species. The Project plans indicate that existing undeveloped land will be developed for the 25-acre park. A review CNDDB indicates occurrences of special status bird species the Project vicinity. Project activities occurring during the breeding season of nesting birds could result in the incidental loss of fertile eggs, or nestlings, or otherwise lead to nest abandonment in habitat directly adjacent to the Project boundary. The Project could also lead to the loss of foraging habitat for sensitive bird species.

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a) CDFW recommends that measures be taken to avoid Project impacts to nesting birds. Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (Code of Federal Regulations, Title 50, § 10.13). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the MBTA).

b) Project activities including but not limited to staging and disturbances to native and nonnative vegetation, structures, and substrates should occur outside of the avian breeding season which generally runs from February 15 through August 31 (as early as January 1 for some raptors) to avoid take of birds or their eggs. If avoidance of the avian breeding season is not feasible, CDFW recommends surveys by a qualified biologist with experience in conducting breeding bird surveys to detect protected native birds occurring in suitable nesting habitat that is to be disturbed and (as access to adjacent areas allows) any other such habitat within 300 feet of the disturbance area (within 500 feet for raptors). Project personnel, including all contractors working onsite, should be instructed on the sensitivity of the area. Reductions in the nest buffer distance may be appropriate depending on the avian species involved, ambient levels of human activity, screening vegetation, or possibly other factors.

9) Landscaping. The Project Description includes landscaped areas and a community garden on the Project site. Habitat loss and invasive plants are a leading cause of native biodiversity loss. CDFW recommends that the DEIR also stipulate that no invasive plant material shall be used. Furthermore, we recommend using native, locally appropriate plant species for landscaping on the Project site. A list of invasive/exotic plants that should be avoided as well as suggestions for suitable landscape plants can be found at https://www.cal-ipc.org/solutions/prevention/landscaping/.

General Comments

1) Project Description and Alternatives. To enable CDFW to adequately review and comment on the Project from the standpoint of the protection of plants, fish, and wildlife, we recommend the following information be included in the DEIR:

a) A complete discussion of the purpose and need for, and description of, the Project, including all staging areas and access routes to the construction and staging areas; and,

b) A range of feasible alternatives to Project component location and design features to ensure that alternatives to the proposed Project are fully considered and evaluated. The alternatives should avoid or otherwise minimize direct and indirect impacts to sensitive biological resources and wildlife movement areas.

2) Compensatory Mitigation. The DEIR should include mitigation measures for adverse Project-related impacts to sensitive plants, animals, and habitats. Mitigation measures should emphasize avoidance and reduction of Project impacts. For unavoidable impacts, onsite habitat restoration or enhancement should be discussed in detail. If onsite mitigation is not feasible or would not be biologically viable and therefore would not adequately mitigate the loss of biological functions and values, offsite mitigation through habitat creation and/or

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acquisition and preservation in perpetuity should be addressed. Areas proposed as mitigation lands should be protected in perpetuity with a conservation easement, financial assurance, and dedicated to a qualified entity for long-term management and monitoring. Under Government Code section 65967, the Lead Agency must exercise due diligence in reviewing the qualifications of a governmental entity, special district, or non-profit organization to effectively manage and steward land, water, or natural resources on mitigation lands that it approves.

3) Long-term Management of Mitigation Lands. For proposed preservation and/or restoration, the DEIR should include measures to protect the targeted habitat values from direct and indirect negative impacts in perpetuity. The objective should be to offset the Project-induced qualitative and quantitative losses of wildlife habitat values. Issues that should be addressed include (but are not limited to) restrictions on access, proposed land dedications, monitoring and management programs, control of illegal dumping, water pollution, and increased human intrusion. An appropriate non-wasting endowment should be set aside to provide for long-term management of mitigation lands.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a data base which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist the County in identifying and mitigating Project impacts on biological resources.

Questions regarding this letter or further coordination should be directed to Emily Gray, Environmental Scientist, at Emily.Gray@wildlife.ca.gov.

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Sincerely,

DocuSigned by:
David Mayer
D700B4520375406...

David Mayer
Environmental Program Manager I
South Coast Region

ec: CDFW
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April 6, 2021

County of San Diego
Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, CA 92123
By email to CountyParksCEQA@sdcounty.ca.gov and lorrie.bradley@sdcounty.ca.gov.

RE: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley,

Thank you for the opportunity to provide information for the Notice of Preparation ("NOP") of the Environmental Impact Report ("EIR") on the Alpine County Park Project ("Project"). The San Diego Chapter of the California Native Plant Society, Environmental Center of San Diego, and Preserve Wild Santee all work to protect California's natural heritage and preserve it for future generations. We promote sound science as the backbone of effective natural areas protection. We work closely with decision-makers, scientists, and local planners to advocate for well informed and environmentally friendly policies, regulations, and land management practices.

There are also two CEQA topics, energy and tribal cultural issues, must be addressed, although they were not identified in the NOP. First, energy efficiency cannot be separated from climate change in the proposed design, so both need to be analyzed for their different impacts. Second, since the Wright's Field area has both recent historical and tribal use, impacts to both cultural and tribal cultural resources must be analyzed.

We have specific comments on biological issues, climate change, and wildfire that need to be addressed in the NOP. These are detailed below. Finally, we strongly urge County Parks to analyze a smaller, less impactful, sustainable park design as an alternative.

Biology
First, we urge the Project DEIR to use reasonably current surveys of the site, surveys conducted during a rainy year in appropriate seasons to find sensitive species. Second, we urge the County

to include impacts to Wright's Field in the DEIR. The issue is the impacts to native plants, animals, vegetation communities, and wetlands as a result of the proposed Project increasing biking, hiking, and horseback riding on both Wright's Field and the project site. Since the project is directly connected to the Wright's Field trail system and will have 260-285 parking spaces, it is obvious that construction of the proposed project will increase the level of human recreation on Wright's Field Preserve. Concerns are ever-increasing about recreational impacts to sensitive biological resources on the conserved lands within San Diego County, including in many reserves, such as Carlsbad Highlands Ecological Reserve, Sycamore Canyon Preserve-Gooden Ranch (particularly with unauthorized use of a highway wildlife underpass), Del Mar Mesa Ecological Reserve, and others. There is a growing body of research about recreational impacts to animals and plants. Research on such impacts is termed recreation ecology. This is analogous to *conservation biology*, which also should be a foundational science for work on this project.

We have included a copy of a recent California Fish and Wildlife Journal issue dedicated to recreation ecology to help you get up to speed. Please include it in the written record, and make sure that the biologists and planners working on the biology section of the DEIR read it. It will help their efforts.

Please analyze recreation impacts in the project EIR, and either avoid significant adverse impacts, or at worst, mitigate them below the level of significance. Any proposed mitigation should reflect that knowing how to mitigate for recreation-related indirect impacts to biological resources requires knowing exactly what those impacts are and when they occur. At a minimum, appropriate impact analyses will require up-to-date surveys of both the proposed project site and Wright's Field, scientifically sound modeling of the present and proposed future trails and recreation, and data on how the presence of humans both with and without their dogs, horses, and other animals affects plants and animals; some such data already exists. Adverse biological direct and indirect impacts can arise from most recreational activities, including: hikers, bikers, and horses and their riders simply using a trail; people allowing dogs to chase animals; and people and/or dogs trampling in vernal pools or on sensitive plants and small animals. Indirect recreation-related adverse impacts include the introduction of weed seeds by mountain bikers and equestrians, and detrimental changes to wildlife involving behavior (e.g., vigilance, foraging, hunting), reproduction, growth, immune system function, levels of stress hormones, the survival of individual animals, and ultimately the persistence of wildlife populations and communities.

Second, the Alpine Community Plan update, which was prepared by the County, states, on page 2.12-3: "The Alpine CPA also includes one preserve, Wright's Field. The purpose of preserves is to maintain community character and protect biological, cultural, and historical resources, while making these resources available for *limited* public recreational opportunities. Some preserves may also provide interpretive and educational amenities, *although public access may be limited according to the sensitivity of the resources*…." (emphases added). Please analyze, in detail, how the proposed project and all alternatives comply with this part of the Community Plan Update.

Third, there are issues with sensitive and listed species. Please insure that the video that substituted for a Scoping Meeting (e.g. https://www.youtube.com/watch?v=xyKiPTawDsQ) is

included in the official record for the project. Since there is no paper trail from a meeting, it is the only evidence that any attempt was made to satisfy the CEQA requirement for a Scoping Meeting. In the video at 6:28, reference was made that the Project intends to "avoid impacts" to Engelmann oaks (*Quercus engelmannii*, CRPR List 4) and to "minimize impacts" to the federally endangered Quino checkerspot butterfly (*Euphydryas editha quino*).

While protection of the oaks is appreciated, there is no legal requirement for it. There is definitely a legal requirement to protect the Quino checkerspot, to the point where the County is currently involved in several lawsuits over plans that harm it. Please redesign the proposed project to *AVOID IMPACTS* to the Quino Checkerspot, rather than simply minimize them. Harming an endangered species in the name of recreation would be a terrible black eye for County Parks, and for the County as a whole.

Climate change impacts

In the climate change section, please include not just construction and traffic impacts, but impacts from park site maintenance, upgrades, and reconstruction. These are a serious issue, because the county plans to go carbon neutral by 2035, while the state of California plans to go carbon neutral by 2045. A park that cannot be maintained due to emissions constraints is not worth building. As part of the design process, estimate the lifespan of each and all of the amenities installed, along with the maintenance requirements and their expected lifespan. Then create a timeline showing carbon annual carbon emissions from routine maintenance and when each amenity will require major repairs or replacement. To avoid unmitigated impacts, the project needs to be carbon neutral by 2035 and to stay that way for the indefinite future thereafter. Avoiding emissions is the simplest way to avoid and mitigate impacts, since there are few ways to mitigate emissions onsite or offsite in the County.

Second, please do not put solar panels and trees close together, as they shade each other. Also, please only put solar panels where they get unobstructed access to the south-facing and/or west-facing sky. These compass directions are necessary for solar panels to work in San Diego. East-facing solar panels are unproductive due to morning cloud cover, and north-facing panels are unproductive in all conditions. The reason for this comment is that the project design (video, at 3:54) specifies "photovoltaic carports." Looking at the attached figure, the carports will line a north-south running road that gradually curves to the southwest, and is bordered by trees. This is a distinctly suboptimal configuration, as either the trees will shade the panels, or the panels will shade the trees.

Please rethink the addition of solar carports. If they are installed, provide a good estimate of how much electricity they will produce at different times of the year, and how much shading is expected from the panels shading each other, trees shading the panels, and panels shading the trees. Remember that the panels provide electricity, while the trees provide carbon sequestration, but both cannot use the same patch of sunlight.

If the County desires to have a solar-powered park, please provide a project alternative that starts from this premise and designs the park to accommodate both solar powered facilities and carbon sequestration in planted trees. Only then design the rest of the facilities around these constraints.

Slapping a few solar panels on a project not designed for this power source is minimally useful. Around 20 standard-sized solar panels with good southern exposure and no shading from trees are necessary to charge one electric car once per week.[1] How many such panels could be installed on the proposed project?

Wildfire

Wildfire impacts have proved a contentious area between the County and the environmental community, with former Supervisor Jacob at one point asking what it would take for environmental groups to stop suing the county (and winning). We therefore urge the County to perform an analysis and design avoidance or mitigation that meet CEQA requirements.

With regard to the proposed project, the concerns we identify are as follows. First, we are concerned about the possibilities for recreational fires on the project site sparking wildfires in the project site, Wright's Field, and homes and businesses downwind. Second, there has been talk that the proposed project would be an evacuation site, due to the number of parking spaces. Since South Grade Road is considered one of the most hazardous roads in Alpine, concentrating traffic in that area during an emergency seems like a recipe for trouble. Please *carefully* analyze evacuation both to and from the park site under all project alternatives. This is not about checking off boxes, it is about making sure people can evacuate safely during a disaster.

Project Alternatives

Please include a project alternative with a smaller, nature-focused, minimally developed park that has no impacts to the biological, cultural, and other resources of the project site, Wright's Field Ecological Preserve, and neighboring properties. Given voiced community concerns about the lack of maintenance on existing Alpine parks, please focus on making park upkeep and maintenance financially sustainable for the community and County. Also make its construction, maintenance, and rebuilding carbon neutral and environmentally sustainable, to meet federal, state, and county goals. Please also analyze each and every project alternative equally, as unequal analysis has been contentious on past county projects.

Thank you for taking this input. Please keep us informed of all developments with this project and associated documents and meetings, at conservation@cnpssd.org.

Sincerely,

Frank Landis, PhD
Conservation Chair
California Native Plant Society, San Diego Chapter

Van K. Collinsworth
Geographer / Director, Preserve Wild Santee

Pamela Heatherington, Director
Environmental Center of San Diego

[1] This from personal experience.

California Fish and Wildlife
JOURNAL

SPECIAL ISSUE

Effects of Non-consumptive Recreation on Wildlife in California



Journal for the Conservation and Management of California's Species and Ecosystems

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California Fish and Wildlife, Recreation Special Issue; 6-10; 2020

Introduction

CAN OUR OUTDOOR ENTHUSIASM AND NATURE COEXIST?

RON UNGER, *Environmental Program Manager, Landscape Conservation Planning Program, Habitat Conservation Planning Branch, California Department of Fish and Wildlife*

[Note: As this special edition journal is published, our State, the nation, and the whole world are gripped by the corona virus pandemic. To slow its spread and not overwhelm limited healthcare resources, voluntary and mandatory directives for staying home, social distancing, and closing parks, reserves, and other public facilities have been put in place on a scale not seen for a hundred years, the time of the 1918 influenza (flu) epidemic.

Stories are emerging of more secretive wildlife seen in some park and urban areas normally filled with people, like the reports of bobcats roaming around empty Yosemite facilities, or an adult black bear roaming the nearly empty downtown Solvang. Hopefully, the pandemic and its horrible devastation will be over very soon, and we may again visit and appreciate our parks and wilderness areas. Hopefully, too, we may gain more information on wildlife's response to fewer visitors that helps us improve our management of parks and reserves in a way that protects wildlife and their habitat while also providing for great recreation experiences.]

"Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul alike" (The Yosemite, 1912). John Muir wrote so eloquently of the importance of taking time to be in, and play in, Nature to heal and nourish our spirit and help us to balance the challenges of our everyday lives. Now more than ever, people find a need to balance their work and domestic lives with the wonders, serenity, and invigorating challenges inherent in playing in Nature. In a world increasingly dominated by computers, cyberspace, and cities, people find a need to go and enjoy the Great Outdoors.

But what is the capacity of Nature to absorb the onslaught of millions of us hiking, riding, flying, boating, and otherwise tromping around the forests, fields, mountains, valleys, streams, and rivers on the other 40,000 or more species that also live in and depend on California? An increasing body of evidence is emerging that indicates non-consumptive recreational activities like hiking and biking, which don't involve harvesting of resources, can have harmful effects on species, their habitat, and efforts to protect them. As our population continues to grow and new and popular recreation technologies develop, California's natural areas are experiencing increased and changing recreation demands, such as increased numbers of hikers, nighttime group trail biking with lights, and electronic mountain bikes in wilderness areas.

Many federal, state, and local agencies' missions include non-consumptive, outdoor recreation, since it is often believed to be consistent with wildlife conservation. It is also widely believed that those who know and observe Nature are more likely to appreciate and protect her resources. Recently, however, several sites acquired primarily for conservation

have experienced extreme recreation pressures such as the Disney-like crowds coming out to see "superblooms" of native flowers of the desert in the spring or mountain biking occurring in areas where it is illegal along with the creation of several miles of unauthorized trails. So, how can we continue to provide for and manage appropriate, legal recreation opportunities while also protecting California's amazing and vast diversity of plants, fish, and other wildlife species and their habitats? How and where can we acquire separate lands for recreation access and for protecting habitat instead of frequently demanding too much recreation access on lands set aside for conservation of species and habitat? And, how can we facilitate various consumptive and non-consumptive recreation groups (e.g., hikers, mountain bikers, equestrians, off-highway vehicle users, hunters, anglers) and conservation groups (e.g., environmental activists, land trusts, resource agencies) to work together to advocate for acquiring and managing separate recreation and conservation lands instead of increasingly coming into conflict with one another over the use of the same lands for both purposes?

This special edition journal seeks to tackle this and related questions. In the introductory essay, "Non-consumptive Recreation & Wildlife Conservation: Coexistence through Collaboration," Dr. Ashley D'Antonio points out the unique need and opportunity California has for addressing recreation use as a social-ecological system (SES) based on its high biodiversity and quickly increasing recreation use of protected lands. Mitrovich, Larson, Barrows, Beck, and Unger, in "Balancing Conservation and Recreation," point to a need for recreation and conservation stakeholders to work together to ensure that sufficient areas are acquired for both uses and to help plan and manage conservation lands better to reduce adverse effects on wildlife and natural resources. They summarize some of the varied research going on in the field, on wildlife behavior and physiology, habitat degradation and fragmentation, reproduction and survival, community composition and richness, and other topics. Indirect effects like the shifts in day and night activity patterns between predators and prey lead to questions on what effects that has on wildlife interactions and possible changes that may lead to in a whole ecosystem. Two case studies cover visitor perceptions and values, and the importance of having groups with different values come together and work through their differences to build trust and facilitate better management decisions and stakeholder support.

The research paper, "Increased hiking and mountain biking are associated with declines in urban mammal activity," by Larson, Reed, and Crooks provides findings on how some wildlife can respond rapidly to changes in the levels of human disturbance, which may help planners design targeted trail closures to reduce recreation impacts in important areas. Townsend, Hammerich, and Halbur conducted somewhat similar research to that of Larson, Reed, and Crooks and present their findings in "Wildlife occupancy and trail use before and after a park opens to the public." Their research provides good insights into how differently various wildlife species respond to trail use by people, including strong differences in how soon and how much species may habituate to people's presence. Baas, Dupler, Smith, and Carnes make the case in "An assessment of non-consumptive recreation effects on wildlife: current and future research, management implications, and next steps" for doing more research to help wildlife and park managers more effectively manage and respond to non-consumptive recreation impacts on wildlife species and their habitats.

Elizabeth Lucas points out deficiencies and a need to improve how recreation is sited, monitored, managed, and enforced in protected areas in her paper, "Recreation-related disturbance to wildlife in California – better planning for and management of recreation are vital to conserve wildlife in protected areas where recreation occurs." She also provides a review

of several research papers in her paper, "A review of trail-related fragmentation, unauthorized trails, and other aspects of recreation ecology in protected areas." Elizabeth points out the need for sufficient funding, science-based approaches to managing protected areas, and educating the public on recreation effects on wildlife, to achieve real protection of species and to retain the benefits of the protected lands. Elizabeth suggests several funding options including a compelling argument for establishing a recreation equipment excise fee or tax like those paid for over 80 years now by hunters and anglers to benefit habitat conservation. With so much use of outdoor areas now by "non-consumptive" recreation uses, and with declining popularity of hunting activities in the population at large, is it time to institute such a change for recreational users to pay their share of conserving and managing habitat?

Together, the articles in this special journal edition cover a broad array of research on recreation effects on wildlife. They provide interesting perspectives and offer a variety of solutions. Learning how to best manage non-consumptive recreation to provide great outdoor experiences while minimizing harmful effects on wildlife will continue to evolve as we learn more from research and experience. We hope that you find this special edition journal useful in your own exploration of this important and emerging field.

"Keep close to Nature's heart… and break clear away, once in a while, and climb a mountain or spend a week in the woods. Wash your spirit clean." –*John Muir*

Introduction--continued

NON-CONSUMPTIVE RECREATION AND WILDLIFE CONSERVATION: COEXISTENCE THROUGH COLLABORATION

ASHLEY D'ANTONIO, PHD, *Assistant Professor in Nature-Based Recreation Management, Gene D. Knudson Forestry Chair, Department of Forest Ecosystems and Society, Oregon State University*

The most basic principle in the field of recreation ecology—an interdisciplinary field that studies the ecological impacts of recreational activities and the management of these impacts—is that if outdoor recreation is allowed in an area, impacts to that ecosystem are inevitable. It is also established that outdoor recreation has a myriad of benefits to society that range from economic growth, improved human health and well-being, community building, and increases in an individual's connection to nature. Moreover, outdoor recreation is one of the primary mechanisms by which humans interact with the natural world in contemporary society. As a result, many county, state, and federal park and protected area (PPA) managers around the United States (U.S.) are faced with mandates or missions that require conserving natural resources while also providing quality outdoor recreation experiences. Key challenges facing researchers, conservation practitioners, and PPA managers as they try to balance conservation goals with recreation access are: understanding the mechanism and the level and extent of these impacts; identifying what level of negative impact, if any, is acceptable; and deciding how to mitigate or manage these impacts.

Within recreation ecology, the impacts from recreation to ecosystem components such as soil and vegetation are relatively well studied. The negative impacts of recreation to environmental factors such as water, air quality, soundscapes, and wildlife are less well understood. Studying the relationships between non-consumptive recreation use and impacts to wildlife can be complex. Part of this complexity is because impacts to wildlife can be direct (e.g., harassment or feeding) and/or indirect (i.e., habitat modification) and at times can be hard to measure or observe (e.g., changes in stress hormone levels in response to recreation presence) as compared to soil or vegetation impacts. Additionally, impacts from non-consumptive recreation use can be interacting with, or compounded by, other ecosystem pressures. These added pressures include, but are not limited to, habitat loss due to development or changes in land use, pressures from consumptive recreation (hunting or fishing), and/or climate change. Moreover, impacts at the wildlife population or community level often require long-term studies, which are somewhat rare in recreation ecology but admittedly more common in the wildlife sciences.

Despite these challenges, there is a recent resurgence of interest in studying the impacts of non-consumptive recreation use on wildlife species. Meanwhile, there is a recognition that studies focusing only on the social or human aspects of a PPA system are insufficient to address current recreation and conservation issues, especially those related to wildlife. Many recreation ecologists, conservation scientists, and managers have begun to view outdoor recreation in PPAs as a complex social-ecological system (SES). As such, we must enhance our understanding of the interactions and intersections between both the ecological and social systems that make up our PPAs. Addressing wildlife conservation and recreation

access in PPAs requires SES-focused thinking and collaborative problem solving.

The rich social and ecological systems comprising California make this state an excellent place to begin to address recreation use through an SES framework. California is one of the most biodiverse states in the U.S. and while 47% of the state is currently protected, 97% of these protected lands are opened to human access. Non-consumptive recreation use in PPA has increased rapidly in recent years across the U.S. but especially in Western states. California State Parks saw a 10% increase in total visitation numbers from the 2015/16 to 2016/17 fiscal year and many California national parks have seen exponential growth in visitation in recent years. As the U.S population becomes increasingly suburban and urban, PPAs that provide refugia and critical habitat for wildlife face increasing pressure from land use change and suburban expansion. Within California, this trend is evident as the state's population continues to grow while land use change, extreme droughts, and development increases pressure on California's PPAs.

Currently, PPAs and open space are limited, and wildlife species and their habitat face many ecological pressures. We are on the cusp of a resurgence and upswell of research exploring non-consumptive recreation impacts on wildlife. However, to meet conservation objectives, additional research is still needed to best inform recreation management in PPAs. Conserving and protecting wildlife species while providing quality recreation experiences to society requires interdisciplinary and transdisciplinary teams of researchers, managers, practitioners, stakeholders, and the public working together towards shared goals and objectives. Because of the social and ecological complexities and uncertainties around recreation impacts to wildlife, no individual field of science or management entity will be able to address this issue on its own. As such, this special issue is timely and important as it adds to the body of literature aimed at understanding non-consumptive recreation impacts to wildlife. Additionally, this special issue serves as a starting point for cooperatively exploring the challenge of protecting wildlife while balancing non-consumptive recreation use. If we are to meet conservation goals related to wildlife and wildlife habitat, it may not be appropriate to allow recreation use in all PPAs and at all times. However, collaborative dialogues (informed by the SES framework) around wildlife conservation are essential to guide decisions related to where, when, and how non-consumptive recreation use should be permitted in our PPAs.

California Fish and Wildlife, Recreation Special Issue; 11-28; 2020

Balancing conservation and recreation

MILAN MITROVICH[1]*, COURTNEY L. LARSON[2], KATIE BARROWS[3], MICHAEL BECK[4], AND RON UNGER[5]

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[4] *Endangered Habitats League, 8424 Santa Monica Boulevard, Suite A 592, Los Angeles, CA 90069, USA*

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**Corresponding Author: milan.mitrovich@icf.com*

Key words: California, equestrian, Habitat Conservation Plans, hiking, horseback riding, human dimensions, Natural Community Conservation Plans, mountain biking, trails, wildlife

---

As California's population has grown to nearly 40 million people, and as the State's beautiful natural diversity draws tourists and explorers from around the world, outdoor recreation has also grown (California Department of Parks and Recreation 2013, 2017; Monz et al. 2019). New equipment and technology enable new activities, such as night-time mountain biking, while social media brings increasing numbers of people to areas seldom visited by people only ten or twenty years ago. With increased time and more sedentary work environments, our society is understandably demanding greater access to more land for outdoor recreation. However, since several species-protection challenges already exist throughout the State due to development, fragmentation, invasive species, altered fire regimes, and climate change, consideration of opening up additional wildlands for recreation presents new challenges to conservation.

Outdoor engagement with natural areas is recognized as a necessary part of people's well-being, yet recreationists are generally attracted to the same high-value open spaces and natural areas that harbor diverse plant and animal communities (Mancini et al. 2018). Accordingly, trails, access points, and associated infrastructure need to be planned and

managed appropriately to complement, rather than diminish, conservation values of lands dedicated to the protection of species and their habitats. In the absence of good planning, recreation-conservation conflicts are increasing, polarizing these two stakeholder groups and eroding their natural affinity and alliance. When conservation and recreation interest groups work together and conservation and recreation lands are planned and managed based on scientific research, a new opportunity emerges for a coordinated approach to protecting California's wildlife while also meeting the demand for high-quality recreational opportunities for diverse user groups.

Recreation and conservation interests would benefit from regular dialogue and collaboration with each other and with federal, state, and local land use authorities regarding regional and local land use planning, acquisitions, and management. A shared, basic understanding of applicable conservation objectives and regulations would provide context and perspective for recreational users and serve to help the two groups work together to ensure each of their interests are served rather than their respective needs being compromised. Without a close alliance among recreation and conservation interests, California risks having insufficient land areas set aside for the thousands of species that depend on California's natural areas, inadequate areas for recreation, and increasing conflicts between conservation and recreation needs. The necessary conversations, research, and determination to collaborate should be embraced and acted upon as soon as possible to help address these needs, reduce the potential for polarization among these stakeholders, and help ensure good land use planning and management decisions are made as development proceeds.

In this essay, we provide an overview of the mechanisms available to implement conservation in California and introduce many of the issues attributed to outdoor recreation when managing for wildlife and natural resources on conservation lands and other public open spaces. We then describe two case studies from our work in southern California that highlight the perceptions and values of outdoor recreationists when visiting conserved lands. The case studies also demonstrate what a successful balance between conservation and recreation uses can look like when moving from conflict to collaboration. We end with a discussion of what is required to achieve that balance and ways to minimize the impacts of outdoor recreation on wildlife and other natural resources.

CONSERVATION CONTEXT

As California's population grew from a few hundred thousand to nearly 40 million people in less than two hundred years, numerous species' populations have declined. Some, like the iconic grizzly bear (*Ursus arctos horribilis*), are now extinct in the state. Over 450 plant and animal species in California are now listed by the federal or state government as threatened or endangered (CDFW 2019). The cost of species recovery can be enormous, such as the tens of millions of dollars spent to save the majestic California condor (*Gymnogyps californianus*; Walters et al. 2010). To prevent further species declines, a number of laws and regulations exist to avoid, minimize, or compensate for impacts of human activities on species. In California, these include the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), among others. Approximately half of California is federally or state-owned lands with a variety of uses, from national forests and state parks to multi-use areas and reserves. In addition to these areas, an appreciable

amount of land is conserved in California as mitigation under ESA, CESA, CEQA, and other laws and regulations.

Successful conservation leads to the protection of species and habitat and the preservation of natural landscapes. Principal types of conservation lands in California include reserves acquired and managed as part of Habitat Conservation Plans (HCPs) and Natural Community Conservation Plans (NCCPs), national parks and monuments, state ecological reserves and wildlife areas, state parks, lands owned by private entities (e.g., land trusts), lands with conservation easements, and mitigation lands. The relative importance of conservation and recreation values to the management goals of these lands vary. For example, state and national parks generally emphasize recreational uses more than mitigation lands and ecological reserves. Sixteen HCP/NCCPs have been approved in California covering part or all of seven counties. Through the new Regional Conservation Investment Strategy (RCIS) Program established in 2017, one RCIS has been approved and an additional eight Regional Conservation Investment Strategies (RCISs) are currently in development or have been submitted for review and approval by the Department of Fish and Wildlife (for more information about RCIS and NCCP programs, see Appendix I). The nine RCISs together will cover part or all of 11 counties. There are also over 130 conservation and mitigation banks in the state, privately held conservation lands, and hundreds of mitigation sites. In total, tens of thousands of acres of habitat have been conserved in California through proactive investments and mitigation. Over one and one-half million acres will be conserved in California under approved HCP/NCCPs, benefiting hundreds of species listed as endangered or threatened under federal and state species protection laws.

OUTDOOR RECREATION

Millions of Californians and visitors recreate outdoors on natural lands within the state each year (Outdoor Industry Association 2019). Examples of outdoor recreation activities include hiking, trail running, mountain biking, horseback riding, backpacking, camping, and motorized activities. The positive effects of outdoor recreation are numerous. Stewardship values are enhanced. Appreciation of nature is magnified as people are exposed to the inherent beauty, complexity, and serenity of natural systems. The next generation of land stewards and conservationists are born out of the experience of being introduced to wildlands when young. Equally important, the mental health benefits of exposure to the outdoors and participation in nature are now well-recognized (Louv 2005; Thomsen et al. 2018). For a society that is increasingly becoming more urban and digital, the restorative properties of nature and the increased social well-being of individuals and communities is ever more important.

Despite these benefits, the negative effects of recreation on wildlife can be profoundly damaging to species and their habitats and must be considered when planning for conservation areas (Hammitt et al. 2015). Trails lead to habitat degradation and fragmentation, which increase when visitors go off-trail and informal trails proliferate. Harassment of wildlife, though often unintended, occurs with increased visitation to an area. Less obvious impacts to wildlife, not easily measured, have been tied to noise, light pollution, trash, and other factors associated with recreation activities.

In general, it can be difficult to accept that recreation activities, especially quiet, non-motorized activities like hiking and mountain biking, can have harmful effects on wildlife. Many types of recreation cause little physical habitat change. Perhaps as a result, recreation

was widely assumed to be a "benign use" that is compatible with conservation goals (Knight and Gutzwiller 1995) and is permitted in the vast majority of protected areas worldwide (Eagles et al. 2002; IUCN and UNEP 2014). Many HCP/NCCPs include a general provision that allows for "low-impact nature trails" without strongly defining what that means and what types and levels of use would be acceptable, given the species that are to be protected. The viewpoint that recreation is a benign use may be changing, however. In recent years, researchers have found evidence that a variety of recreation activities and intensities can have detrimental impacts on wildlife (Geffory et al. 2015; Larson et al. 2016; Samia et al. 2017).

RECREATION EFFECTS ON WILDLIFE

Behavior, activity budgets, and physiology

Behavioral reactions, such as flight, flushing, or vigilance are some of the most commonly-observed and studied wildlife responses to recreationists (Larson et al. 2016). Changes in activity budgets have also been observed, with animals typically spending less time in activities such as foraging and caring for young and more time moving or being vigilant when recreationists are present (Schummer and Eddleman 2003; Arlettaz et al. 2015). Physiological responses, such as increases in stress hormones (Arlettaz et al. 2007) or decreased body mass (McGrann et al. 2006), are less obvious to observe, and can occur even when a corresponding behavioral response does not. It is critical not to assume that an animal is tolerant of recreation simply because it does not exhibit a visible response.

Habitat degradation and fragmentation

Recreation can degrade or fragment habitat, resulting in habitat that is otherwise of high quality being used less frequently or not at all. This is particularly concerning in highly fragmented or developed landscapes where remaining habitat is scarce and there is limited opportunity for wildlife to move to alternative areas. Researchers have observed avoidance of areas used by recreationists in species as diverse as grizzly bears (Coleman et al. 2013), wolverines (*Gulo gulo*; Heinemeyer et al. 2019), caribou (*Rangifer tarandus*; Lesmerises et al. 2018), capercaillie (*Tetrao urogallus*; Coppes et al. 2017), and dolphins (*Tursiops* spp.; Lusseau 2005).

Reproduction, survival, and abundance

Assessing recreation's impacts on wildlife population abundance or vital rates can be difficult and time-consuming, and is therefore largely unknown. In one of the few studies of population trends in relation to recreation, Garber and Burger's long-term study (1995) observed dramatic declines in North American wood turtle populations after the area was opened to recreation. Reproductive success is one of the better-studied population vital rates; negative effects of recreation on reproductive success have been observed in several species including elk (*Cervus canadensis*; Shively et al. 2005), penguins (Giese 1996; Lynch et al. 2010), and plovers (*Charadrius* spp.; Lafferty et al. 2006; Yasué and Dearden 2006). However, other studies have found that habituation can moderate impacts of recreation on reproductive success (Baudains and Lloyd 2007).

Community composition and richness

Within an ecological community, species respond to recreation differently. This can lead to changes in community composition if more sensitive species avoid areas with recreation or decline in abundance while the habitat use or abundance of tolerant species remains constant or even increases due to reduced competition. When the sensitive species are native and the more tolerant species are non-native, this can lead to dramatic declines of native species as compared to their non-native counterparts (Reed and Merenlender 2008). Overall species richness can also decline if sensitive species disappear from local communities (Bötsch et al. 2018).

Indirect effects

Recreation can also cause other changes that indirectly affect wildlife, many of which are not well understood. Shifts in diel activity patterns could change the way that species interact with each other or with their environment, potentially leading to increased interspecific competition during nighttime hours or increased overlap between predators and their prey (Gaynor et al. 2018). Recreation can facilitate the spread of non-native species in freshwater, marine, and terrestrial environments (Anderson et al. 2015), which can have dramatic effects on native wildlife. Recreation activities also often involve infrastructure (e.g., parking lots, maintenance buildings, roads, ski lifts), which can lead to further habitat loss and fragmentation (Nellemann et al. 2010).

Examples of recreation impacts from southern California

Examples from southern California, where much of our work occurs, highlight some of the many ways recreation can impact natural resources. Results of ten years of camera-trap studies on conservation lands in Orange County indicate mule deer (*Odocoileus hemionus*) and coyotes (*Canis latrans*) are shifting the timing of activity due to the presence of humans on trails creating novel predator-prey conflicts for wildlife (Patten et al. 2017). Observed shifts toward more nocturnal activity by both species leads to greater temporal overlap in activity periods between mule deer and their principal predator, the mountain lion (*Puma concolor;* Figure 1). Greater overlap between coyotes and gray foxes (*Urocyon cinereoargenteus*) has also been observed, leading to predicted changes in predator-prey dynamics.

Bobcat (*Lynx rufus*) movement modeling using more than ten years of telemetry data in the 7,284-ha South Coast Wilderness of coastal Orange County highlights the importance of maintaining regional connectivity among isolated parcels and continued exclusion of human presence at culverts and other critical linkage points along the coast (Boydston and Tracey 2018). Within landscapes containing natural areas constrained by development, protected habitat and other high-value open space is a premium for wildlife. Providing for safe, unobstructed passage for wildlife among isolated parcels, especially at culverts and other pinch-points, is essential to enable access to high-value habitat within these otherwise constrained landscapes.

In heavily used open space areas, some wildlife appear to develop a tolerance for regular human activity on trails over time. However, patterns of wildlife habitat use can be disrupted by disturbances occurring outside this regular activity, such as large recreation

events, off-trail visitor behavior, or the proliferation of new social trails, even in areas that traditionally see high levels of visitor use. At a local scale, observations of breeding bird behavior before, during, and after a mountain bike race at a wilderness park in Orange County highlights elements of both sides of this phenomenon (Hamilton et al. 2015). In this example, breeding bird behavior continued uninterrupted in areas experiencing similar amounts of activity along the racecourse during the event as to what was experienced prior. As people gathered in numbers on and off the trail at the designated start/end staging area for the event, evidence suggests behavior was disrupted as the sheer volume and continual

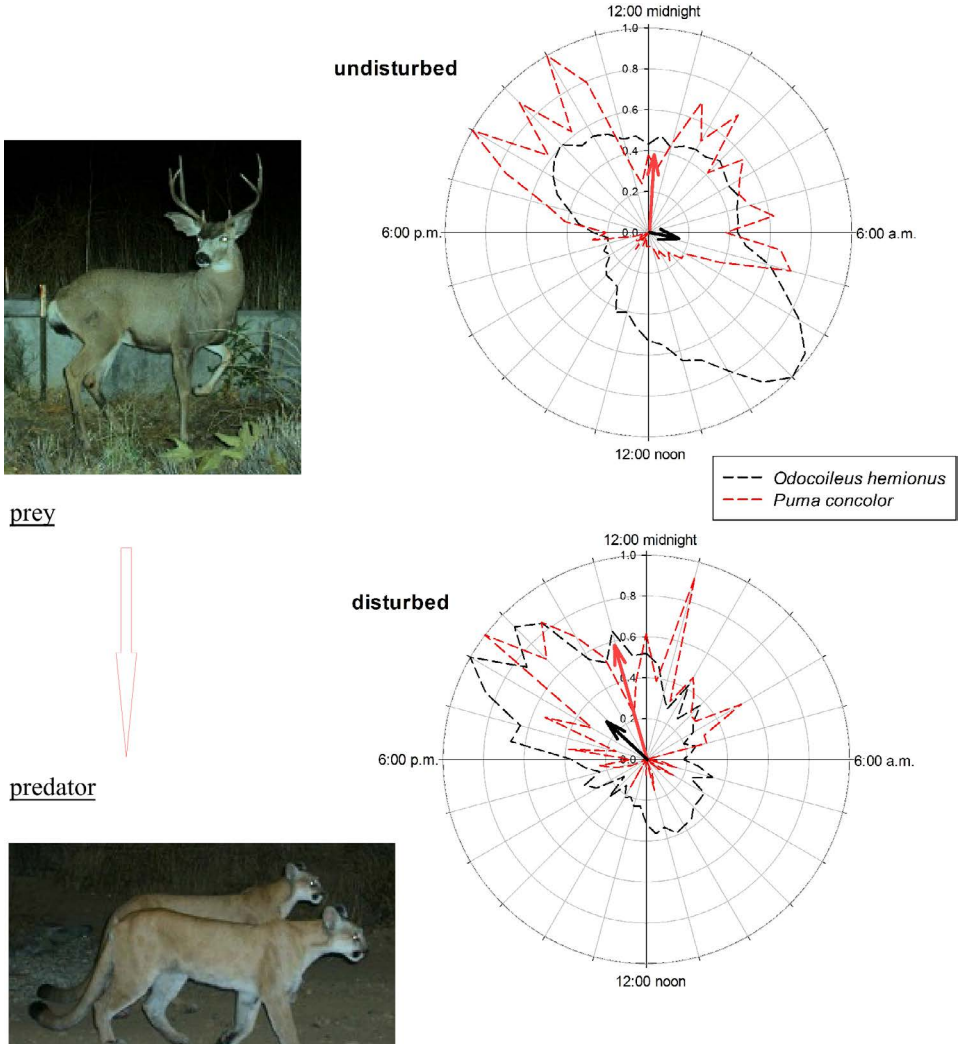

Figure 1. Diel activity of the mule deer and mountain lion with or without human disturbance. Arrows indicate time (direction) and proportional magnitude (length) of mean activity, and the "net" displays the spread of activity on a 24-h clock, binned at 30-minute intervals. Note the prey's (the deer) nocturnal shift when disturbance was present. (Figure credit: Patten et al. 2019)

presence of people gathered around the staging area was atypical for this location within the park.

CASE STUDY:

UNDERSTANDING VISITOR PERCEPTIONS AND VALUES IN ORANGE COUNTY

To successfully strike a balance, we need to know more about the human perspective of conservation. By surveying visitors to protected natural areas in southern California over the last couple of years, we learned there is potential for a shared vision of nature protection addressing the needs of both conservationists and outdoor recreationists. Clearly the issues are complex, but with good planning and communication, much can be done to support the creation of a collective vision for compatible conservation and recreation.

Natural Communities Coalition (NCC) is the non-profit management corporation overseeing implementation of the conservation strategy for the County of Orange Central and Coastal Subregion NCCP/HCP. Stretching from the Newport Coast to the Santa Ana Mountains, over 20,200 ha (50,000 acres) of conserved lands together with National Forest are embedded within the conservation plan's 84,000-ha (208,000-acre) planning area. The 75-year plan, signed in 1996, was the first landscape-scale NCCP in the state and one of the first multi-species HCPs nationally.

With 3.2 million residents in Orange County (Center for Demographic Research 2019), the demand for outdoor recreation on lands protected for conservation purposes is ever-present and increasing. Equally important is the recognized need and desire by the community to conserve the rich natural heritage of the southern California region. In Orange County, like in other high-value natural areas of the state experiencing rapid population growth, there is a strong need to strike a balance between conservation and recreation.

Recreation management is one of four main tenets of the regional landscape-level conservation strategy managed by NCC. Recognizing the increasing need to address this topic, NCC staff began focused and meaningful conversations with recreation ecologists and then followed with talking directly to park visitors to understand the human dimensions, that is, the motivations, desires, and values of visitors to the conserved lands. Partnering with Dr. Christopher Monz, Professor of Recreation Resources Management in the Department of Environment and Society at Utah State University, the organization surveyed close to 2,000 visitors in the spring and fall seasons of 2017 and in the spring of 2018 to better understand their perceptions, values, and characteristics (Sisneros-Kidd et al. 2019). In this process, the research team used a theoretical framework that allowed for the identification of internal constructs embedded within visitor questionnaires to reveal motivations and define different user groups. Through the work, two principal groups or clusters of visitors were discovered, those who are motivated most by the opportunity to experience nature immersion and those who are more focused on fitness-based recreation.

Surprisingly, given the urban-proximate setting, and in contrast to the expectations of local land managers, by almost two to one, recreationists were looking to experience nature immersion compared to those seeking fitness-based recreation. These visitors were more motivated by solitude and escape, learning about and experiencing nature, spiritual renewal, and the social experience, versus those in the fitness-based recreation group who

were motivated principally by challenge and outdoor exercise. Learning that the motivation and values of most visitors are more in alignment with resource protection than expected, we had to shift our thinking. Rather than focusing on direct conflict between recreation and conservation, we had to reevaluate how the conversation about balancing recreation and conservation is framed. Knowing it is often the most vocal and well-organized user groups who receive the greatest attention, whether from rangers at a local park or elected officials at a public meeting, we recognized it was of value for decision-makers to be informed of the findings and equally consider the motivations, values, and desires of the quiet majority in these public spaces and forums.

Digging deeper into the results of the work, we found people largely recognize the value of habitat and natural resource conservation; however, they too want to be part of the story. People do not want to be left "standing on the sidelines or looking over the fence;" they want to experience the rich natural resources that make California so unique. When asked how satisfied they were in their ability to achieve a variety of experiences during their visit to a park, visitors reported they were often left wanting more when it came to learning about nature and becoming more in touch with their spiritual values.

Visitor responses indicated they experience place attachment. When asked, they recognize the lands upon which they choose to regularly recreate are not necessarily unique relative to other protected areas. However, to them these lands and parks are special, meaningful, and important. Place attachment may be reflected in the high repeat visitation rates of visitors. More than half of those surveyed visited parks more than 50 times within the same year. Furthermore, many of the visitors live within neighboring communities. For almost half of the parks included in the study, more than 25% of visitors live within 3 miles of an entrance location (Mitrovich, unpublished data). To these people, the parks are a recognized and utilized part of their local community's resources.

Recreation is multidimensional and multifaceted, and we recognize a more sophisticated approach to finding solutions is warranted when seeking to minimize recreational impacts on sensitive natural resources. Impacts and motivations vary by user group, as does the attractiveness of different topography. From the surveys, we learned mountain bikers look to avoid crowds, are most knowledgeable about "leave no trace," most interested in more trails, and most likely of all user groups to be satisfied in their ability to get away from the demands of life when out on trails. Dog walkers, on the other hand, were least knowledgeable about "leave no trace," most avoided by other recreational groups, and least satisfied in their park experiences as it relates to their ability to learn more about plants and animals. Some hikers and runners were concerned about the number of mountain bikers they encountered in particular parks and along certain trails. Different topographic features attracted different users. Steep trails that offer high speeds and technical challenges are attractive to mountain bikers but can be off-putting to other user groups. In unregulated spaces popular with the masses and advertised through social media, trails can be degraded and spider, further fragmenting and degrading available habitat. The overlap between areas used for recreation and high-value wildlife habitat may be greatest with nature-based recreationists.

One positive take-home, as we look for solutions, is that visitors in urban landscapes are much more tolerant of crowded conditions than previously recognized by land managers. Parks in Orange County have seen a dramatic increase in use over the last decade, with increases of greater than 50% not uncommon over a 4-year period (Monz et al. 2019). However, at many parks considered to be "crowded" by land managers, over 80% of re-

spondents surveyed did not feel the presence of other people on the trail interfered with their activities or made them feel rushed or slowed them down during their visit. Equally, over 80% of respondents in 2018 did not feel the number of people at the park increased their risk of injury.

Although many folks are comfortable in a more crowded space, not everyone is comfortable with the changing dynamics and increases in observed use experienced over the last decade. Across both before-mentioned measures, there were respondents that felt the number of people at the park during their visit did increase their risk of injury at least some of the time, and other visitors and their activities interfered with their visit. Like wildlife, it appears people's tolerance of novel conditions is not fully universal and may differ across generations, by past experiences, and expectations (Shelby et al. 1983). When coupled with their understanding that off-trail activity is most impactful, the general tolerance of folks to increased visitation rates gives hope as we look for solutions to meeting increased demand while paying the necessary attention to detail to create the recreational opportunities valued by most that continue to honor the shared commitment and need for lasting conservation.

CASE STUDY:

CONFLICT TO COLLABORATION IN THE COACHELLA VALLEY

Now we turn to one example of how a region is addressing the question, what to do when trail users and sensitive species like the same habitat? Like other areas of southern California, the Coachella Valley in the desert and mountain regions of eastern Riverside County has seen a remarkable increase in the demand for outdoor recreation on trails, especially hiking and mountain biking. In this desert resort area, land of more than 100 lush golf courses, demand for golf is flat, while hiking has surged in popularity, in large part due to the influence of social media.

In 2008, the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) approved the Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (CVNCCP) with a 75-year permit. Like other efforts in California and beyond, it was a visionary effort to balance conservation and development. The plan encompasses an area of almost 500,000 ha (1.1 million acres) from Palm Springs to the Salton Sea and beyond. Implementation of the plan is overseen by the Coachella Valley Conservation Commission (CVCC), made up of elected officials from participating cities, Riverside County, local water districts, and other agencies.

However, several years earlier, the conflict between trail users and agency biologists nearly derailed the CVNCCP. During development of the plan, proposals by state and federal wildlife agencies to impose seasonal closures on some trails galvanized trail users to organize and turn out in large numbers at public hearings. The proposal to close trails centered on concerns about the impacts of trail use on Peninsular bighorn sheep (*Ovis canadensis nelsoni*), a state and federally listed endangered species (Figure 2). In response, trail users read scientific literature, interviewed bighorn sheep biologists, and questioned the scientific basis of the trail restrictions. They used their newfound knowledge and spoke passionately about their concerns to elected officials, often quoting published scientists.

When the CVNCCP was approved in 2008, it did not include the trail closures that had been envisioned. Public input from trail users convinced decision-makers to avoid these measures. It also convinced conservation planners that a full trails management plan needed

to be developed for the CVNCCP. Unfortunately, the process also left trail users alienated and with a lack of trust in the state and federal wildlife agencies. Wildlife agencies were suspicious of trail users' motivations. It would be years before these attitudes changed. Trail users seeking nature immersion, who could have been a natural constituency for support of the conservation proposed by the CVNCCP, continued to question the scientific basis of the trails plan. Even after the CVNCCP was completed and fully permitted, the lack of trust remained.

To provide a forum for input from trail users and local governments, the final CVNCCP called for formation of a Trails Management Subcommittee, composed of a representative from each of nine cities involved in the CVNCCP, the Agua Caliente Band of Cahuilla In-



Figure 2. In some areas of the Santa Rosa and San Jacinto Mountains National Monument, seasonal trail closures are in place to allow bighorn sheep and other wildlife access to waterholes during the hot summer months. (Photo credit: CDFW)

dians, trail user groups (mountain bikers, hikers, equestrians), environmentalists, biologists from CDFW, USFWS, Bureau of Land Management, and other land management agencies. The group was charged with providing recommendations on trails management, annually reviewing the status of bighorn sheep, and communicating trails-related information to stakeholders. Their tasks required them to develop a shared understanding of relevant conservation objectives and regulations while they worked together to accomplish their charge.

A dedicated group of volunteers, the subcommittee took their responsibility seriously and worked hard. Meetings were well attended and often animated. Passions flared, and sometimes sparks flew. On occasion, meetings devolved and became acrimonious and full of

conflict. Trail users continued to question the scientific basis for trails management actions proposed by "the agencies." Agency biologists doubted the trail users' commitment to the protection of bighorn sheep and were reluctant to share data. Unfortunately, throughout the process, scientifically rigorous data on the effects of trail use on bighorn sheep was limited. The studies needed to understand the relationship between trail use and bighorn sheep had not been done. The CVNCCP was approved in 2008, the year the recession hit and resources for local, state, and federal agencies were further limited by lack of funding.

In 2011, the conflict between recreation and habitat ended up in the state legislature when CDFW closed the upper portion of the very popular Bump and Grind Trail to protect bighorn sheep. Though not a trail which offers the experience of solitude, the Bump and Grind provides a great cardio workout, with hikers numbering more than 1,000 some days. Questioning whether any studies to prove that hikers have an impact on the endangered bighorn had been presented, trail users went to their state legislators. Ultimately, a compromise was worked out and Governor Brown signed legislation in October 2013. The upper Bump and Grind is now closed for three months during the sensitive bighorn sheep lambing season, from February through April, and open for the remaining nine months of each year. The Coachella Valley Conservation Commission worked with CDFW to install a fence to discourage off-trail travel and educational signs about bighorn sheep.

Despite the challenges, the Trails Management Subcommittee persevered. They worked through the challenges, developed more trust, and learned to work together. They completed an update to the 2008 Trails Management Plan in 2014. The updated plan emphasizes the adaptive management approach described in the CVNCCP. It calls for research on the relationship between bighorn sheep habitat use and trail use, prior to construction of new trails. Technology has made such research more feasible, especially in the rugged and remote terrain of the Santa Rosa and San Jacinto Mountains National Monument. Since 2015, GPS collars have been placed on bighorn sheep, providing data on their movements and habitat use. The CVCC is now working on a study of bighorn sheep and trails, led by Dr. Kathleen Longshore of the U.S. Geological Survey and funded by a grant from CDFW. The trails subcommittee is actively involved with researchers in the development of the study protocol and review of all data. Field work began in fall 2019, with volunteers collecting data on recreational trail use and researchers comparing the human use data with bighorn sheep collar data.

Conflict has been replaced with collaboration. Although all of the best practices were not used initially, when they were used, they became lessons learned. If people understand why, they are more likely to go along with regulations (Marion and Reid 2007). Furthermore, when the need for regulation or constraints are understood, constraints can become a positive as they provide the basis for best practices and assure access via responsible use.

WHAT IS NEEDED TO ACHIEVE BALANCE? WHAT WORKS?

Several land management decisions are being made today with long-term implications for the state of biodiversity and human wellness within California. Without collaboration among recreation and conservation interests, California risks insufficient lands being set aside for the benefit of protecting species, insufficient lands for recreating, and poorly located lands for both purposes, with people and other species suffering the consequences. Recreation and conservation stakeholders need to talk and work with each other and with

ecologists and land planners early and often in the regional visioning and land planning process to ensure both interests get what is needed in a way that strikes a balance for species and habitat protection, and people's access to the outdoors.

To achieve a better land use future for conservation and recreation outcomes, we recommend early investment in working relationships. Increased early communication among all stakeholders, land planners, and managers, together with basing decisions on the best available science, can help reduce land use conflicts, the loss of species, and lower-quality recreation experiences. Groups should accept there will be situations when they collectively agree to disagree. However, the long-term commitment to work together will increase the likelihood of achieving goals and objectives for all interests. Most land conserved through public funding sources and/or mitigation and all HCP and NCCP properties have some form of Resource Management Plan (RMP) and/or Conservation Easement attached to them. It is critical RMP's are developed with a "clean slate" to identify critical sensitive species, regional context, and wildlife linkages up front. This, in turn, identifies potential areas appropriate for trails and other recreational uses, thus reducing debate and conflict later.

We also recommend establishing appropriate monitoring programs that are used to evaluate conservation and recreation outcomes and modify management plans to better achieve the original goals and adjust to changing conditions. The wide variety of nature-based recreational activities, timing and frequency of those activities, and numbers of people that participate in them, all result in a complex array of potential effects. Adding to that is the complexity of behavioral responses and sensitivities of different species to those activities. Recognizing this complexity and planning according to research findings that are available, and the anticipated growth or other changes expected, can help planners create conservation areas and recreation areas positioned to avoid future conflicts.

Opportunities to be inclusive and reach out to stakeholders as partners in the long-term management of protected lands are numerous. By simply involving everyone up-front, community members can be engaged early in the planning process and contribute to the search for solutions. Volunteers can help to enforce site rules using peer pressure. They may also be able to help with site maintenance, monitoring, and identification of possible management actions, such as when monitoring information indicates a problem exists. An open phone line to land managers is essential and over time naturally builds relationship and trust.

How can effects be minimized?

Using good science in the decision-making process is key, as is making data transparent and remembering the importance of educating the public throughout the process. Planning efforts should search for and incorporate relevant scientific findings. Despite the variability in species responses to different types and intensities of recreation, researchers have identified some ways to minimize the effects of recreation on wildlife:

- Monitor and prevent unauthorized trail creation and off-trail use. Many animal species respond more strongly to recreationists in unexpected places, such as off-trail (Stankowich 2008; Heinemeyer et al. 2019), so increasing the predictability of human presence by constraining people to the existing trail network may help mitigate negative effects.
- Limit nighttime access to parks and trails. Since people are primarily active during the daytime, many animal species avoid interactions with people by increasing the proportion of their activity that takes place at night (Gaynor et al. 2018). While the

implications of this shift for foraging success and interspecific interactions are largely unknown, limiting activity to daytime hours may be a way for humans and wildlife to coexist in parks and natural areas. Nighttime recreation is growing in popularity but may prevent animals from temporally avoiding people, and should be limited in general, and probably all together avoided in urban-proximate wildland areas where the existence of refugia is already severely limited spatially.

- Leave areas without trails, both within individual properties and at landscape scale. For the most part, research has not yet identified 'safe' levels of human activity that result in minimal negative outcomes for wildlife. Some species appear to respond to very low levels of human activity and would benefit from blocks of trail-free habitat; in one example, mountain lions, coyotes, and bobcats increased nighttime activity and decreased daytime activity in locations with levels of use as low as two people per day (Wang et al. 2015).
- Plan access points and infrastructure carefully. Parking lots and other facilities can increase the level of use at corresponding trails (Larson et al. 2018). On the other hand, a lack of parking space at popular trails can result in public safety issues if visitors park along busy roadways. Improper parking can also impact habitat, which can cascade to impact wildlife as well.
- Use seasonal trail closures during sensitive periods. For many species, the most sensitive period is the breeding period, when disturbance can lead to reduced reproductive success (Bötsch et al. 2017), which in turn can result in population declines.
- Collect visitor use data. Without some knowledge of the intensity and distribution of recreational use, it is difficult for managers to know where and when impacts on sensitive wildlife species may be occurring. Monitoring equipment can be costly to purchase and maintain, but basic measures like periodic manual counts at parking lots or trailheads can be helpful in tracking trends, and there are promising emerging approaches using information that visitors share on social media platforms, mobile devices, and fitness applications (Fisher et al. 2018; Monz et al. 2019; Norman et al. 2019).
- Consider diverse visitor perspectives and values. Employ contemporary scientific approaches so key components in the human dimension of recreation (e.g., perceptions, characteristics, and motivations) can be understood more formally and inform a planning process for long-term sustainable use.
- Determine thresholds of acceptability of key indicators of resource and social conditions. Recognize "carrying capacities" exist for protected lands and their identification is a key component in the planning process and essential to developing a range of possible management actions, from the spatial and temporal separation of different types of recreational uses to acceptance and identification of high and low intensity use areas within the greater protected open space network.

An opportunity is emerging to expand upon local successes and encourage a new dialogue among agencies, conservationists, and recreationists, both at the local level and regionally, in support of the expanded protection of natural lands throughout California. We encourage interested parties to continue to learn more about the use of conservation planning tools and visitor use management made available through the CDFW and USFWS, and Interagency Visitor Use Management Council (Appendix I). Forming partnerships allows stakeholder groups to work together to plan ahead of growth and build regional conservation

strategies for the increased protection of natural lands, addressing the long-term conservation needs of California's natural resources and the strong desire of people to experience nature.

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APPENDIX I: AVAILABLE CONSERVATION PLANNING AND VISITOR USE MANAGEMENT TOOLS

Natural Community Conservation Planning

The Natural Community Conservation Planning (NCCP) Program promotes collaborative planning efforts designed to provide for the region-wide conservation of plants, animals, and their habitats, while allowing for compatible and appropriate economic activity. https://www.wildlife.ca.gov/Conservation/Planing/NCCP

Regional Conservation Investment Strategy Program

The Regional Conservation Investment Strategy (RCIS) Program encourages a voluntary, non-regulatory regional planning process intended to result in high-quality conservation outcomes. The Program consists of three components: regional conservation assessments (RCAs), regional conservation investment strategies (RCISs), and mitigation credit agreements (MCAs). https://www.wildlife.ca.gov/Conservation/Planning/Regional-Conservation

Conservation and Mitigation Banking

Conservation and mitigation banking in California is overseen and undertaken by several Federal and State Agencies. The Banking Program coordinates with other agencies and stakeholders to develop statewide policy and guidance for the establishment and operation of conservation and mitigation banks. https://www.wildlife.ca.gov/Conservation/Planning/Banking

Biogeographic Information and Observation System (BIOS)

BIOS is a system designed to enable the management, visualization, and analysis of biogeographic data collected by the California Department of Fish and Wildlife and its Partner Organizations. https://www.wildlife.ca.gov/Data/BIOS

Areas of Conservation Emphasis (ACE)

ACE is a CDFW effort to analyze large amounts of map-based data in a targeted, strategic way, and expressed visually, so decisions can be informed around important goals like conservation of biodiversity, habitat connectivity, and climate change resiliency. https://www.wildlife.ca.gov/Data/Analysis/Ace

Visitor Use Management (VUM) Framework

VUM is a toolbox for visitor use management and addresses conservation issues. The framework also includes topic areas like capacity, indicators and thresholds, as well as the importance for monitoring recreation use. https://visitorusemanagement.nps.gov/VUM/Framework

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Recreation-related disturbance to wildlife in California – better planning for and management of recreation are vital to conserve wildlife in protected areas where recreation occurs

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Expanding levels of authorized and unauthorized non-consumptive recreation increasingly threaten sensitive biological resources in areas protected primarily or solely to conserve them. As California's human population grows, recreational use in protected areas grows commensurately. The majority of the documented effects on wildlife from non-consumptive recreation are negative; they include detrimental changes in behavior, reproduction, growth, immune system function, levels of stress hormones, and finally, to the survival of individual animals and persistence of wildlife populations and communities. This paper provides insights from the recreation ecology literature into these recreation-related disturbances to insects, amphibians, reptiles, birds, and mammals from hiking, jogging, biking, horseback riding, boating, and off-highway/all-terrain vehicles. The documented evidence of these disturbances to wildlife reveals the flaw in the prevalent assumption that recreation is compatible with biological conservation, the dual-role protected areas' core function. This assumption usually rests on the expectations of (1) allowing only ecologically sound siting of recreational areas and ecologically acceptable types, levels, and timing of recreation, and (2) providing sufficient monitoring, management, and enforcement of recreation to ensure the perpetuation of viable populations of focal sensitive species. However, it is rare that these expectations are met. The ultimate essential outcome of the information provided in this paper is the cessation of the extant recreation-related exploitation of dual-role protected areas. This calls for a societal course change involving: widespread, long-term, and continual multimedia dissemination of the science-based information about recreation-related disturbance to wildlife; application of a science-based approach to siting recreational areas and allowing only ecologically acceptable types, levels, and timing of recreation; and, perpetual personnel and funding explicitly for management at levels commensurate with recreational pressure. These measures would also improve the often cited economic, educational, and recreational/health benefits of dual-role protected areas.

Key words: dual-role protected areas, enforcement, fragmentation, management, multimedia education, non-consumptive recreation, perpetual funding, planning and siting of trail networks, recreational disturbance to wildlife, unauthorized trails

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Conserving habitats is a key strategy for conserving biodiversity worldwide (Pickering 2010). In California, the core function of many areas protected for conservation is to ensure the perpetuation of sensitive species (i.e., species whose persistence is jeopardized), as is appropriate for the nation's most biologically diverse state (CDFW 2015). The level of land conservation that California enjoys is intended to ensure that the state's globally renowned biodiversity remains intact. However, of all the states in the USA, California hosts the most listed species imperiled by recreation, in part because the strongest association of outdoor recreation is with urbanization (Czech et al. 2000), which is itself an important cause of endangerment (Reed et al. 2014). The anticipated growth of the state's human population from approximately 38 million in 2013 to 50 million by mid-century with a commensurate increase in recreational demands in protected areas will likely increase the continual challenge of conserving the state's wildlife (CDFW 2015).[1, 2] The dual role of protected areas to conserve biodiversity and provide nature-based recreational and educational opportunities for millions of people rests on the assumption that non-consumptive recreation is compatible with wildlife conservation, despite documented evidence to the contrary (Reed and Merenlender 2008; Larson et al. 2016; Hennings 2017; Dertien et al. 2018; Reed et al. 2019).[3] Ecologically sound types, levels, timing, and siting of recreation, and perpetual management of recreation at or exceeding a level commensurate with the recreational pressure, are vital to ensure the perpetuation of viable populations of focal sensitive species in "dual-role" protected areas.[4, 5]

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[1] Protected areas include locally-owned lands (e.g., county and city reserves), state-owned lands (e.g., ecological reserves, wildlife areas, state parks), federally owned lands (e.g., national wildlife refuges, wilderness areas), and privately owned lands (e.g., conservation easements, conservancy lands, mitigation banks and lands). Here, the focus is on protected areas preserved primarily or solely for the perpetuation of sensitive species (e.g., ecological reserves, protected areas established pursuant to Natural Community Conservation Plans and/or Habitat Conservation Plans, mitigation banks and lands).

[2] Wildlife means all wild animals: insects, fish, amphibians, reptiles, birds, and mammals.

[3] In contrast to consumptive recreation (e.g., hunting, fishing), non-consumptive recreation is generally assumed not to directly extract a resource; it includes nature and wildlife viewing, beach-going, kayaking, hiking, biking, horseback riding, and wildlife photography (Reed and Merenlender 2008; CDFW 2016; Gutzwiller at el. 2017). From here forward, "recreation" means non-consumptive recreation, unless otherwise stated.

[4] Focal species are organisms whose requirements for survival represent factors important to maintaining ecologically healthy conditions; identified for the purpose of guiding the planning and management of protected areas in a tractable way, focal species include keystone species, umbrella species, flagship species, and indicator species (Soulé and Noss 1998; Marcot and Flather 2007). Here, the term "focal species" is intended to include those species encompassed by the guild surrogate approach of conservation; this approach entails one member or a subset of members serving as a surrogate for other members of the guild (Marcot and Flather 2007).

[5] From here forward, "management" includes monitoring, management, and enforcement with the necessary authority. The level of enforcement necessary is dependent on the level of continual management implemented; generally, the more the management, the less enforcement is necessary. In addition, monitoring and management encompass both the natural resources and human users of the protected areas. The fiscal support to be secured includes personnel and all program costs.

Insights from studies

Purpose.—The purpose of the following discussion is to provide insights to disturbances to several wildlife species from non-consumptive recreation. Accordingly, the insights are exclusively from studies that document recreation-related disturbance to wildlife. This approach reflects the evidence that the majority of documented responses of wildlife species to non-consumptive recreation are negative, as demonstrated in two systematic literature reviews (Reed et al. 2014; Larson et al. 2016) and a literature review of over 500 articles written and reviewed by the scientific community (Hennings 2017). The insights are intended to (1) illustrate that scientific studies provide clear evidence of recreation-related disturbance to wildlife, (2) elicit awareness of and concern about the disturbance, and (3) stimulate action to address it.

Sources and scope.—The 71 articles and 13 reports[6] reviewed about the recreation-related effects on wildlife generally reflect Larson et al.'s (2016) finding that studies about such effects focus on mammals (42%) and birds (37%), followed by invertebrates (12.4%), reptiles (5.5%), fish (5.1%), and amphibians (0.7%); there are no insights herein from studies of fish. Larson et al. (2016) found that some of the least-studied taxonomic groups (i.e., reptiles, amphibians, and invertebrates) had the greatest evidence for negative effects of recreation. While not all the studies selected for this paper address wildlife in California, all the studies' scenarios could occur in the state as do all species types among the studied taxa (i.e., insect, amphibian, reptile, bird, mammal).

Not all of the studies selected for this paper address sensitive species. This is primarily because current research on recreation-related effects on wildlife includes few species of conservation concern (Larson et al. 2016). However, sensitive species may experience greater levels of recreation-related disturbance than described for common species in the study insights herein. This is because many rare and isolated species are specialists, and they may be more sensitive to anthropogenic disturbance, including recreational activities, than common and widely distributed species (Bennett et al. 2013; Reilly et al. 2017). Recreation-related declines of common species warrant attention because of their functional ecological importance – local depletions of common species can have broad consequences within the food web (Säterberg et al. 2013; Baker et al. 2018; Reed et al. 2019). Recreation-related declines or disturbance in an important common prey species may affect the species in higher trophic levels (Reed et al. 2019). More than a quarter of species become functionally extinct before losing 30% of their individuals (Säterberg et al. 2013; Baker et al. 2018; Reed et al. 2019); here, functional extinction occurs when the population size of the depleted species is below the level at which another species goes extinct (Baker et al. 2018).

The scope of this paper does not include studies about snow-based recreation, though all of the 14 articles addressing snow-based recreation that Larsen et al. reviewed reveal that non-motorized and motorized snow-based activities (i.e., skiing, snowshoeing, snowmobiling) can have significant negative effects. Nor does the scope of this paper include studies exclusively about the effects of dogs on wildlife; however, a literature review on the effects of dogs on wildlife concludes that (1) people with dogs on leash, and even moreso

[6] All the articles are published in peer-reviewed journals. Some of the reports were peer reviewed and all were written by or contributed to by professionals in the fields of biology or ecology, though none of the reports were published in peer-reviewed journals to this author's knowledge (e.g., Burger 2012; Hennings 2017; Dertien et al. 2018; Reed et al. 2019). This paper does not cite all the articles and reports this author read. And, the totals exclude documents that are not explicitly about recreation-related effects on wildlife (e.g., Tinkler et al. 2019; Taff et al. 2019; Wolf et al. 2019) and all newspaper articles.

off leash, are more alarming and detrimental to wildlife than any non-motorized recreational user group without dogs, and (2) people with dogs substantially increase the amount of wildlife habitat affected (Hennings 2016). Hennings (2016) also asserts that wildlife does not appear to habituate to the presence of dogs; effects linger after dogs are gone because the scent of dogs repels wildlife.

Management measures.—The study insights focus on the documented recreation-related disturbance to wildlife, not on management measures to prevent or minimize the disturbance. However, many of the reviewed articles and reports identify such measures, which range from full prohibition of human access, to time-of-access restrictions (e.g., seasonal or diurnal/nocturnal restrictions), to various measures based on disturbance thresholds. Disturbance thresholds are thresholds of various measurable parameters above or below (depending on the parameter) which wildlife is disturbed. Examples of disturbance thresholds are distance between trails and nesting sites, density of active trails, number of recreationists, number of recreational events per time frame, and duration of recreation. These thresholds may be used to establish management measures such as minimum widths of spatial buffers between recreational trails and wildlife.

A common theme among the management measures is that continual proactive and adaptive management is needed to protect wildlife from recreational disturbance, and that access closures should occur if the management fails.[7] Adaptive management is a cornerstone of large-scale multi-species conservation (CDFW 2014). An example of proposed management measures is Dertien et al.'s (2018) recommendation for a precautionary approach that adopts maximum values of quantitative disturbance thresholds observed for the taxa of concern, while excluding the extreme values of the thresholds.[8] This approach stems from the gaps in knowledge about quantitative disturbance thresholds of recreation; such thresholds are lacking for many species, taxonomic groups, and sources of disturbance.

Regarding spatial buffers, a general rule of minimum thresholds for distance to trails cannot be established for some species, as individual variability within species can be high and can differ among populations, types of topography, and frequencies and types of human intrusion (González et al. 2006). For example, Dertien et al. (2018) recommended a 200-m minimum buffer for ungulates; however, this would be insufficient for the circumstances of Taylor and Knight's (2003) study further cited below in which they found that mule deer (*Odocoileus hemionus*) showed a 96% probability of flushing within 100 m of recreationists located off trails, and the probability of their flushing did not drop to 70% until perpendicular distance reached 390 m. Two additional factors that influence the determination of spatial buffers are "effect zones" (i.e., areas within which wildlife is disturbed by recreational ac-

[7] Based on section 13.5 of the California Fish and Game Code and the Natural Community Conservation Planning Act (i.e., section 2805 of Fish and Game Code), adaptive management generally means (1) improving management of biological resources over time by using new information gathered through monitoring, evaluation, and other credible sources as they become available, and (2) adjusting management strategies and practices accordingly to assist in meeting conservation and management goals (e.g., conservation of covered or focal species). Under adaptive management, program actions are viewed as tools for learning and to inform future actions.

[8] The central tenet behind the precautionary principle is that precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. Generally, the four central components of the principle are: taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making (Kriebel et al. 2001). There are subtle differences between the precautionary principle and precautionary approach, but their consideration is beyond the scope of this paper.

tivities on trails) and the density of the trail networks. The effect zones can extend several hundred meters on either side of the trails (Reed et al. 2019). The smaller a protected area is and the denser its trail networks are, the greater the proportion of the protected area is occupied by effect zones, and the less likely it is that spatial buffers such as those Dertien et al. (2018) recommended will protect the focal species from recreational disturbance (Wilcove et al. 1986; Ballantyne et al. 2014).

There are many sources that provide information about management of recreation in protected areas, or guidance on the design or siting of trails/trail networks. These sources include management framework tools designed to address recreational use, though they vary in their attention to the needs of wildlife (Hennings 2017).

Insects

In a study of the effects of walkers, runners, and runners with dogs on the federally endangered Karner blue butterfly (*Lycaeides melissa samuelis*; Karners) at the Indiana Dunes National Lakeshore, USA, Bennett et al. (2013) found that (1) Karners flushed in the presence of recreationists as they would respond to natural agents, such as predators; (2) recreation restricted host-plant choice by reducing host-plant availability, effectively rendering the quality of habitat within 10 m of the trail unsuitable; (3) recreation had the potential to reduce oviposition rate of virtual females by 50%, and therefore population growth rates; (4) the frequency at which recreationists negatively affected the females (including their oviposition) varied substantially with habitat extent, number of recreationists, and sensitivity; and (5) habitat extent was the primary predictor variable. The authors concluded that Karners will experience less recreation-related disturbance the farther their habitat extends beyond trails.

In a study conducted near Palo Alto, California, USA focusing on 10 native oak woodland species of butterflies, Blair and Launer (1997) concluded that even small perturbations by hikers and joggers in a recreational area led to (1) a loss in the number of butterfly species (species richness) of the original oak-woodland community compared to the number of these species in a biological preserve with no recreation, and (2) a lower number of butterflies (abundance) in the recreational area compared to the biological preserve. The authors also concluded that multi-use areas may not adequately preserve butterfly species diversity.

Herpetofauna

Responses of the Iberian frog to recreational activities.—In a study involving field research in the Guadarrama Mountains in central Spain and simulation modelling to assess the effects of recreation on Iberian frogs (*Rana iberica*), an endemic species in decline, Rodríguez-Prieto and Fernández-Juricic (2005) measured frog abundance and response to human disturbance. The authors found that Iberian frog abundance (a population-level parameter): (1) was significantly affected mainly by study site location and distance to the nearest recreational area, a proxy for human disturbance; (2) was positively related to distance from recreational area (i.e., as distance decreased, abundance decreased); and (3) increased as number of humans decreased. With respect to the effects of repeated disturbances (e.g., human approaching with a steady pace) on the individual-level parameters of

flight initiation distance[9] and time to resume pre-disturbance activities, the study showed that: (1) frogs' flight initiation distances were longer in areas with less vegetation cover; (2) though the flight initiation distances did not vary with repeated human approaches, the number of repeated human approaches affected the frogs' time to resume pre-disturbance activities, with second and third approaches increasing the time it took frogs to reoccupy the disturbed spot; and (3) there was an 80% decrease in the frogs' stream-bank use with a 5-fold increase in the direct disturbances per hour, and a 100% decrease in stream bank use with a 12-fold increase in human disturbances per hour. The authors concluded that direct human disturbance affects this species at the population level, and that it needs to be considered as a potential factor affecting amphibian populations with low tolerance for disturbance.

Responses of the yellow-blotched map turtle to human disturbance.—In a study along a 300-m reach of the Pascagoula River in southeastern Mississippi, USA, Moore and Siegel (2006) studied the effects from boating, fishing, jet skis, and direct anthropogenic damage to nests on the nesting and basking behavior of the yellow-blotched map turtle (*Graptemys flavimaculata*), listed as threatened under the U.S. Endangered Species Act. With respect to human disturbance of nesting turtles, the authors found that numerous turtles waited several hours near a sandbar before emerging from the water onto the beach to nest, and turtles that attempted to nest upon emerging onto the beach frequently abandoned their efforts and retreated to the water—of a total of 79 nesting attempts, only 15 successfully completed oviposition. With respect to human disturbance of basking turtles, the authors found that the number of turtles disturbed differed significantly with the type of disturbance; specifically, anglers that remained in the basking vicinity caused the most disturbance, and jet-skis caused less than an expected amount of disturbance; this was likely because of the anglers' closeness (compared to the jet-skis) to the basking logs and the long periods they remained, both of which caused turtles to bask less. Moore and Siegel (2006) concluded that: the interruption of nesting activities may have a severe impact on the viability of this population of turtles through changes in numbers of clutches; and, the interruption of basking and consequent reduction in the turtles' body temperature has the potential to negatively affect the ability of all turtles to process and digest food, and the ability of females to develop eggs during the reproductive seasons.

Responses of the common wall lizard to tourism.—In a study of common wall lizards (*Podarcis muralis*) conducted in areas with high and low levels of tourism within the same habitat in the Guadarrama Mountains in central Spain, Amo et al. (2006) examined whether the lizards differed in several parameters upon each human approach. The authors found that: (1) regardless of the level of tourism, lizards usually exhibited anti-predator behavior by fleeing to hide in refuges upon approach of a human; (2) in comparison to lizards inhabiting areas of low tourism pressure, lizards inhabiting areas with high tourism pressure, and therefore presumably escaping to hide in refuges more often, showed a poorer body condition and higher intensity of tick infection at the end of the breeding period; and (3) the intensity of tick infection was higher in male than in female lizards. The authors speculated that the higher intensity of infection probably resulted from the cumulative costs of high frequency of flight, since anti-predatory behaviors such as flight are costly in terms of losing time for other activities, including feeding—nutritional status can affect the capacity

[9] The flight initiation distance is the distance from an approaching threat (e.g., recreationist) at which an animal initiates moving away to escape from the threat. This movement is a fitness/energy cost to the fleeing animal. For the Iberian frogs, this was the distance between an approaching human and the frog when the latter jumped into the water in response to the human's approach.

of lizards to mount an immune response to infection. Furthermore, lizards with poor body condition had low levels of immune response, which may aggravate the deleterious effects of anti-predatory behavior on body condition. Female lizards in poor body condition produced offspring of small size, and body size of infant lizards can affect their probability of survival. Additionally, females with blood parasites also showed reduced fat stores and produced smaller clutches. By these effects on infants and clutch sizes, tourism may also negatively affect the maintenance of lizards' populations.

Responses of various reptiles to recreationists.—In a study to systematically assess recreationists' direct and indirect effects on sensitive wildlife species in 14 NCCP/HCP protected areas in San Diego County, California, USA, Reed et al. (2019) integrated monitoring of both wildlife species and recreationists (e.g., hikers, mountain biker, horseback riders).[10] The authors found that recreation was associated with declines in reptilian species' richness, occupancy, habitat use, and relative activity in the NCCP/HCP protected areas. Of the three species (all lizards) for which statistical analyses were feasible, two exhibited negative relationships between occupancy and human recreation—the orange-throated whiptail (*Aspidoscelis hyperythra beldingi*, an NCCP/HCP-covered species) and common side-blotched lizard (*Uta stansburiana*).

Birds

General responses.—In Steven et al.'s (2011) review of 69 peer-reviewed articles (50 of which were research conducted in protected areas) of original research on the effects on birds from non-motorized nature-based recreation, 61 articles reported recreation as having negative effects (i.e., negative changes in physiology, behavior, abundance, and reproductive success, the latter including the number of nests, eggs laid, and/or chicks hatched or fledged). The single documented positive effect involved an increase in the abundance of corvids (e.g., crows and ravens) in campgrounds. Walking or hiking, standing or observing birds from viewing platforms or standing next to a nesting colony, dog walking, running, cycling/mountain biking, and canoeing were all reported as negatively affecting birds. A large majority (85–93 %) of the studies that examined the effects of a single person, groups of two or more people, and/or avian population-level responses, reported negative effects. The population-level responses entailed effects on density, abundance, and reproduction.

In a study using data collected in 112 urban parks throughout Melbourne, Australia, Bernard et al. (2018) tested whether birds responded differently to bikers and walkers. They found that: (1) relative to their response to walkers, four of the 12 focal species studied initiated escape from bikers at longer flight initiation distances and two escaped with greater intensity (i.e., more likely to involve flying); (2) no species responded less to bicycles than to walkers; and (3) the flight initiation distance did not differ in response to speed of bicycle travel, though the difference in the two speeds used was only 1 m/sec. In concluding that

[10] An NCCP (Natural Community Conservation Plan) is a comprehensive, single- or multi-jurisdictional/utility plan that provides for regional habitat and species conservation at an ecosystem level while allowing local land use authorities to better manage growth and development. Upon issuing an NCCP Permit, the California Department of Fish and Wildlife (CDFW) can authorize take of selected state listed species and other species of concern, subject to the terms of coverage under the NCCP (CDFW 2015). An HCP (Habitat Conservation Plan) is the federal counterpart to an NCCP; the U.S. Fish and Wildlife Service prepares HCPs and issues HCP permits. The terms and conditions under which an NCCP/HCP's protected areas are conserved establish the types and levels of public access that are permitted (Burger 2012). The types and levels of public access vary among the NCCP/HCP protected areas from no access to guided-only access to open access. The species protected by NCCPs/HCPs are typically called covered species.

bikers can appear more or less threatening to birds than a single pedestrian, Bernard et al.'s (2018) results underscore that the responses of wildlife to recreational activities vary among species, sites, types of recreation, and exposure over time to the activities.

Songbirds.—Davis et al.'s (2010) study of the effects of mountain biking on golden-cheeked warblers (*Dendroica chrysoparia*, warblers) with nests near biking trails in the Fort Hood Military Base in Killeen, Texas, USA, and the Balcones Canyonlands Preserve in Austin, Texas, found direct and indirect effects. The direct effects included warblers flushing >20 m in response to encounters with passing mountain bikers. Indirect effects included abandonment of nests <2 m from the biking trails and a reduction in the quality of nesting habitat due to biking-related fragmentation and alteration of habitats. In comparison to the control sites, it was likely that habitat fragmentation resulting from trails in the biking sites caused the increased predation of warbler nests by rat snakes (*Elaphe obsoleta*) and other edge-adapted predators. The authors speculated that the biking sites, which were able to maintain viable populations of warblers at the time of the study, may not continue to do so with additional recreational use, fragmentation, and alteration of the habitats.

Forest birds.—Bötsch et al. (2018) examined how breeding-bird communities changed with distance to trails in four broad-leafed and mature forests in Switzerland and France; the forests were similar in size, structure, and trails, but widely different in levels of recreation (mostly walkers). The authors found that: in the forests with high levels of recreation, the density and species richness of birds decreased by 12.6% and 4.0%, respectively, at points close to trails compared to points farther away; cavity, ground, and open-cup nesters had fewer territories and species close to trails compared to farther away; and, above-ground foragers and ground foragers showed a similar pattern. None of these effects on density, species richness, nesting guild, or foraging guild occurred in the forests with low levels of recreation. Both high- and low-sensitivity species (i.e., long versus short flight initiation distances) had fewer territories and fewer species close to versus far from trails in forests with high levels of recreation; however, in forests with low levels of recreation, highly sensitive species exhibited only a slight tendency for fewer territories close to trails. The authors inferred from their findings that (1) human presence in forests disturbs avian community composition and abundance along trails in recreational areas, (2) the overall effect of recreational trails themselves depends mainly on recreational intensity and only slightly on species characteristics, and (3) the observed effects on birds in forests where recreation has occurred for decades suggest that habituation to humans has not outweighed the effects.

Raptors.—In a study along the Boise River in Idaho, USA, examining flight initiation distances of bald eagles (*Haliaeetus leucocephalus*) in response to actual and simulated walkers, joggers, anglers, bikers, and vehicles, Spahr (1990) found that the highest frequency of eagle flushing was associated with walkers, followed by anglers, bikers, joggers, and vehicles. Eagles were most likely to flush when recreationists approached slowly or stopped to observe them, and were less alarmed when bikers or vehicles passed quickly at constant speeds. However, the longest flight initiation distance was in response to bikers, followed by vehicles, walkers, anglers, and joggers. Hennings' (2017) literature review provides the following about bald eagles: pedestrians within 275 m caused a 79% eagle response rate; eagles did not resume eating for four hours after disturbance by walkers; a suggested minimum 600-m buffer around breeding eagles, beyond which response frequency dropped below 30%; an apparent threshold of about 20 daily recreational events after which eagles were slow to resume feeding, and after 40 events, feeding was uncommon; sub-adults were

less tolerant of disturbance than adult eagles; and recreation-related long-term effects can include reductions in survival, particularly during winter and especially for juveniles.

With respect to the tolerance (through habitat imprinting, genetic inheritance, or habituation) of golden eagle (*Aquila chrysaetos*) for recreational disturbance, Pauli et al. (2017) used an individual-based model[11] to assess the effects of walkers and off-highway vehicles on golden eagle populations. The primary modeling results indicated that, while golden eagles can develop tolerance for recreational disturbance, tolerance for even moderate levels of disturbance may not develop within a population at a sufficient rate to offset the effects of increased recreation on breeding golden eagles, particularly because this is a long-lived species with low recruitment. Pauli et al. (2017) conclude that, taken together, the simulation results suggest that recreation-related disturbance has a substantial effect on golden eagle populations and that increased recreation activity will exacerbate such effects. Given the results and the fact that non-motorized recreation decreases the probability of egg-laying in golden eagles (Spaul and Heath 2016), the authors asserted that trail management and a reduction in recreation activity within eagle territories are necessary to maintain golden eagle populations in locations where levels of recreation are increasing.

Shorebirds.—In a controlled study conducted in Scotland of the behavioral responses of the ruddy turnstone (*Arenia interpres*) to an approaching human, Beale and Monaghan (2004) found that birds supplemented with food flushed sooner from the human and searched for predators more frequently than birds not supplemented with food. That is, birds responding most were actually the least likely to suffer any fitness consequences associated with the disturbance. This study demonstrates the possibility of misconstruing the reasons for and implications of observed responses among all wildlife species. Traditionally and intuitively, species that readily flee from or avoid human disturbance are considered to be the most in need of protection from disturbance. However, species with little suitable habitat available nearby cannot show marked avoidance of disturbance even if the costs of reduced survival or reproductive success are high, whereas species with many nearby alternative sites to move to are likely to move away from disturbance even if the costs of the disturbance are low (Gill et al. 2001). It should not be assumed that the most responsive animals are the most vulnerable (Beale and Monaghan 2004). Gill et al. (2001) asserted that the absence of an obvious behavioral response does not rule out a population-level effect. In the same vein, it may be that species occurring in protected areas that are remnant fragments within urban landscapes are forced to utilize all components of the fragments, irrespective of their land-use intensity and land cover. This may occur if animals have nowhere else to go, and may be an explanation for instances when the relative abundance of birds is greater in urban and suburban reserves than in exurban reserves (Markovchick-Nicholls et al. 2008).

Mammals

General responses within NCCP/HCP protected areas in southern California.—In series of three studies about the responses of mammals to hikers and runners, bikers, horseback riders, dog walkers, and motorized vehicles, George and Crooks (2006), Patten et al. (2017), and Patten and Burger (2018) analyzed camera-trap data captured throughout areas protected under the 1995 County of Orange Central and Coastal NCCP/HCP (Orange County NCCP/HCP). All studies analyzed bobcat (*Lynx rufus*), coyote (*Canis latrans)*, and mule

[11] Individual-based models are simulation statistical tools that use empirical data to examine effects, such as anthropogenic population-level effects, that are difficult or impossible to study in a field setting.

deer, and Patten et al.'s (2017) analysis also considered mountain lion (*Puma concolor*), gray fox (*Urocyon cinereoargenteus)*, striped skunk (*Mephitis mephitis*), and northern raccoon (*Procyon lotor*). The authors found that: (1) mammal detections were negatively correlated with all types of recreationists; hikers and runners had the greatest negative association with wildlife, and equestrians had the least; (2) the overall trend is sharply negative: as human activity increased, mammalian activity decreased, regardless of species, type of human activity, or camera placement; (3) mammals were nearly four times as likely to be recorded on days with no human activity than on days with human activity at the same site; (4) detections of mammals decreased incrementally as the number of humans increased within a day, and fell to near zero probability at ≥60 humans per day; and (5) all seven species listed above exhibited short-term spatial displacement in response to events with more than 100 visitors.

Bobcats' negative associations were strongest with bikers, hikers, and domestic dogs. In areas of higher human activity, bobcat were detected less frequently along trails and appeared to show temporal displacement, becoming more nocturnal. Coyotes' overall activity was lower at the sites with the most recreation and was negatively associated with overall human, hiker, and biker visitations; and, a trend of temporal displacement in response to dogs was also evident. Generally, both bobcats and coyotes displayed a relatively wide range of activity levels at sites with low human use, but a lower and markedly restricted range of activity at those sites with the highest levels of recreation. Both coyotes and mule deer shifted their activities temporally over the long term. The mule deer's (a primary consumer) marked shift brought it into closer temporal alignment with its main predator (mountain lion) and the coyote's marked shift (secondary consumer) brought it into closer temporal alignment with a chief prey species (gray fox). These human-induced diel shifts involving animals in two trophic levels have important ramifications for predator–prey dynamics. Despite these studies' results, no evidence was found suggesting mammalian populations have declined in the Orange County NCCP/HCP protected areas between 2007 and 2016, even as human activity increased markedly across the study period. However, it is critical to consider this observation in light of: (1) the fact that, at least for the years 2007-2011, public access was controlled across most of the study area by permit-only entry, regular docent-led programs, and monthly self-guided wilderness access days—much higher levels of restrictions on public access than for most protected areas; (2) the authors' assertion that various mammalian species' avoidance behavior may yet drive mammalian populations downward upon further increase in human disturbance; and (3) the status of the Vail Colorado elk herd as recounted below—once a herd of 1,000 head diminished to 53 due to steadily increasing levels of recreation.

Overall, the results of the above three studies were similar to those of a study to assess recreationists' effects on sensitive wildlife species in 14 NCCP/HCP protected areas in San Diego County, for which Reed et al. (2019) used data from camera traps and a before-after-control-impact (BACI) experiment. Reed et al. found that bobcat, gray fox, mule deer, and northern raccoon were less active in areas with higher levels of human recreation. Bobcat habitat use was more strongly negatively associated with human recreation than urban development, which also decreased the probability of habitat use. The collective results for mule deer among the four studies suggest that mule deer may stop using some areas altogether if human recreation is too high. Reed et al. (2019) did not detect negative associations between human recreation and the habitat use or relative activity of the six following mammalian species of the 12 observed: coyote, striped skunk, ground squirrel, jackrabbit, brush rabbit

(*Sylvilagus bachmani*), and desert cottontail (*S. audubonii*). However, of special note are results from the protected area with the highest level of recreation (i.e., an average of 1,797 people per day) observed in the study, where the cameras captured only rabbits, and no other mid- to large-bodied wildlife species during 7.5 weeks of monitoring. Yet, this 2,449-ha protected area is considered a core biological area and regional wildlife corridor targeted for conservation (City of San Diego 2019). The BACI experiment conducted in another protected area showed a significant decrease in bobcat detection probability in a four-week period following a trail re-opening, suggesting that this species can modify its behavior (e.g., shift its activity patterns) rapidly after a change in human recreation. This is evidence that temporal closures have the potential to reduce disturbance during critical periods for some species. Although human recreation may not often extirpate mammalian species from urban habitat fragments, it can reduce habitat suitability and carrying capacity (Reed et al. 2019).

Responses to human voice.—Suraci et al. (2019) tested whether mammalian carnivores' responses to human voices alone can result in landscape-scale effects across wildlife communities, including cascading effects on the behavior of lower trophic level animals. The results of the study, which was conducted in the Santa Cruz Mountains of central California, USA, indicate that human voice alone does result in such effects. Where humans are absent or rare, large and medium-sized carnivores exhibit greater movement, activity, and foraging, while small mammals use less space and forage less. Where humans are present, the activity, foraging, and/or habitat use of large and medium-sized carnivores are suppressed, while small mammals increase their total space use and foraging intensity. The implications of these results are far-reaching, and include that, even in the absence of land development or habitat fragmentation, increased human presence can: (1) affect large carnivore movement, which could eventually limit carnivores' hunting and feeding behavior or force individuals to abandon high risk areas of their home range; (2) suppress activity of medium-sized carnivorous species; and (3) increase the abundance of small mammals that are prey to the large- and medium-sized predators, which could ultimately increase the abundance of small mammals in wildlife areas people visit (Suraci et al. 2019, citing other authors). Moreover, if the sublethal effects observed in the study in response to human voices alone are comparable to those effects (e.g., increased physiological stress, reduced reproductive success) that fear has been demonstrated to cause in predator-prey systems, they may amount to additional widespread but largely unmeasured effects of humans on wildlife populations (Suraci et al. 2019, citing other authors). Hennings (2017) provides additional insights about, and citations for studies on, the effects on wildlife from the human voice, concluding that conversational noise along trails can be very disturbing to wildlife.

Ungulates.— In a two-year study of elk (Cervus elaphus) in a herd near Vail in central Colorado, USA, Shively et al. (2005) found that elk reproductive success rebounded to pre-disturbance levels after the cessation of their exposure to back-country hikers during the calving season over the previous three years. Shively et al. concluded that, it seems prudent to protect elk during calving seasons, because, although the study provides evidence that elk reproduction can rebound from depressed levels when human disturbances are removed or reduced, there had been a linear decline in calf production in response to increasing levels of disturbance compared to controls without such disturbance, and it is not known if there is a threshold level of reproductive depression from which elk cannot recover. Recognizing that it is seldom easy to curb human activities that have become traditional, or to restore wildlife habitats once they have been developed, they recommended the continuation of

some closures imposed on parts of both the Vail and control elk herd study areas. However, a recent article in The Guardian reported that the number of elk in this same Vail herd dropped precipitously since the early 2010s with the steady increase in human recreation; once a herd of 1,000 head of elk, it had decreased to 53 at last count in February of 2019. The article explains that, for Bill Alldredge, one of the authors of the 2005 study, there is no other explanation than the increased levels of hiking, biking, and skiing in the area that supports this elk herd (Peterson 2019). This outcome adds to the already ample evidence that pregnant animals or those with young—especially mammals—are particularly sensitive to human disturbance (Hennings 2017).

In a study subjecting 13 captive female elk in the Starkey Experimental Forest and Range in Oregon, USA, to four types of recreational disturbances (all-terrain vehicles [ATV] riding, mountain biking, hiking, and horseback riding), Naylor et al. (2009) recorded the elk's resting, feeding, and travel times in response to the disturbances. The authors found travel time (a proxy for energy expense) increased in response to all four disturbances and was highest in mornings. The authors suggest that the elk's lesser response to each disturbance in afternoons was likely due to elk moving away from the disturbances in the mornings and avoiding them for the remainder of the day. Elk travel time was highest and feeding time lowest during ATV exposure, followed by exposure to mountain biking, hiking, and horseback riding. Resting decreased with exposure to mountain biking and hiking disturbance, and elk showed no evidence of habituation to mountain biking or hiking.

In a study of how bison (*Bison bison*), mule deer, and pronghorn (*Antilocapra americana*) responded to hikers and bikers on designated recreational trails at Antelope Island State Park in Great Salt Lake, Utah, USA, Taylor and Knight (2003) found the following: with respect to alert distance, flight initiation distance, and distance moved,[12] there was little difference in how each species responded to hikers versus mountain bikers (with an exception of mule deer flight distance), though each species exhibited its own degree of response in the three parameters tested; and all three species exhibited a 70% probability of flushing from on-trail recreationists within 100 m from designated trails. Trials were also conducted with only mule deer along a randomly chosen, off-trail route to assess the response of mule deer to hikers or bikers off designated trails. From these trials, the authors found that mule deer showed a 96% probability of flushing within 100 m of recreationists located off trails, and the probability of their flushing did not drop to 70% until perpendicular distance reached 390 m. There was little evidence of habituation to recreationists among the species at the time of the study. In fact, the pronghorn at the study site did not habituate to largely predictable recreational use over a three-year period following the opening of trails at the site, and used areas that were significantly farther from trails than they had prior to the start of recreational use.

Carnivores.—In a study of mammalian carnivores in 28 protected areas located in oak woodlands in northern California, USA, Reed and Merenlender (2008) found the following about carnivores' responses to recreationists. Generally, in paired comparisons of neighboring protected areas with and without recreation, the presence of dispersed, non-motorized recreation (hiking, biking, and horseback riding) led to a five-fold decline in the

[12] Alert distance is the distance from a stimulus at which an animal initiates vigilance behavior; more specifically in this context, it is the distance between a recreationist and an animal when the animal first becomes visibly alert to the recreationist. Flight initiation distance is defined in footnote #9. Distance moved is the distance an animal travels from its initial position until it stops (Taylor and Knight 2003).

density of native carnivores and a substantial shift in community composition from native to nonnative species. Specifically, a higher mean number of native species was detected in protected areas that did not permit recreation. By contrast, in protected areas that permitted recreation, more nonnative species were detected, domestic dogs were detected more frequently, and densities of coyotes and bobcats were more than five times lower. The authors concluded that the key variable for moderately sized protected areas (50–2000 ha) near urban development seems to be whether or not the site is open to public access.

In a study within three protected areas in Arizona, USA, Baker and Leberg (2018) found the following about how 11 mammalian carnivore species respond to varying levels of hiking, horseback riding, and border patrol activity. The study sites with the highest levels of human activity had significantly lower carnivore diversity, higher occupancy of common species (coyote, gray fox, and bobcat), and lower occupancy of all other carnivorous species. Generally, rare carnivores (e.g., mountain lion and kit fox, *Vulpes macrotis*), badgers (*Taxidea taxus*), and gray foxes avoided trails, whereas common species (except gray fox) preferred trails. Overall, edges of protected areas appeared to negatively affect occupancy of nearly all the study's species, and the presence alone of roads and trails, and not necessarily how much they are used, has a significant negative effect on the occupancy of most carnivorous species. In general, coyotes and bobcats were the carnivores least sensitive to human disturbance, gray foxes had a moderate negative association with human disturbance variables, and smaller carnivores and mountain lions seemed to be exceptionally vulnerable to human disturbance. Furthermore, the higher the level of overall disturbance in a protected area, the more sensitive carnivores were to disturbance variables.

Conclusions and Suggestions

With the expanding recreation-related disturbance to wildlife in protected areas, their dual role of conserving biological resources and providing nature-based recreational and educational opportunities for people presents a continual challenge to land managers and a continual threat to wildlife and the state's biodiversity, particularly sensitive species. The scientific literature provides clear evidence that recreation can disturb wildlife in several ways. Documented effects include detrimental changes to behavior, reproduction, growth, immune system function, levels of stress hormones, other physiological effects, and finally, the survival of individual animals and persistence of wildlife populations and communities. Having been observed on nearly every continent and in every major ecosystem on earth, recreation-related disturbance to wildlife is increasingly recognized as a threat to global biodiversity, and as having wide-ranging and, at times, profound implications for wildlife individuals, populations, and communities (Dertien et al. 2018). Yet, a prevalent assumption exists that non-consumptive recreation is compatible with wildlife conservation; sources that articulate this assumption in various ways include but are not limited to the Natural Community Conservation Plans/Habitat Conservation Plans (NCCPs/HCPs in the California Department of Fish and Wildlife's (CDFW) South Coast Region, Title 14 of the California Code of Regulations (§630(a)) about CDFW's ecological reserves, CDFW's 2016 State Wildlife Action Plan's Consumptive and Recreational Uses Companion Plan, Burger 2012, Larson et al. 2016, Dertien et al. 2018, and Reed et al. 2019. This assumption underlies the widespread acceptance of non-consumptive recreation in dual-role protected areas.

Is the assumption of compatibility flawed?—The assumption of compatibility rests on four expectations, which are often legal obligations (as with NCCPs/HCPs). First, recreation in protected areas is to occur only in ecologically sound locations. Second, only ecologically sound types, levels, and timing of recreation are acceptable. Third, monitoring is expected to regularly and reliably assess whether the types and levels of recreational activities in protected areas are disturbing the focal species to a degree that these activities should be curtailed or prohibited entirely. Fourth, changes in management are to occur promptly when monitoring determines them to be necessary (see footnote #5 for description of management). In short, the overarching expectation is that recreation would not hinder the achievement of the dual-role protected areas' primary conservation objective (i.e., perpetuation of viable populations of focal sensitive species). At least seven NCCPs/HCPs in the CDFW's South Coast Region explicitly deem recreation compatible or conditionally compatible; most articulate these expectations as conditions that recreational activities in protected areas must meet. Such activities are considered "conditionally compatible" with the protection of the covered species. However, the assumption of compatibility is flawed because: for example, designated trails and trail networks are often ecologically inappropriately planned, designed, or sited; and, even for authorized recreation, there is rarely adequate management to control the allowed types and levels of recreation such that they are compatible with conservation. While finding an appropriate balance between biodiversity conservation and recreation is complicated because recreation-related effects on wildlife vary among species and recreational activities (Larson et al. 2016), there are also societal factors at play that further complicate achieving an appropriate balance and compatibility.

Factors allowing inappropriate planning/siting and inadequate management - a societal conundrum.—The degree to which the above-listed expectations are met varies among NCCP/HCP permittees and other managers of dual-role protected areas, the primary limiting factors being fiscal constraints and each land manager's primary mission. As to the latter factor, for areas protected primarily or solely to conserve biological resources, a serious fundamental conflict with conservation arises when managers' primary mission is to provide recreational opportunities, and the protection of biological resources is a secondary or tertiary priority. As to fiscal constraints, land management budgets generally have not kept pace with the increasing levels of recreation in protected areas (CDFW 2015; Havlick et al. 2016). For example, the activities of the CDFW for resource assessment, conservation planning, and wildlife conservation at risk are "severely underfunded;" in 2005, maintenance, restoration, and management of CDFW's wildlife areas and ecological reserves were supported, on average, at the level of $13 per acre (0.40 ha) and one staff person per 10,000 acres. Many lands were operated at $1 per acre, with no dedicated staff (CDFW 2015—refer to Volume 1, Section 7.3). CDFW's fiscal shortfalls for managing its protected areas mirror the same among public agencies at the local, state, national, and international levels (CDFW 2015); these shortfalls result in continual grave shortages of management personnel and other resources.

California's State Wildlife Action Plan (CDFW 2015) and most of the literature about recreation-related ecological effects identify the economic, educational, and recreational/health benefits of protected areas. They also identify the benefits (e.g., economic) to protected areas from humans pursuing recreational activities. So, despite the documented recreation-related disturbance to wildlife, there seems to be an implicit assumption of a mutually beneficial relationship between protected areas and the humans who benefit from them. But,

the severe underfunding of management for protected areas renders mutual reciprocity in this relationship infeasible; the protected areas' wildlife are heavily on the losing side. This is particularly perplexing given the evidence that lack of adequate management negatively affects not only biological resources, but also societal benefits.

Regarding the human health benefits of protected areas, visible recreation-related damage to the terrain diminishes the level of benefit people enjoy while being in nature, as illustrated by a study examining the relationship between recreational impacts in protected areas and human mental/emotional states (Taff et al. 2019). The study's results demonstrate that, as visible recreation-related ecological impacts increased, sense of wellbeing and mental state decreased, especially in response to settings with unauthorized trails. Collectively, the results show that managing tourism in protected areas in a manner that reduces such impacts is essential to providing beneficial cultural ecosystem services related to human health and wellbeing (Taff et al. 2019). As Wolf et al. (2019) put it, the more attractive a site is, the more likely it is that it will be degraded, which in turn, may diminish the quality of the human experience, and thus, visitor satisfaction. To capitalize fully on the positive aspects of tourism (including recreation) for protected areas, the degradation of resources needs to be constrained to ecologically acceptable levels, and to levels beyond visitor perception (Davies and Newsome 2009; Wolf et al. 2019); otherwise, recreationists may think it unimportant to minimize their own impacts. Also diminishing the human experience are the closures to public access as a default reaction to lack of adequate management, and the liability resulting from injuries that can occur when people use unauthorized trails (Dertien et al. 2018).

There is a two-fold irony here: despite the prevalent emphasis on the societal benefits of protected areas and the purported reciprocal relationship between protected areas and humans, most agencies responsible for managing protected areas are chronically underfunded. And, promoting the pursuit of these societal benefits without protecting the dual-role protected areas' core function (biological conservation) from that pursuit actually undermines both the human experience and biological conservation. This is a societal conundrum that stems at least in part from a societal disconnection.

The factor of a societal disconnection.—A lack of public interest in and concern about protected areas figures into the societal conundrum. Public opposition to trail closures, caps on daily visitation, or reservation systems can be strong and could damage the support for conservation agencies and organizations (Reed et al. 2019), despite the ecological need for such measures for protected areas. A disconnection pervades our society with respect to recreation-related disturbance to wildlife (Marzano and Dandy 2012): 50% of 640 backcountry trail users surveyed in 2001 did not believe that recreation negatively affects wildlife, and recreationists generally held members of other user groups responsible for stress or negative effects on wildlife rather than holding members of their own recreational user group responsible (Taylor and Knight 2003). The results of a survey conducted in 2018 for the San Diego End Extinction (SDEE) initiative to elucidate what the San Diego public know, think, feel, and do in relation to species and habitat conservation, indicate that 71% of the 600 respondents are not knowledgeable about the problems San Diego's plants and wildlife face (Tinkler et al. 2019).[13] While the passage of California Proposition 68 in 2018 reflects the voters' broad support for clean water and access to open space, which were the main elements of the Proposition that promotional efforts emphasized, it is unclear how

[13] The respondents were San Diego County voters and were representative of the voter pool in terms of age, gender, ethnicity, and region, but voters tend to be less ethnically diverse and more educated than the San Diego County population overall (Tinkler et al. 2019).

much the biological conservation-related elements of the Proposition influenced voters.

Overall, it is probable that a large majority of the general public are unaware of or in denial about the disturbance to wildlife from non-consumptive recreation, much less the distinctions between areas protected primarily or solely for conservation and areas otherwise designated as open space (e.g., recreational fields, golf courses, small community parks). Information on these topics is not widely available, and what is in the literature, may not be reaching a broad audience even among conservation scientists and wildlife ecologists (Larson et al. 2016). What then can be done to address this unawareness as a step toward enabling dual-role protected areas to meet their conservation objectives despite the expanding recreational pressure?

Suggested plan of action.—To enable dual-role protected areas to meet their conservation objectives despite the expanding recreational pressure, the optimal approach is to: ensure that all recreational areas (e.g., trails and trail networks) are planned, designed, and sited using ecologically sound criteria; and, to continually employ sufficient proactive and adaptive management to prevent or at least minimize recreation-related disturbance to wildlife; such management would curtail the need for regular enforcement. This approach also has the potential to yield general public support for management, particularly if information provided about management challenges includes data and supporting graphics, specifically about fragmentation, to enhance the public's understanding of the challenges of poorly designed trail systems and the creation and use of unauthorized trails (Leung et al. 2011; Taff et al. 2019; Wolf et al. 2019). But this approach requires perpetual personnel and funding explicitly for management, which in turn points to the urgent need for public advocacy to secure fiscal support for management resources (i.e., fiscal support that is sustainable, perpetual, and at levels commensurate with the recreational pressure; footnote #5). How can this be achieved?

How people perceive their and others' recreation-related effects on wildlife may influence their general perspectives on such effects (Marzano and Dandy 2012). Shifting this perception-perspective nexus over time toward a common value of respecting wildlife may eventually mend some of the aforementioned societal disconnection. A shift in perspectives on the purpose of protected areas is also needed to one of understanding and acknowledging that their core function is conservation (Davies and Newsome 2009; Patten et al. 2017). The only chance there is of influencing people's perceptions is making the pertinent scientific information readily available. So, it is essential to implement a concerted campaign to disseminate science-based information about recreation-related disturbance to wildlife. Such a campaign needs to be well orchestrated, widespread, long-term, continual, and multimedia; this includes social media per Greer at al.'s (2017) conclusions about its efficacy in this context. In addition to the general public/voters (including recreationists), the following parties would be both the audience and the distributors within each of their fields and beyond: the media, environmental organizations, elected officials, policy and land-use decision makers, land management agencies and organizations, outdoor recreation merchants and associations, educational institutions, and researchers. The coverage would be framed as stories aimed to evoke appreciation for the diversity of sensitive species and the many ways they respond to our presence, and provide opportunities for what people can do to lessen the recreation-related disturbance to wildlife, which will benefit not only wildlife and other biological resources in the protected areas, but also the human experience there.

While the objectives of the campaign would be to influence people's perspectives in favor of wildlife and to modify recreational behaviors, policy, planning, and decision-

making accordingly, the final goal would be to cultivate support for and harness the power of advocacy to gain the political will and action needed to secure perpetual fiscal support for management resources. Implementing such a campaign would not be easy nor fast and would take diligent oversight, as suggested by William Craven, the chief consultant for nearly 20 years of California's Senate Natural Resources and Water Committee. In an interview with the California Native Plant Society, he stated, "the best way to achieve your policy objectives is to make sure your policy objectives are funded. For example, small but important programs for the [California Department of Fish and Wildlife] are literally budget dust in the California budget, but unless someone is there to pay attention and connect the dots between the budget and the state laws, we don't get a complete resolution…[P]ositive changes in state law that everyone works so hard to accomplish are really much more effective when someone monitors the budget process to make sure those changes get as much funding as possible" (CNPS 2020). But, it seems that the choices are either to never reverse or at least halt the downward trajectory of wildlife in protected areas experiencing damaging levels and types of recreation or to ambitiously implement such a campaign toward a societal course change (Waterman 2019 for the term "course change").

Several of the results of the survey conducted for the SDEE initiative hint at a potential to mobilize a critical mass of people who learn about the recreation-related disturbance to wildlife and the associated urgent need for resources to address it, and assist in information dissemination. While the survey conducted for the SDEE initiative revealed a knowledge deficit among the respondents regarding problems plants and wildlife face, its results also indicate that, over a 12-month period, 74% of respondents voted in favor of laws to protect the environment, 31% volunteered to improve the environment, and 21% donated money to protect San Diego County's environment; in addition, approximately 70% were willing to pay additional local taxes to protect the environment, and a majority of the respondents were willing to pay up to $50 per year (Tinkler et al. 2019).

One avenue available for advocacy to secure perpetual fiscal support specifically for management of protected areas is assessing recreational fees and taxes. With respect specifically to the management of CDFW-owned protected areas, CDFW's 2005 and 2015 State Wildlife Action Plans recommended implementation of recreational fees and taxes beyond fishing and hunting licenses that would allow non-consumptive recreationists to support wildlife conservation and management of the resources they use and enjoy (CDFW 2015, 2016). To generate funds for the management of all protected areas, a long-successful model could be employed: since the 1930s, hunters have been paying federal excise taxes on the sales of sport hunting and shooting equipment to generate funding for habitat conservation (CDFW 2015). Eighty years later, these taxes plus sales of angling equipment had generated more than $10 billion towards conservation (CDFW 2015). Thus, hunters and anglers have been the primary funding sources for conservation efforts in California and North America (CDFW 2015). Considering the disturbance to wildlife from non-consumptive recreationists, it is past time for them also to pay their way for the use of protected areas through paying taxes on equipment for hiking, biking, riding, etc. to support management of these activities. A secondary benefit of such fees and taxes is that they may establish a direct connection for recreationists between their use of protected areas and the costs of protecting the protected areas, and thereby possibly diminish their disconnection from their disturbance to wildlife.

Other avenues for advocacy to secure fiscal support for management of protected areas include bond measures and voluntary contribution funds (VCF), though neither would necessarily provide a reliably perpetual source of funding. VCFs are sponsored by legislators

to be enacted by the legislature; a VCF in this context would be explicitly and solely for the management of the protected areas in California, including CDFW's lands (with protected areas and management defined as described in footnotes #1 and #5, respectively). The funds must be administered such that they are made available timely. This would be similar to the VCF for California's Rare and Endangered Species Preservation Voluntary Tax Contribution Program which has funded work benefiting California's native at-risk plants, wildlife, and fish since 1983 (CDFW 2019) and now raises around $500,000 annually (FTB 2019).

Mainstream online and print media carried several articles in 2018 and 2019 about the overcrowding at and underfunding for the national parks (e.g., Simmonds et al. 2018; Waterman 2019; Wilson 2019); coverage such as this provides a good foundation of information. Articles like Yong's (2019) about the effects of the human voice alone on wildlife and Peterson's (2019) about the effects of hiking on elk represent steps in the right direction toward mainstream media honing in on specific impacts on wildlife from recreationists in protected areas. Coverage on species local to where people live is important and may make a stronger and more lasting impression with greater potential for shifting the perception-perspective nexus than species or settings remote from consumers of the media. Organizations like San Diego Zoo Global, which spearheaded the SDEE initiative (Tinkler et al. 2019), could significantly assist the campaign by engaging their media engines on behalf of local wildlife threatened by recreation.

A societal quid pro quo for protected areas?—At some point, the exploitation of protected areas resulting from recreation-related disturbance to wildlife, without commensurate reciprocity with care for the protected areas, may outweigh the benefits of public access to protected areas (Bennett et al. 2013). Many protected areas have already reached this point. Without adequate resources to combat the challenge of the obligation to conserve wildlife exposed to ecologically damaging levels and types of recreation, including unauthorized activities, the challenge will persist indefinitely at great risk of jeopardizing the protected areas' ability to meet their conservation objectives.

Regarding the pressure local, state, and federal government agencies have undergone for decades to acquire additional open space for recreation and to expand public access in existing protected areas (Wells 2000 in Reed and Merenlender 2008), elected officials and land-use decision makers need to address the demands, but not at the expense of biological conservation in protected areas. Some of the protected areas (e.g., the NCCP/HCP reserves) represent long-negotiated compromises for the sensitive species they are intended to protect in perpetuity. For some protected areas, no ecologically sound further compromise (e.g., expansion of public access) is possible; while recreation may be considered conditionally compatible in such protected areas, if open to public access at all, the extant levels of recreation may strain their ability to meet their conservation objectives. Protected areas that represent the final compromise for the species they support are particularly vulnerable to their wildlife values being compromised due to inadequate management (CDFW 2015). Ultimately, for wildlife that avoids human activity, it is unlikely that dual-role protected areas are entirely sufficient or justifiable for meeting conservation objectives; limiting or prohibiting recreation in strategic circumstances and locations within protected areas is necessary to achieve conservation objectives (Reed and Merenlender 2008; Bötsch et al. 2018; Dertien et al. 2018; Reed et al. 2019). Of course, this presumes sufficient management to maintain whatever recreational limits are set.

In summary, in the interest of wildlife in California and, more broadly, conservation within protected areas everywhere, the necessary actions with respect to non-consumptive

recreation are to: (1) widely and continually disseminate science-based information about the recreation-related disturbance to wildlife; (2) apply the science to all planning for, policy- and decision-making about, and management of, recreation in dual-role protected areas; and (3) secure perpetual fiscal support for management of recreation in dual-role protected areas commensurate with the recreational pressure.

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Increased hiking and mountain biking are associated with declines in urban mammal activity

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Outdoor recreation can have negative consequences for many wildlife species (Larson et al. 2019, 2016; Monz et al. 2013; Sato et al. 2013). Increasingly, parks and preserves are embedded in a landscape of urban and suburban development (Radeloff et al. 2010), intensifying the exposure of remaining wildlife populations to human activity (Larson et al. 2018). In California, several research groups have studied wildlife responses to recreation in parks and preserves within densely populated coastal cities. Some of the resulting studies have documented negative effects, including declines in native mammal occupancy and detection rates (Patten and Burger 2018; Reed and Merenlender 2008) and reduced daytime activity (George and Crooks 2006), while others have found limited effects of recreation on wildlife occupancy and detection rates (Markovchick-Nicholls et al. 2008; Reilly et al. 2017). Managers need context-specific understanding of the nature and severity of recreation effects on wildlife to sustainably manage recreational use in protected areas, the vast majority of which are open to the public (Leung et al. 2018; UNEP-WCMC and IUCN 2019).

Experimental tests of recreation effects on wildlife can provide valuable insight into species' responses to human activity by minimizing variation in other factors that affect wildlife, such as residential development and vegetation composition. However, fewer than one-third of studies of recreation effects on wildlife include an experimental component (Larson et al. 2016), and a large proportion of experimental treatments exclusively measure immediate reactions of wildlife to an approaching human, often using flight initiation distance (e.g., Ikuta and Blumstein 2003; Jorgensen et al. 2016; Keeley and Bechard 2011). These immediate responses cause increased energy expenditure and can trigger trade-offs between

foraging and flight behaviors (Duchesne et al. 2000), but it is less clear how they may translate into longer-term habitat degradation due to the regular presence of recreationists. It can be logistically difficult to experimentally alter the level of recreation on a trail segment or within a defined area, but when successfully implemented such studies have documented increased presence of nest predators (Gutzwiller et al. 2002) and reduced numbers of bird territories and bird species richness (Bötsch et al. 2017).

Conservation of mammals in densely populated and fragmented habitats such as southern California requires an understanding of the suitability of remaining habitat patches (Crooks 2002; Ordeñana et al. 2010), many of which receive high levels of recreational use (Larson et al. 2018). In this study, we assessed whether increased recreation rates were associated with reduced habitat suitability for native mammals. We conducted an opportunistic, quasi-experimental study of recreation effects on mammals using a before-after-control-impact (BACI) design, taking advantage of the closure and re-opening of an existing recreational trail in an open space park in San Diego, California. We expected that at impact locations (sampling points on the trail that was closed and re-opened), hiking and mountain biking would increase and wildlife activity would decline after the trail re-opened, while human and wildlife activity would remain similar at control locations (sampling points on trails consistently open throughout the study) within the same reserve.

The study was conducted in Black Mountain Open Space Park (32.984, -117.117) in San Diego, California, USA, which is owned and managed by the City of San Diego. The park is 951 ha, comprised primarily of coastal sage scrub and chaparral vegetation communities with some riparian and native and non-native grassland habitats. Dense suburban communities surround the park, and it contains approximately 32 kilometers of multi-use trails visited primarily by hikers and mountain bikers. The park also permits leashed dogs on the trails.

We established a total of seven sampling points on official and unofficial trails within the park in January 2017. Two points were located along the Miner's Ridge loop trail ("impact points", Figure 1), which was closed to public access from January 2017 until April 2018 for testing and remediation of elevated levels of arsenic detected in the soil. Five points were located along nearby trails not affected by the closure ("control points"; Figure 1). Point locations were selected as part of a larger project using a spatially balanced random design using the RRQRR algorithm on rasterized trail network data (Theobald et al. 2007).

To monitor human and mammal activity, we installed one motion-triggered camera (Bushnell TrophyCam HD Aggressor) at each sampling point, housed in metal security boxes and affixed to metal poles pounded into the soil facing recreational trails. We did not bait the cameras to avoid influencing animal activity (Wearn and Glover-Kapfer 2019). Cameras were programmed to take two photos per trigger with a five second delay between triggers. We began monitoring human and mammal activity at the impact points in late October 2017, leaving cameras running continuously until after the trail re-opened in April 2018. At the control points, we collected data between November 2017 and February 2018. After the trail re-opened, cameras operated at all seven sampling points for at least four weeks, ending in June 2018 (Table 1).

The seven cameras captured over 80,000 photos during the study period. Many of these were "false triggers" caused by rapidly growing vegetation, high temperatures, and wind, mostly in the mid-morning to late afternoon. Therefore, we randomly subsampled 20% of photos between 11 am and 5 pm at all sampling points to reduce time spent sorting

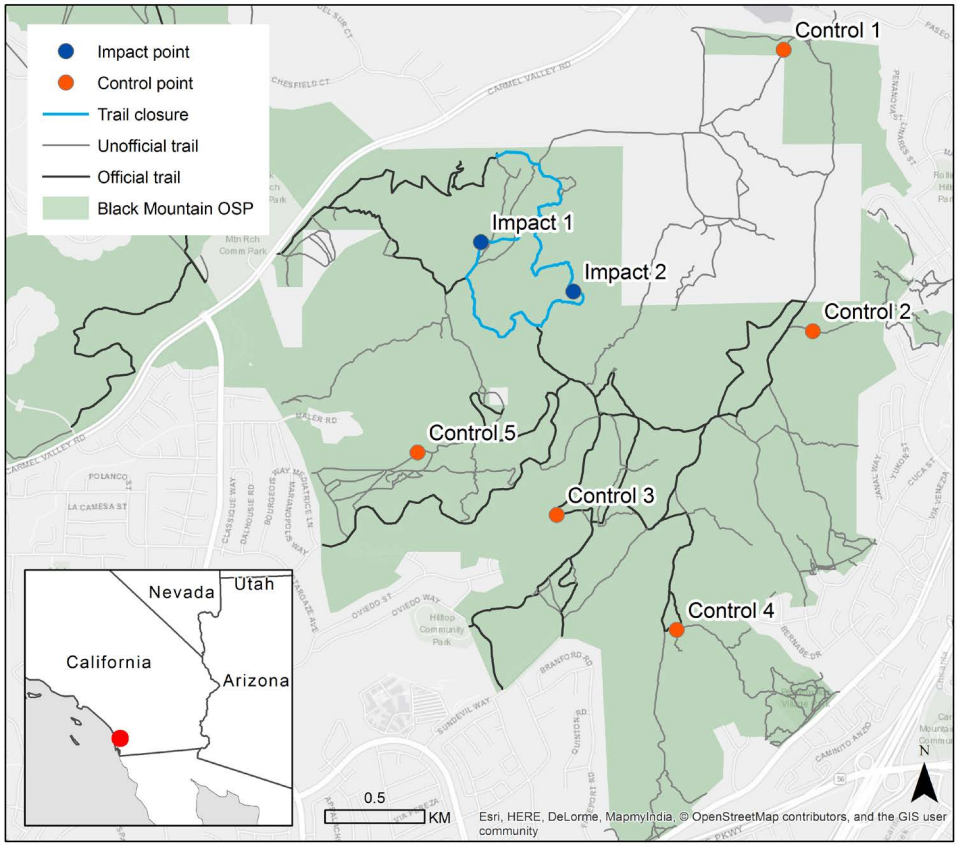

Figure 1. Location and **s**ampling design of the before-after-control-impact (BACI) study conducted in Black Mountain Open Space Park in San Diego, CA, USA.

Table 1. Dates of camera data collection before and after the trail re-opened at impact and control sampling points at Black Mountain Open Space Park. Cameras were not installed or did not operate correctly on all days between the first and last sampling day; the "total days" columns report the number of days on which cameras were operational.

	Sampling effort before trail re-opened			Sampling effort after trail re-opened		
Point	First day	Last day	Total days	First day	Last day	Total days
Impact 1	1 Nov 2017	17 Apr 2018	134	19 Apr 2018	31 May 2018	43
Impact 2	1 Nov 2017	17 Apr 2018	168	19 Apr 2018	28 Apr 2018	27
Control 1	12 Dec 2017	1 Feb 2018	26	18 May 2018	30 May 2018	13
Control 2	12 Dec 2017	1 Feb 2018	26	4 May 2018	31 May 2018	28
Control 3	18 Nov 2017	13 Dec 2017	5	4 May 2018	30 May 2018	22
Control 4	18 Nov 2017	22 Dec 2017	26	4 May 2018	30 May 2018	28
Control 5	19 Nov 2017	22 Dec 2017	21	4 May 2018	31 May 2018	29

photos. Photos were organized in the Colorado Parks & Wildlife Photo Warehouse (Ivan and Newkirk 2016). Humans appearing in photos were categorized by activity (pedestrian, cyclist, equestrian, or vehicle) and animals were identified to species, except for brush rabbit (*Sylvilagus bachmani*) and desert cottontail (*S. audubonii*), which are difficult to distinguish in photos and were both labeled "rabbit."

To assess changes in human activity before and after the trail re-opened, we compared mean people per day at impact and control points using a non-parametric Wilcoxon-Mann-Whitney test since the data are counts. To assess changes in mammal habitat use before and after the trail re-opened, we used single-species occupancy models for each mammal species with sufficient detections using the R package *unmarked* (Fiske and Chandler 2011). Detection data were pooled into 5-day sampling occasions, resulting in ten survey occasions with five before and five after the trail re-opening. We did not include habitat covariates because minimal changes in habitat occurred between the sampling periods and because our primary goal was to investigate the interaction of treatment (control or impact sampling point) and time period (before or after the trail re-opened). Therefore, treatment and time period were the only variables included in the models, and we included the interaction (treatment*period) to test whether species showed a response to the trail re-opening. When a species was predicted to occur at all or nearly all sampling points, we assessed changes in detection probability rather than occupancy as a measure of relative activity or frequency of habitat use (Lewis et al. 2015; Wang et al. 2015).

Across all sampling points and time periods, there were an average (± 1 SD) of 12.2 ± 21.7 hikers, 7.2 ± 10.0 cyclists, 1.7 ± 3.2 dogs, and 0.01 ± 0.2 horseback riders per day at each sampling point, as well as infrequent motorized vehicles (park staff or utility personnel) at one sampling point where the trail was drivable. These recreation rates are relatively low compared to other parks and preserves in the region (Larson et al. 2018). People did not cease using the trail while it was closed, with the two impact points averaging 18.0 ± 15.8 and 20.4 ± 14.9 people per day during the closure (Figure 2). However, human activity approximately doubled at the impact points after the trail re-opened, averaging 38.2 ± 28.9 and 38.9 ± 19.6 per day (time period differences: $P < 0.001$). At the control points, human activity was similar between time periods (all $P > 0.33$) except for Control 5, which averaged 5.7 ± 8.1 people per day before and 23.2 ± 13.0 after the trail re-opened ($P < 0.001$). Control 5, located on an unofficial trail, is not part of the most obvious loop routes that could be made using the closed trail, but it could be connected with a longer loop route using unofficial trails, and therefore may have experienced depressed visitation rates during the closure period. Therefore, we ran additional occupancy models in which Control 5 was considered an impact point to ensure our results were robust to this possibility.

Mammal species we detected included rabbits (*Sylvilagus spp.*, total photos n = 537), coyotes (*Canis latrans*, n = 409), bobcats (*Lynx rufus*, n = 135), California ground squirrels (*Otospermophilus beecheyi*, n = 22), black-tailed jackrabbits (*Lepus californicus*, n = 4), raccoons (*Procyon lotor*, n = 2), and mule deer (*Odocoileus hemionus*, n = 1). However, only the bobcat, coyote, and rabbit were detected frequently enough for analysis. Bobcats were detected at six out of seven sampling points, and coyotes and rabbits were detected at all seven points; accordingly, we used detection probability rather than occupancy as our primary variable measuring changes in frequency of habitat use for all three species. At sampling points where they were detected, each species was detected at least once before and after the trail re-opening.

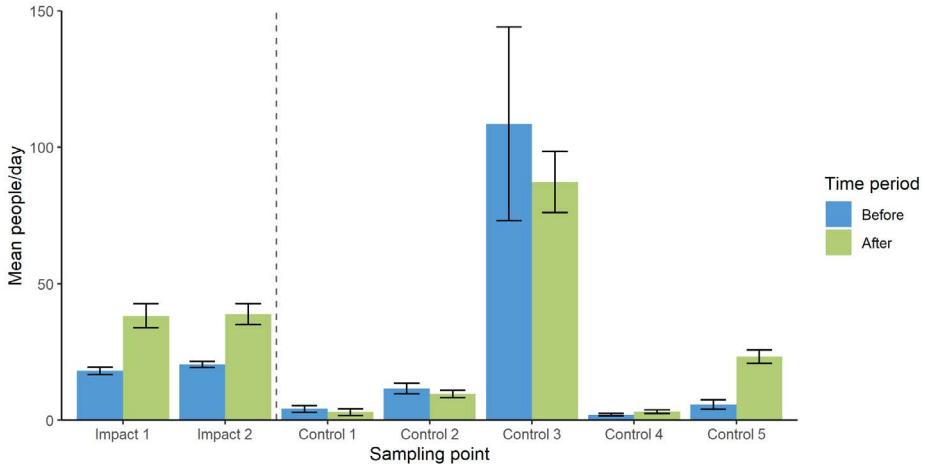

Figure 2. Human activity (mean people per day) before and after the Miners Ridge Loop trail re-opened at impact and control sampling points at Black Mountain Open Space Park. Error bars show one standard error. Differences between time periods were significant ($p < 0.05$ using a *t*-test) at Impact 1, Impact 2, and Control 5. The vertical dotted line divides the impact points (left) from the control points (right).

Occupancy models showed that detection probability was reduced at impact points after the trail re-opened for bobcats and coyotes, while remaining approximately the same at the control points (Figure 3). The effect was particularly strong for bobcats, with detection probability dropping from 0.90 ± 0.09 to 0.40 ± 0.15 at impact points after the trail re-opened while detection probability at control points increased slightly from 0.53 ± 0.13 to 0.65 ± 0.12. The interaction of treatment*period for bobcats was significant (z = 2.15, P = 0.03). Coyotes were detected at impact points during nearly every occasion before the trail re-opened (detection probability of 1.00 ± 0.001) but afterwards detection probability dropped to 0.70 ± 0.14, while detection probability increased slightly at control points from 0.79 ± 0.09 to 0.82 ± 0.08. However, the interaction term was not significant for coyotes (z = 0.14, P = 0.89). Rabbit detection probability did not differ significantly in relation to time period or treatment (interaction term z = 0.52, P = 0.61). Results did not change for bobcats or rabbits when Control 5 was considered an impact rather than a control point, but for coyotes patterns became less clear, with detection probability dropping more at control than impact points after the trail re-opened.

The number of sampling points was small due to the opportunistic nature of our study, limiting our ability to detect an effect of altered recreation rates on wildlife activity. Therefore, the fact that we still observed reduced activity rates by bobcats and, to a lesser extent, coyotes is particularly notable. Our findings echo those of previous studies in the region, which have found that these species and other mammals avoid human presence on short time scales (same-day occurrence; Patten and Burger 2018), and restrict their activity

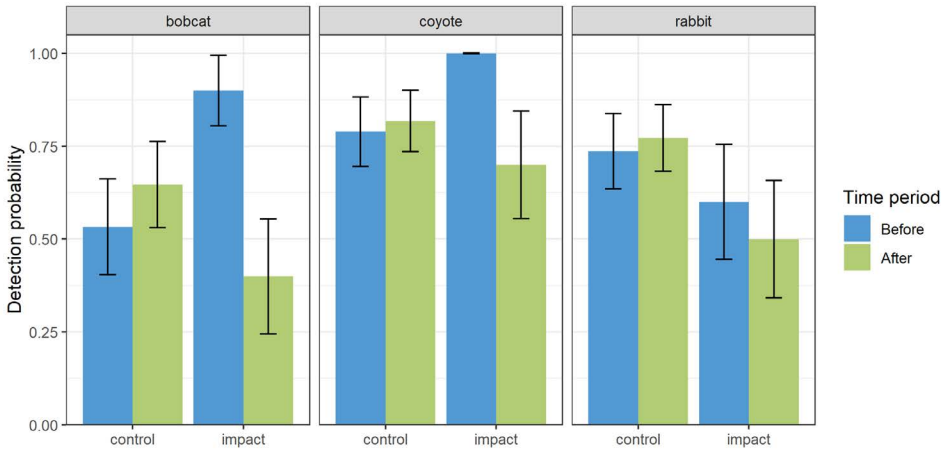

Figure 3. Predicted detection probabilities from single-species occupancy models for bobcats, coyotes, and rabbits before and after the Miners Ridge Loop trail re-opened at impact and control sampling points at Black Mountain Open Space Park. Error bars show one standard error. The interaction term for treatment*period was significant ($P < 0.05$) for bobcats.

in high human-use areas (George and Crooks 2006). We observed greater responsiveness in bobcats than in coyotes. While both carnivore species have shown sensitivity to recreation in previous studies (Patten and Burger, 2018; Reed and Merenlender 2008), coyotes can be relatively tolerant of human disturbance due to their adaptable behavior and omnivorous diet (Riley et al. 2003; Ordeñana et al. 2010). We did not observe changes in rabbit activity rates in connection with increased human activity, or by extension, reduced predator activity. Their smaller home ranges compared to bobcats and coyotes may mean that they are less able to shift their within-home range habitat use in response to short-term changes in human and predator activity.

Previous studies have also found that these species may shift their diel activity patterns to be more nocturnal in areas with higher human use (George and Crooks 2006; Reilly et al. 2017; Wang et al. 2015; Nickel et al. 2020). While shifts in diel activity patterns may have occurred in our system, overall activity levels were lower after the trail was re-opened, indicating than any temporal shift did not completely mitigate effects of human presence. However, despite changes in activity levels (as measured by detection probability), we did not observe changes in the occupancy status of the sampling points, suggesting that while the habitat may have been somewhat degraded, it was not completely unsuitable after the trail re-opened. Given the relatively small size of the park and its highly developed surroundings, reduced use of impact points by bobcats and coyotes likely indicates a partial shift in habitat use to other areas of the park. Bobcats slightly increased their use of the control points after the trail re-opened, perhaps suggesting such a shift, though this difference was negligible for coyotes.

Future experimental manipulations at larger spatial and temporal scales could help assess the consistency of our findings, increase the precision of estimated detection probability parameters, and assess responses of additional wildlife species. The opportunistic nature of our study design resulted in spatial separation of the impact and control points,

which may have limited their ability to serve as true replicates due to spatial autocorrelation (Legendre 1993). A true experimental design with randomly assigned treatment and control locations would provide stronger evidence of recreation effects, such as the study by Bötsch et al. (2017) which documented reductions in bird territory establishment in response to low levels of recreation compared to areas with no recreation. Coordination with volunteer groups and docent-led programs or using recorded human voices (e.g., Suraci et al. 2019; Ware et al. 2015) could make it more feasible to experimentally apply treatments that simulate higher levels of recreation.

Though the level of human activity approximately doubled after the trail was re-opened, we speculate that the difference may not have been obvious to recreationists. Forty people per day, approximately the average level of use after the trail re-opened, is still low compared to many other San Diego-area parks and preserves (Reed et al. 2019). However, this difference appears to have been perceptible and meaningful to wildlife, and perhaps crossed a critical threshold of disturbance causing reduced rates of use of the trail. Accordingly, habitat degradation near trails due to human disturbance is likely common across parks and preserves across the region.

Our findings highlight that wildlife can respond rapidly to changes in the levels of human disturbance, even when they have experienced similar levels of disturbance previously. Data collection for the 'after' period started immediately after the trail was re-opened and continued for four weeks. The observed reduction in detection probabilities suggests that bobcats, and to a lesser degree coyotes, may respond to changes in the relative intensity of human activity by rapidly altering their fine-scale habitat selection. Rapid avoidance responses to recreation have been previously documented for mountain caribou (Lesmerises et al. 2018) and bottlenose dolphins (Lusseau 2004), but it is not clear how short-term behavioral avoidance may translate to fitness or population impacts (Bejder et al. 2006). Higher recreation intensity was presumably not novel to these individuals since the trail had been open to recreation for many years prior to our study, which suggests that the animals were not fully tolerant of prior levels of human disturbance. It is therefore possible that for these species, habitat degradation from recreation could be relatively quickly reversed if human activity was limited to lower levels, or spatially or temporally constrained. Land and wildlife managers often use seasonal closures to protect wildlife during periods of heightened sensitivity such as the breeding period (Burger and Niles 2013; Coleman et al. 2013; Richardson and Miller 1997), but the efficacy of these closures is rarely tested. The rapid response we observed suggests that targeted temporal closures could be a promising approach for reducing impacts of recreation.

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Author contributions:
Conceived and designed the study: CLL, SER, KRC
Collected the data: CLL
Performed the analysis of the data: CLL
Authored the manuscript: CLL
Provided critical revision of the manuscript: CLL, SER, KRC

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An assessment of non-consumptive recreation effects on wildlife: current and future research, management implications, and next steps

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Most research on the effects of non-consumptive recreation on wildlife to date has focused on birds and mammals. This research typically focuses on behavioral responses of individuals despite practical limitations in extrapolating ecological outcomes from individual behavior. Data gaps therefore present difficulties in integrating wildlife-protective policies into public access management. These gaps are exacerbated by a lack of wildlife studies that include data on public use patterns of open space areas. In a survey of park and open space managers in the San Francisco Bay Area, few of the entities surveyed restricted recreational access permanently or seasonally to address biological constraints; yet most indicated the presence of sensitive plant or animal species on their lands or stated conservation as one of their organization's purposes. To better bridge the gap between research and management practice, more research is needed on species beyond birds and mammals. This research should extend beyond noting behavioral response and should integrate investigation of outdoor recreation use patterns.

Key words: California, non-consumptive recreation, open space, parks, public access management, San Francisco Bay Area, wildlife

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Throughout the state of California, there exists a large diversity of designated open space and protected areas that allow public access and outdoor recreation. Based on data from the Survey of Public Opinions and Attitudes on Outdoor Recreation in California, the average number of days of outdoor recreation participation among adult Californians

is 96 days per year (California State Parks 2012). Based on California's population of approximately 27.4 million adults in 2008, California State Parks estimated approximately 2.6 billion days of outdoor recreation by adults during that year; that figure would be higher based on current population estimates. Within regional, state, or national parks, outdoor recreation participation (i.e., adults and children) totaled an estimated 478 million days, and for non-park natural and undeveloped areas there were an estimated 368 million annual days of outdoor recreation participation (California State Parks 2011).

A large portion of outdoor recreation activity consists of frequent use in the same areas by the same visitors. Much of it is relatively close to visitors' homes, and with California's warm, Mediterranean climate, outdoor recreation use often occurs near dawn and dusk, the times of day when multiple wildlife species are most active. Many areas where outdoor recreation occurs also provide occupied or potentially suitable habitat for special status wildlife species. California includes a variety of habitats that are occupied or potentially occupied by 181 state or federally listed wildlife species (CDFW 2019).

Non-consumptive forms of outdoor recreation (defined as those activities that do not include fishing and hunting) can impact wildlife species and their habitats in a variety of ways. There may be loss of individuals along trail corridors through incidental recreational use, such as crushing burrows or destroying nests. Non-consumptive recreation may also affect habitat. For example, recreation facility development can remove habitat, and recreational use of facilities can result in water quality degradation, soil erosion, and ground cover loss (USDA 2008). Presence of humans may cause displacement or change in behavior of wildlife, both temporary and permanent, through proximity to habitat, habitual use of an area (e.g., trails), or through direct harassment (Trulio et al. 2013; Shannon et al. 2014). There may also be effects on wildlife behavior from nighttime outdoor recreation activity, including light and sound pollution, or other disturbances associated with these recreational activities. Littering can have both direct and indirect effects (Boarman 2002), and bringing pets to open space and other types of protected areas may also cause direct and indirect impacts to wildlife species (Reed and Merelender 2008; Reilly et al. 2017).

However, despite more than 40 years of research on this topic, significant information gaps exist. The purpose of this article is to: 1) summarize what is known about effects on non-consumptive recreation on wildlife, 2) summarize current management practices used by park and recreation agencies in the San Francisco Bay Area to manage public access to protect wildlife, and 3) suggest additional research that will help fish and wildlife managers as well as park and open space managers more effectively manage and respond to potential impacts of non-consumptive outdoor recreation on wildlife species and their habitats.

CURRENT STATE OF THE KNOWLEDGE

Overall state of the knowledge

To preliminarily identify potential data gaps and long-term trends in the literature, we searched Google Scholar for articles containing the keywords "non-consumptive recreation" and "wildlife" at ten-year increments from 1980 to 2019. We subsequently performed the same query substituting "plants" for "wildlife." We identified 515 results containing the keywords "non-consumptive recreation" and "wildlife" between 1980 and 2019. Of these, 26 (5%) were published in the 1980s, 82 (16%) in the 1990s, 170 (33%) in the 2000s, and

237 (46%) in the 2010s. The same search with "plants" substituted for "wildlife" yielded 298 results between 1980 and 2019—15 (5%) in the 1980s, 44 (15%) in the 1990s, 105 (35%) in the 2000s, and 134 (45%) in the 2010s.

It is clear that the number of articles related to non-consumptive recreation and plant and wildlife management has increased over time, and that wildlife is consistently more studied than plants. More granular trends in the literature are less immediately apparent. We therefore identified several comprehensive literature reviews from the last 40 years to better understand which topics in plant and wildlife management are most often studied. In particular, we sought out reviews that would elucidate long-term trends in which types of recreational activities are the most studied, whether response variables are typically quantified at the individual or population level, which taxa are the most studied, and other trends that may inform the scope of future research. Due to the higher volume of studies available on wildlife than plants, we focused our efforts on wildlife-centered articles.

Boyle and Samson (1985) conducted a comprehensive review of the state of knowledge in which they identified trends in studies containing original data on terrestrial vertebrates in North America (n = 166). These articles most often studied birds (103, 62%), followed by mammals (70, 42%), with few studies of herpetofauna (7, 4%). Boyle and Samson reported negative effects for most activities and taxa, postulating potential mechanisms such as direct disturbance and indirect effects such as habitat degradation, noting that the latter may result in simpler vegetation profiles and overall loss of habitat diversity. Positive effects on overall biodiversity were reported in a few studies, but these positive effects typically corresponded with increased abundance and diversity of common species well-adapted to frequent disturbance by humans. Based on data gaps identified through their review process, Boyle and Samson concluded that primary shortcomings in the literature included a lack of experimental, rather than observational data, and a need to move from assessment of disturbance and mortality to analysis of long-term ecological effects (Boyle and Samson 1985).

A more contemporary review conducted by Larson et al. (2016) analyzed 280 articles on the effects of non-consumptive recreation and wildlife. This review was broader in scope than that of Boyle and Samson, including a wider swath of recreational activities and all taxa globally. Although these results are not directly comparable due to differences in scope, Larson et al. identified similar trends to Boyle and Sampson 31 years earlier. The researchers found that articles remained mostly observational, with only 30% of articles containing an experimental component. Among the articles included in their review (n = 280), mammals were studied the most often (114, 42%), followed closely by birds (101, 37%). A wide gap was observed between mammals and birds and invertebrates (34, 12%), herpetofauna (17, 6.2%), and fish (14, 5.1%). Notably, the authors found that the majority of species studied with International Union for Conservation of Wildlife (IUCN) status were classified as species of least concern, and that endangered, critically endangered species, and data-deficient species were the least often studied. Similar to Boyle and Samson, most studies evaluated identified significant effects of non-consumptive recreation on wildlife, with negative effects being the most frequent. Most studies that showed unclear results as to whether effects were positive or negative had a behavior-based response variable, demonstrating the challenges associated with interpreting behavioral responses (one of which is the potential for wildlife to habituate to recurring, non-threatening recreational use), and the implications for long-term ecology and land management (Larson et al. 2016).

Most studies on the effects of non-consumptive recreation on wildlife were conducted

in North America (Larson et al. 2016). In a paper on recreation impacts on wildlife submitted to the federal Interagency Visitor Use Management Council (IVUMC), Marion (2019) summarized the current state of research, with results falling into five broad categories. The categories included: 1) type of recreational activity; 2) recreationist behavior; 3) impact predictability; 4) impact frequency and magnitude; and 5) impact timing and duration. In regard to category one, Marion found mixed results on impacts from slow versus fast (e.g., walk, run, mountain bike, motorized vehicles) recreation activities. Regarding category two, he found visitors who directly approach wildlife are perceived as threatening, and wildlife are less disturbed by recreation travel that is slow, quiet, and in directions parallel to or away from them. Marion also found that wildlife are able to adapt to and tolerate consistent nonthreatening recreational activities, but unpredictable recreational activity in less visited off-trail locations can cause greater impact (category three). Repeated human interaction and disturbance of wildlife can exceed a threshold of tolerance that causes wildlife to leave a preferred habitat (category four). In regard to category five, Marion found wildlife show locational and seasonal sensitivities to recreation. Marion then describes multiple strategies to manage recreation to minimize impacts on wildlife, which are summarized later in this paper.

California-focused research

California plays an important role in this body of research due to its abundant biodiversity and large areas of protected and/or publicly-owned lands. California has been relatively well-studied, with most research focused on birds, and more recently mammalian carnivores. The discussion below is not intended to be exhaustive but rather to summarize the findings of representative research efforts with implications for recreation and wildlife management and provide context for on-the-ground practices and recommendations, with a focus on California.

In the San Francisco Bay Area, several studies on avian wildlife have emerged in recent years. A 2008 study on foraging shorebirds and trail use found no change in behavior or species diversity during trail use (Trulio and Sokale 2008). These findings indicate foraging shorebirds at regularly used trails may habituate to human activity. However, other experimental studies have found that shorebird numbers decreased with human presence on trails (Trulio et al. 2013), and that trail uses such as jogging and dog walking can increase flight distance (Lafferty 2001). Differences in shorebird response to human disturbance are likely attributable to the birds' degree of habituation to human disturbance. Studies indicate that shorebirds in areas of more frequent human disturbance display less response to human activity; although, birds tend to use these areas at lower rates than areas with less disturbance (Josselyn et al. 1989). Trulio et al. (2013) recommended keeping trail users at least 50 m from foraging habitat. They also suggested that infrequent trail use may be more disruptive to birds then frequent trail use, indicating that habitation may occur as referenced above. Similarly, Miller et al. (1998) found the composition and abundance of birds to be altered in a Colorado grassland and forest setting, with an area of influence of approximately 75 m (zone where human activity may displace wildlife from suitable habitat).

As exemplified by these studies, even the least intrusive non-consumptive recreational activities, such as hiking and picnicking, have the potential to affect wildlife. Reed and Merenlender (2008) examined this possibility in the context of mammalian carnivores in the Northern San Francisco Bay Area. They consistently found that sites where quiet, non-

consumptive recreation is permitted had lower density of native mammalian carnivores than areas with no recreation. All recreational sites showed a shift in carnivore detections toward non-native carnivores such as domestic dogs and cats (Reed and Merenlender 2008). These results corroborate the relatively consistent finding that the mere presence of humans and their introduced domestic species may prove detrimental to native wildlife, regardless of the types of recreation in which they engage.

The finding that community composition shifted toward non-native species such as domestic dogs where recreation was permitted suggests a need to better understand the effects of dogs on native wildlife and the efficacy of various dog management strategies. This need is furthered by the outsized role dogs tend to play in open space management efforts. To follow up on their previous findings, Reed and Merenlender (2011) further studied the effects of different dog management policies in recreation areas. They found no significant differences in mammalian carnivore abundance or species richness between recreational sites with no dogs, sites with on-leash dogs, and sites with off-leash dogs. They did, however, identify significant differences between all three types of sites and reference sites with no recreation, suggesting that the presence of humans is a more important influence on species diversity and carnivore density than that of dogs (Reed and Merenlender 2011).

MANAGING PUBLIC ACCESS TO PROTECT WILDLIFE

To better understand whether trends identified in the literature are translated to open space management practice, we obtained information from local park, recreation, and open space area managers on how they address public access and its potential impacts on wildlife. Due to the abundance of literature focusing on the region and the richness of open space availability and biodiversity in close proximity to urban populations, we focused this effort on the San Francisco Bay Area.

Case study on San Francisco Bay Area open space management strategies

To assess current practices in addressing biological constraints in public access management and to identify how principles elucidated in the literature are applied in practice, we conducted a case study based on information obtained from ten open space management entities in the San Francisco Bay Area. Four of these were special districts, four were county agencies, and two were non-profit organizations. Each organization is identified numerically in the following discussion for the purposes of anonymity. All organizations were contacted by email in September 2019 and provided a survey with a standardized set of questions on public access management approach in areas known to contain sensitive biological resources. Each organizations' webpage was subsequently queried for supplemental information.

Five of ten organizations contacted via email responded to initial outreach efforts. Of these, three indicated that they restrict recreational access to some or all of their lands based on the presence of sensitive biological resources (County Two, Special Districts Two and Three). The other two respondents said they do not restrict access on any of their lands (Special District Four) or that they entitle open space preserves but do not hold land in the long-term or provide access opportunities (Non-Profit One).

County Two's response suggests limitations in their capacity to restrict public access for the purposes of addressing biological constraints. This County was in the process of de-

veloping a dog policy to determine where dogs are permitted and where leashes are required. In describing this policy, County Two representatives did not specify any biological factors being considered. Outside of its dog policy, the County indicated that they may restrict park access due to wet weather or public safety concerns; but that they generally do not restrict access for biological reasons apart from seasonally fencing off a small portion of one park for nesting shorebirds. In describing their shorebird protection efforts, representatives stated that they only restrict access insofar "as that is allowed."

Webpage queries of all 10 organizations demonstrated that a management approach similar to County Two's was common. There was little indication of restricted recreational access such as permit-only areas or seasonal park or trail closures to address biological constraints, with dog policies being the most common strategy to protect wildlife. Most permits were related to facility rental or special event production, with some parks containing sensitive plant species also providing scientific collection permits. Furthermore, most seasonal trail closures cited severe weather and trail washouts, and few were explicitly tied to biological concerns. Among the organizations surveyed, restricting the presence of dogs in parks was the most common strategy used by land managers to reconcile potential incompatibilities between non-consumptive recreation and sensitive species protection. Virtually all organizations had some type of dog policy in place or were in the process of establishing a dog policy. More than half of them specifically cited disturbance of wildlife or other biological constraints when describing dog access restrictions. Policies ranged from outright prohibition of dogs to requirements that dogs be kept on leashes.

Special District One was a notable exception to the patterns described above. In addition to restrictions on dogs, this organization employed a variety of methods, including permit-only access areas and seasonal trail and road closures. Special District One maintains one area that can only be accessed by permit holders. This area provides habitat for special-status avian species and other non-special status wildlife species. Recreational activities in this area are restricted to camping, hiking, horseback riding, and backpacking, and permits must be purchased in advance. Hunting is not allowed. Additionally, Special District One closes portions of one park annually for raptor nesting, and at the time of writing, one other park had trail closures for unspecified habitat protection. Special District One indicated in its response to outreach efforts that it annually and occasionally employs this technique as needed, closing trails and roads based on the presence of wildlife during sensitive windows such as nesting or mating. Moreover, correspondence with this District indicated that they purchase lands in collaboration with conservation organizations and place these lands under easement, and that when these lands become publicly accessible, permissible recreational activities are limited to those compatible with applicable habitat conservation plans. In addition to these strategies and similarly to other organizations, Special District One provides restrictions on where and how dogs may be present on their land. Biological considerations incorporated in this District's dog policy included prohibition on dogs where specified by conservation easements and in sensitive habitats such as marshes and wetlands.

The two non-profit entities included in this study had management practices that were among the most wildlife-protective. Non-Profit One indicated that opportunities for public access on their lands are very limited due to their high conservation value and the organization's emphasis on preserving biodiversity—suggesting an approach placing higher value on conservation than recreation and incidentally allocating recreational opportunities where compatible with biological constraints. Perhaps the most unique management strategy

identified in our case study was employed by Non-Profit Two. This organization divided their lands into two distinctive types of preserves—with the primary purpose of one type being public outreach and education, while the other type primarily served conservation purposes. While conservation and restoration activities are held on both types of preserve, the former includes more opportunity for educational events, hiking, and community volunteer days than the latter, where public access is limited due to resource constraints.

In our outreach and website queries, we looked for permit-only access areas, seasonal trail closures, restrictions on dogs, and other management strategies. Few of the public entities included in this case study restricted recreational access permanently or seasonally to address biological constraints, with surveyed non-profit organizations doing so more holistically. Yet, most public entities indicated the presence of sensitive plant or animal species on their lands or stated conservation as one of their organization's purposes. Although this case study examines a small, non-representative sample of management entities, these findings suggest that the public land management agencies that responded to our query may be constrained by mission and purpose in their ability to limit public access relative to other organizations such as non-profits with a singularly focused purpose of resource protection.

ADDITIONAL RESEARCH NEEDS

Several implications emerge from our review: 1) research efforts need to extend beyond noting individual behavioral responses; 2) more research is needed on species beyond birds and mammals; and 3) impact studies needs to be more frequently integrated with research on outdoor recreation use patterns.

The studies we reviewed indicate that although some research has been conducted on the effects of non-consumptive recreation on wildlife, the scope is generally narrow. There is a need for additional information on other taxa, given the number of listed species that are not birds or mammals. Moreover, recreational impacts on special status plant species are consistently less studied than those on wildlife, despite the high number of listed plant species, and the fact that habitat degradation (including impacts to vegetation) is a potential mechanism for recreation's impacts on wildlife. One example of such an investigation is the Spring Mountains National Recreation Area Landscape Analysis (USDA 2008). This report included an evaluation of spatial impacts from current and future recreation facilities on habitat loss for 30 special status species, most of which were plants. Another example is the Marin County Road and Trail Management Plan (Marin County Parks and Open Space District 2014) which included an analysis of illegally constructed mountain bike trails on special status species, most of which were plants.

Our findings suggest that individual wildlife response to recreational activity is studied more often than population-level response. One exception is experimental, longitudinal research conducted by Riffell et al. (1996), who evaluated the effects of repeated intrusion by hikers to avian communities in Wyoming's Medicine Bow National Forest for 10 weeks during the breeding season over 5 years. Their study found no cumulative or yearly declines in seasonal species richness, mean richness, or mean total abundance. They did find that repeated intrusions altered the composition of the community represented by the most common species, but no widespread impacts on avian community structure were documented. Continuing this line of research will be important to evaluate recreation impacts at the population level. This is particularly crucial given the nature of Federal and State regula-

tory schemes for endangered species, which typically take a population-based approach to species protection. Moreover, conducting research at the population level eliminates the need to interpret individual-level responses' implications for broader conservation efforts. Extrapolating individual response to a population-level context can prove difficult (Bejder et al. 2009; Caro 2007), and eliminating the need to do so reduces uncertainty for decision-makers.

Population-based outcomes should continue to be incorporated in future studies to facilitate stronger understanding of recreation's implications for conservation. While this is a more difficult undertaking than simply investigating behavioral responses, this type of research is needed to inform policies implemented by land managers. Useful models for conducting long-term, quasi-experimental research that addresses the larger question of population viability in the context of known threats, including non-consumptive recreation, to special status species exists in previous studies and can be used to inform future research.

Additionally, the taxa studied need to be prioritized to include additional groups. Mammals and birds have been studied more often than other taxonomic groups since non-consumptive recreation became a popular topic of research in the 1980s, and continue to be the most studied today. This does not necessarily correspond with greater conservation or research needs, especially considering the high number of amphibian, reptile, and invertebrate species with special status as designated by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service (~61% of listed species in California). If park and open space managers are to make informed, high-impact conservation decisions using the limited resources available to them, research efforts must be prioritized based on conservation need rather than focusing on the most visible species. Similar work is needed to provide frameworks for prioritizing research dollars in wildlife and open space management.

Before embarking on a new vein of research to address these above areas, it may be useful to consider comments offered by Dr. David Cole and William Hammitt, from their textbook, *Wildland Recreation: Ecology and Management*. From Hammitt and Cole (2015):

> The relationship between amount of recreational use and wildlife impacts is not well understood. Very few studies have systematically examined the effects of varying numbers of visitors on wildlife. Even fewer wildlife studies have determined an accurate population count of organisms prior to the introduction of recreation…..Previous research indicates the complexity of the relationship by stating that the number of visitors cannot be considered in isolation from species requirements and habits, setting attributes, and type of recreational use. Various aspects of use intensity are also involved, including frequency and regularity of use and number of people at one time.

Thus, the third area where additional research is needed is integrated research that links specific outdoor recreation patterns to effects on species distribution and abundance. Some of this is occurring via research by Larson, Reed, Merelender, and others. For example, Larson et al. (2018) correlated recreational use levels with habitat occupancy for seven special status species for 18 reserves in San Diego County. This is a thorough research effort that integrates a model to predict recreation use levels with whether habitats for special status species are occupied. A more comprehensive and robust effort is needed that extends this type of research to a variety of habitat types and recreational use levels

throughout California. Finally, the effectiveness of the "regulatory toolkit" that park, recreation, and open space managers have to control outdoor recreation use is well-established for federal lands, but its applicability to protected areas in close proximity to urban areas is largely unknown. Marion (2019) mentions strategies on how to address recreation impacts to wildlife including: reducing use, modifying the timing and location of use, modify the type of use, visitor behavior and expectations, and maintain and/or rehabilitate the resource. In regard to modifying visitor behavior, there is an entire body of research that focuses on how well visitors comply with wilderness and other protected area regulations (Lucas 1981; Washburne 1982; Duncan and Martin 2002; Marion and Dvorak; Martin and McCurdy 2010), and a review of low impact education programs (Marion and Reid 2007), such as Leave No Trace, suggests these programs can be effective at altering visitor behaviors that can cause impacts to natural resources. However, what has not been well investigated is how widespread such programs are implemented by park, recreation, and open space managers, and their applicability to open space preserves near urbanized areas.

Furthermore, it is important for research to go beyond theory and be adopted into practice by land managers. Research findings must be placed into a conservation and management context, with actionable priorities and recommendations for park, recreation, and open space managers. Researchers should engage with park and open space managers to ensure that science-based policies are enacted. Although limited in scope, our case study indicates some potential disconnects exist between the scientific community and on-the-ground open space management entities. For example, a large portion of the San Francisco Bay Area open space management and wildlife conservation efforts focused on developing sound dog policies; yet our research on the matter suggests that the effects of dogs are secondary to those of the presence of humans. Therefore, it may be of higher impact to examine ways to limit human activity in areas with sensitive biological resources through trail routing, permanent and seasonal park closures, and other methods.

Researchers and managers should therefore work together to develop, implement, and test science-based strategies. Social science-based methods should be included when testing approaches to better understand compliance with and attitude towards various management approaches as well as park use patterns. Several studies described above (Duncan and Martin 2002; Martin and McCurdy 2009) integrated these methods into their research but were focused on compliance with wilderness regulations.

Taylor and Knight (2003) demonstrated a potential approach for researchers to integrate study of park user perceptions into their work. They used a behavior-based model to study ungulate response to hikers and mountain bikers in a state park in Utah and, importantly, analyzed visitors' perceptions of their own effects on wildlife. They found that recreationists tend to attribute adverse effects on wildlife to other recreationists' actions and not their own. These results illustrate the importance of park user education as well as collaboration between the natural and social sciences in recreation and wildlife management.

Another example may be found in research conducted by Jefferson County Open Space District in Colorado, which has documented "heat maps" of recreation use for trails that bisect their open space areas. This information can then be overlaid with known or potential occurrences of special status species. Accurately collected recreation use data such as these would help biologists and park and open space managers better understand the relationship between overall park use patterns and wildlife impacts, an area of research that we found to be notably understudied.

To move toward sound management practice that effectively accommodates demand for public access and need for species protection, methodological changes and research prioritization are needed. Through review of literature related to the effects of non-consumptive recreation on wildlife and a survey of local agencies' integration of science-based methods into open space management efforts, we found that significant data gaps exist in both science and policy. New frameworks are needed to prioritize conservation efforts, which identify sensitive resources and integrate these into management efforts. Additional research using population-based response variables is necessary to quantify effects and determine whether management strategies are effective. A holistic approach incorporating conservation status and public recreational use patterns is needed to prioritize finite research and management resources.

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Author Contributions

Conceived and designed the study: JB
Collected the data: AS
Performed analysis of the data: AS
Authored the manuscript: JB, KD, AS
Provided critical revision of the manuscript: JB, KD, RC

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Wildlife occupancy and trail use before and after a park opens to the public

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We investigated changes in wildlife trail use and occupancy from baseline conditions after a park opened to the public; we were curious if wildlife would alter either their use of the trails or the surrounding areas or both in response to the park opening. We generated single-season occupancy estimates as a site-wide occupancy metric from 23 camera traps placed at 0.5 km intervals throughout the park and wildlife and human detection rates to measure intensity of trail use from 10 camera traps placed every 500 m on the trail. We compared the findings from the four seasons before to the four seasons after the park opened to the public. Human trail use increased sharply after opening and then lessened, but was markedly higher than prior to opening. Bobcat (*Lynx rufus*), coyote (*Canis latrans*) and gray fox (*Urocyon cinereoargenteus*) did not alter trail use relative to study area occupancy. Two species, black-tailed deer (*Odocoileus hemionus*) and gray squirrel (*Sciurus griseus*) altered trail use, and puma (*Puma concolor*) and wild turkey (*Meleagris gallopavo*) altered both trail and study area use. All species, except for the raccoon (*Procyon lotor*) and wild turkey, recovered to pre-opening conditions, by the winter (that is, after approximately 9 months) following opening.

Key words: camera trapping, occupancy, open space, recreational impacts, trail use

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Protected open space is considered important for conserving wildlife and providing public recreational opportunities in the San Francisco Bay Area. Recreation is often supported by concomitant trails and infrastructure, that is, that existing trails and fire roads are used by the public and, in turn, additional infrastructure is required to facilitate access. To conserve wildlife effectively, it is important to understand how wildlife may be affected by human use of the landscape even when those uses appear benign. Wildlife often share the use of trails with humans, their dogs, cyclists, motorized vehicles, and equestrians, while also

preferentially using roads and trails for movement (Whittington et al. 2005). The extent to which non-motorized recreational human uses impact wildlife that rely upon open space (for breeding, movement, foraging, etc.) is the subject of this study. Wildlife may be disturbed by human presence on trails and, as a result, vacate the surrounding landscape despite the landscape's capacity to support them. An alternate scenario may be that wildlife avoid or reduce trail use (that humans are using) but remain resident in the surrounding landscape in response to human trail use.

Wildlife can be both negatively or positively associated with human presence and zones of urbanization. Recreation has been shown to have behavioral impacts on wildlife, such as reduced feeding times (Cassirer et al. 1992), detrimental stress responses (Barja et al. 2011), reduced temporal occupancy (Wang et al. 2015), but also the reverse (Ordeñana et al. 2010; see also Reilly et al. 2016 for a review of the literature). With pressure on open space providers to accommodate human recreation and increase accessibility, understanding how access and intensity of human use affects wildlife provides essential information towards making decisions that effectively balance wildlife conservation with human interests.

We examined how public presence may affect wildlife trail use and occupancy in the surrounding landscape in the North Sonoma Mountain Regional Park and Open Space Preserve (hereafter, "Park/Preserve") in southeastern Sonoma County, California. A camera trapping array (grid) encompassed the Park/Preserve to assess changes in single season occupancy estimates (that is, we use occupancy as an index of prevalence or a surrogate of abundance in the study area; O'Brien et al. 2010; Royle and Nichols 2003; MacKenzie and Nichols 2004; MacKenzie et al. 2006; but see Burton et al. 2015 and Steenweg et al. 2018, 2019 for cautionary discussions). Additional cameras were placed on the trail to assess wildlife and human use (that is, through detection rates as a measure of intensity of use); trail construction had been completed by the time the study began.

Below we outline the key hypotheses to address the following question: How does human trail use affect wildlife trail use and occupancy in the study area?

H_0: Wildlife did not change their use of trails or residency (abundance) within the Park/Preserve after it is opened to the public. Wildlife occupancy estimates (abundance) from the grid and the trail detection rates do not change after the Park/Preserve opens to the public.

H_1: Wildlife use trails less but are still resident within the study area after the Park/Preserve is open to the public. Wildlife trail detection rates decrease after human trail use increases but occupancy estimates (abundance or residency) does not change in study area after the Park/Preserve opens.

H_2: Wildlife reduce trail use and vacate the study area after the Park/Preserve is open to the public. Both wildlife trail detection rates and site-wide occupancy decrease within the Park/Preserve after it opens to the public.

H_3: Certain types of wildlife (e.g., carnivores or ungulates) may be differentially affected by the presence of humans. With regard to trail and Park/Preserve use, see H1 and H2.

H_4: Wildlife resume a similar intensity of trail use and abundance within the study area after a period of time post-opening compared to pre-opening measures (latency to habituation). Wildlife trail detection rates decrease initially after opening, but then return to the pre-opening levels after a period of time. If wildlife do leave the study area for a period of time (lower abundance), these measures (trail detection rates and occupancy estimates) will both decrease initially after Park/Preserve opening but then recover to pre-opening levels.

METHODS

Study area

The 3.4 km^2 study area, North Sonoma Mountain Regional Park and Open Space Preserve (Park/Preserve; 38.3235 N, 122.5756 W, parks.sonomacounty.ca.gov/Visit/North-Sonoma-Mountain-Regional-Park/Park-Map/) is located in Sonoma County, California, USA (Figure 1). Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) acquired the property and built the 5.95 km trail that ranges in elevation from 244 m to 750 m between June 2010 to September 2012. The Park/Preserve was then transferred to Sonoma County Parks in 2014 and opened to the public on 14 February 2015. Cattle grazing occurred before and during the study in portions of the site that supported grasslands; the site had no exclusionary fencing dividing up the site.

This area is subject to a Mediterranean climate characterized by wet, cool winters and dry, hot summers. Habitats included non-native grasslands (warm grasslands), oak-bay woodland (montane hardwood), redwood forest, mixed forest with madrone (montane hardwoods), and remnants of coast live oak forest/woodland and California bay forest (Biodiversity Portfolio Report, https://www.bayarealands.org/explorer/#, Conservation Lands Network Explorer 2016, 1 December 2016; Bay Area Open Space Council 2011). Matanzas and South Fork Matanzas creeks run through the study area. The topography is characterized by the steep hillsides of Sonoma Mountain. The surrounding land use matrix is composed of low-density rural development, protected open space, vineyards, and grazed grasslands.

Study design

A north-south grid of 23 motion and heat-differential triggered camera traps, HCO SG550V IR Scouting Cameras [and replacement Bushnell Trophy Cams (model#119636c)] were set in a randomly-generated fixed array at 0.5 km intervals covering the entire Park/Preserve ("grid cameras"). We adjusted six camera coordinates by less than 200 m to fit within the study area prior to going in the field (see yellow circles on Figure 1). Species-specific single-season occupancy estimates were generated for four seasons before and after the Park/Preserve opened to the public (see Table 1). We placed ten additional cameras at 500 m intervals along the trail ("trail cameras"; Figure 1). We calculated seasonal trail detection rates (detections per 100 trap nights) as a measure of intensity of wildlife and human use for four seasons before and after the Park/Preserve was opened to the public (see Appendix I for a list of human use categories).

Camera trapping methodology.—We followed a camera trapping and data management protocol, which is a modified version from TEAM Network 2009 and O'Brien 2010. Grid cameras were uniquely identified by line letter and number (e.g., A1, A2, A3, etc.; Figure 1). We placed camera traps within 100 m of the pre-determined coordinate during field deployment. Camera traps were attached to a wooden stake or tree with a nylon strap. Camera height was standardized to detect a mammal approximately gray fox size at a distance of 2 m at a perpendicular angle. Eight of the ten trail cameras were mounted on trees, and, after the Park/Preserve opened, were outfitted with security boxes to prevent theft. We recorded location (GPS coordinates), habitat within which the camera was placed (open, closed, or mixed), and elevation during deployment. Habitat (vegetative structure) included just three

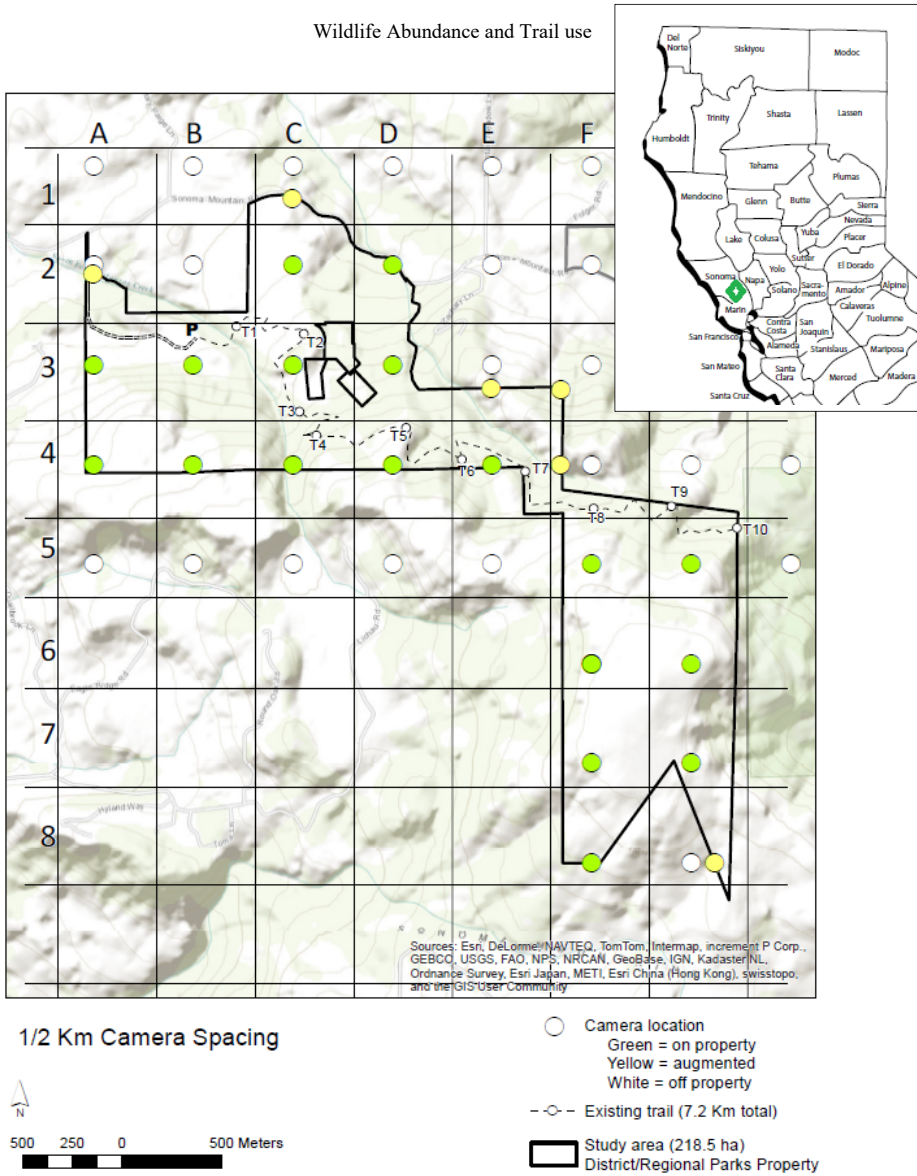


Figure 1. Camera layout for grid (yellow and green circles) and trail cameras (T1-T10) with study area location (green diamond in inset map of California counties); North Sonoma Mountain Regional Park and Open Space Preserve, California, USA, 2014–2016.

Table 1. Seasons before and after park opening, beginning and end dates for seasonal analysis, and effort (trapnights) for trail (n = 10) and grid (n = 23) camera arrays in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA, 2014-2016.

Before or after opening Park/Preserve	Season	Begin and end dates	Trail trapnights	Grid trapnights
Before	Spring	1 March–30 May 2014	591	1,251
Before	Summer	1 June–31 August 2014	601	1,266
Before	Fall	1 September–31 November 2014	656	1,508
Before	Winter	1 December 2014–13 February 2015	606	1,106
Opening		*14 February 2015*		
After	Spring	1 March–30 May 2015	245	1,019
After	Summer	1 June–31 August 2015	16	701
After	Fall	1 September–31 November 2015	540	1,200
After	Winter	1 December 2015−15 January 2016	146	587

categories: closed (closed canopy), mixed (mixture of open and some overhead canopy such as oak woodland intergrading with grassland or chaparral), and open (no overhead canopy usually grassland). All cameras were set to take three images per trigger (event), a five second interval between events, 6 MP image size, high sensitivity level, and time stamp "ON." We adjusted image size and sensitivity as needed to match field conditions and improve data collection.

To verify camera station functioning during set up and maintenance, we took photographs of whiteboards with date, camera station identification, region, and subregion. We maintained camera stations regularly for proper functioning. We downloaded images from SD cards into a Windows Explorer embedded file system; EXIF image data was exported using PIE software (Picmeta v.6.75, www.picmeta.com/) into .csv files. We (authors and C. Lafayette) catalogued images to species or highest taxonomic order attainable; one of the authors (SET) vetted for accuracy during data preparation. Birds and other non-mammalian taxa were not identified to species nor included in the analysis. We categorized humans into several categories including pedestrian, cyclist, or equestrian (see full list in Appendix I). Unidentifiable images ("unknowns") and blanks were recorded as such.

Statistical analyses

We prepared a species detected list for the study area and trail compiled from before and after the Park/Preserve opened (Appendix I). We calculated single-season occupancy estimates from the camera grid and trail detection rates (detections per 100 trapnights) for terrestrial mammals (squirrel-size and larger) and wild turkeys (*Meleagris gallopavo*) from the cameras placed on trails (only). Trail cameras were not used in calculating occupancy estimates.

We calculated camera trap days ("trapnights") as the number of 24-hour periods (0000 to 2359) that the camera trap was functioning for each season [spring (March-May), summer (June-August), fall (September-November), and winter (December-February)]. We aggregated trapnights by grid and trail (Table 1) and compiled detection histories for grid cameras.

We recorded detections as the maximum number of individuals for each species in an image in a burst of three (an "event"), which are taken when the camera trap was triggered by movement and/or heat differential. For example, in a burst of three images, one image recorded two deer, in the next, three deer and in the final image, a deer; 3 deer would be recorded for that detection (maximum number of individuals in an image detected during one event).

Occupancy Analysis.—An occupancy estimate (ψ) for each species detected for the season was obtained using the program PRESENCE (v3.2, www.mbr-pwrc.usgs.gov/software/presence.html; Hines 2016). We used single-season occupancy models to estimate initial occupancy estimates (ψ) and detection probabilities (ρ) for each species (Mackenzie et al. 2003). Occupancy models account for imperfect detection and provide unbiased estimates of occupancy. To apply these models, detection histories were compiled for each species at each camera station as a series of ones (detection) and zeroes (non-detection). Each day (24-hour period commencing at 0000) the camera station was up was considered a (re)survey. Each day the camera station was "down" or not functioning was treated as a missing value.

Two pre-defined models were run, and the model with lowest delta Akaike's Information Criterion (AIC) was used to estimate probability of detection and occupancy (Hines 2016) . The first model assumes the same occupancy probability for all camera station locations and that detection probability (ρ) was constant across both camera station location and survey occasions (i.e., two parameters). The second model assumes that all camera station locations have the same probability of occupancy (ψ), but that ρ varies between the surveys—although at each survey occasion, ρ is the same at each camera station location. The software PRESENCE uses AIC to rank models (Burnham and Anderson 2002), which relies on rules of parsimony. In this case, twice the log-likelihood values at the maximum likelihood estimates were used to calculate the AIC values in model weighting.

Comparison of seasonal occupancy estimates and detection rates.— Single-season occupancy values were compared from the season before to the season after and plotted in a seasonal time series to compare to trail detection rates relative to occupancy estimates. We added linear trend lines in several time series figures to show trend from the first season (spring 2014) to the last season of the study (winter 2015-2016).

RESULTS

We set up camera traps during February 2014 and maintained them regularly until the study ended in mid-January 2016. Camera placement elevation ranged from 252 to 737 m in closed, open, and mixed habitat. Of the 23 grid cameras, four (17%) were set in closed habitat, four (17%) in mixed, and 15 (65%) in open habitat; of the 10 trail cameras, five (50%) were in closed habitat, two (20%) in mixed, and three (30%) in open habitat. The trail was located largely within closed habitat. The Park/Preserve was open (warm grasslands, 50%) with remainder mixed and closed (41.8% montane hardwoods and 6% redwood forest; Biodiversity Report, www.bayarealands.org/explorer/#, Conservation Lands Network Explorer 2016).

The composition of the wildlife community changed little from before and after the Park/Preserve opened (Appendix I). Common and expected species including large and medium-sized carnivores were detected; a California Species of Special Concern, the American badger (*Taxidea taxus*), was detected within the study area after the Park/Preserve was opened. Several rare and data-deficient species that may occur in this region were not

detected [e.g., the western spotted skunk (*Spilogale gracilis*), ringtail (*Bassariscus astutus*), porcupine (*Erethizon dorsatum*), and black bear (*Ursus americanus*)].

Seasonal analysis and effort

We generated seasonal Park/Preserve occupancy estimates and trail detection rates for eight seasons (four seasons before and after, Table 1). Trail camera trap nights averaged 425 (range = 16–656) per season. Grid trapnights averaged 1,080 (range = 587–1,508) per season. Seasonal trapping effort varied due to stolen (and replaced) camera traps, data loss due to theft of SD cards, and increased trail use filling up the SD cards with images.

Before and after seasonal comparison of occupancy estimates

Five wildlife species exhibited changes in occupancy estimates in the first season after the park opened; opossum increased (*Didelphis virginianus)* and raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), and puma (*Puma concolor*) declined (Figure 2a) in the spring post-opening. Seven wildlife species exhibited changes in summer occupancy estimates; five decreased: striped skunk, gray fox (*Urocyon cinereoargenteus*), coyote, puma, and wild turkey (*Meleagris gallopavo*), and two increased [opossum and bobcat (*Lynx rufus*), Figure 2b] in the summer post-opening. Four wildlife species exhibited changes in occupancy estimates in the fall following opening; three decreased (gray fox, puma, and wild turkey) and one increased (opossum; Figure 2c). Only one wildlife species, raccoon, exhibited changes (increased) in occupancy estimates in the winter post-opening (Figure 2d).

Trail use

Even though the trail was not officially open to the public, some pre-opening trail use by "humans" (pedestrians, staff and trail crew) as well as their dogs and cyclists was observed in consistently low numbers (Figures 3a-c). The Park/Preserve did not allow dogs, and dog detection rates remained low throughout the study period (Figure 3c). Human trail detection rates increased dramatically immediately after the park opened; 4,393 detections per 100 trap nights (spring 2015) from 148 the season prior to opening (winter 2014–15, Figure 3a). Cyclists increased from an average of 53 (range 4–64) pre-opening to 228 (range 77–338) post-opening. Aggregated wildlife trail detection rates decreased after Park/Preserve opening (Figure 3d).

Comparing Wildlife Occupany in the Park/Preserve and on the Trail

We compared wildlife species' intensity of trail use (trail detection rates) with occupancy estimates seasonally before and after park opening.

Black-tailed deer. —Black-tailed deer occupancy increased post-opening (Figure 4a) and trail use decreased for two seasons then returned to pre-opening levels (see Figure 4b).

Gray squirrel.— Gray squirrel occupancy was stable both before and after the Park/Preserve opened to the public (Figure 4a). Gray squirrels decreased trail use post-opening summer, fall and winter from pre-opening levels (Figure 4c).

Striped Skunk.— Occupancy of striped skunks decreased (slightly) post-opening

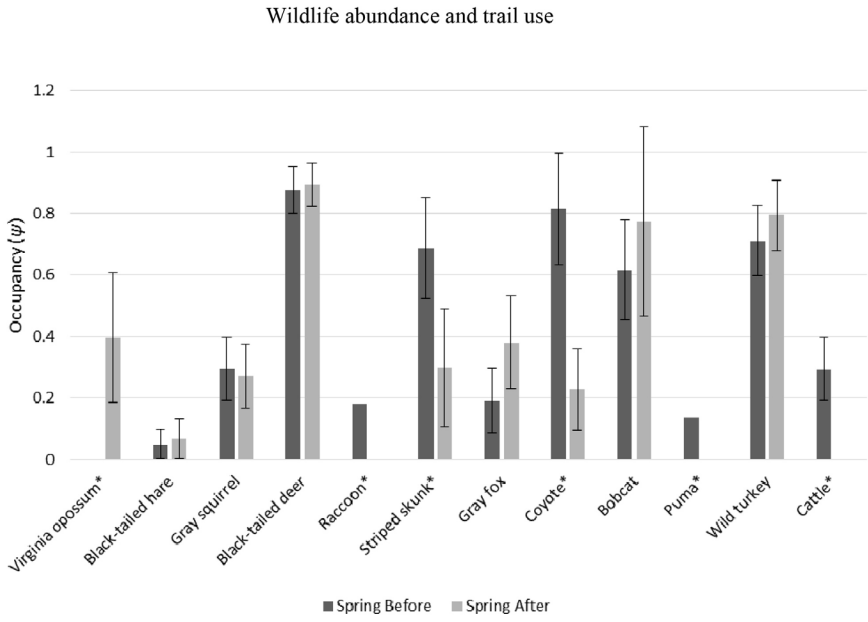


Figure 2a.

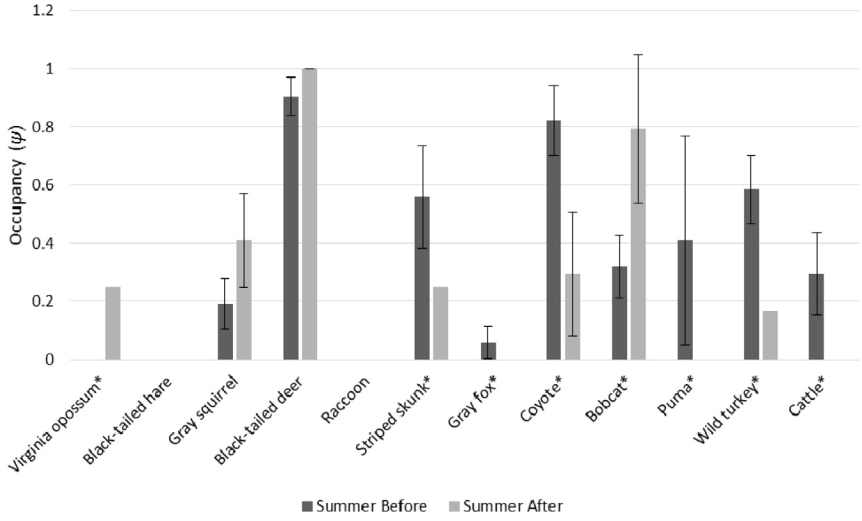


Figure 2b.

Figure 2a-d. Single-season occupancy estimates (error bars = ±SE) for wildlife species (* = difference noted between before and after occupancy estimates) in the a) spring before (2014) and after (2015), b) summer before (2014) and after (2015), c) fall before (2014) and after (2015), and d) winter before (2014_15) and after (2015_16) in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA.

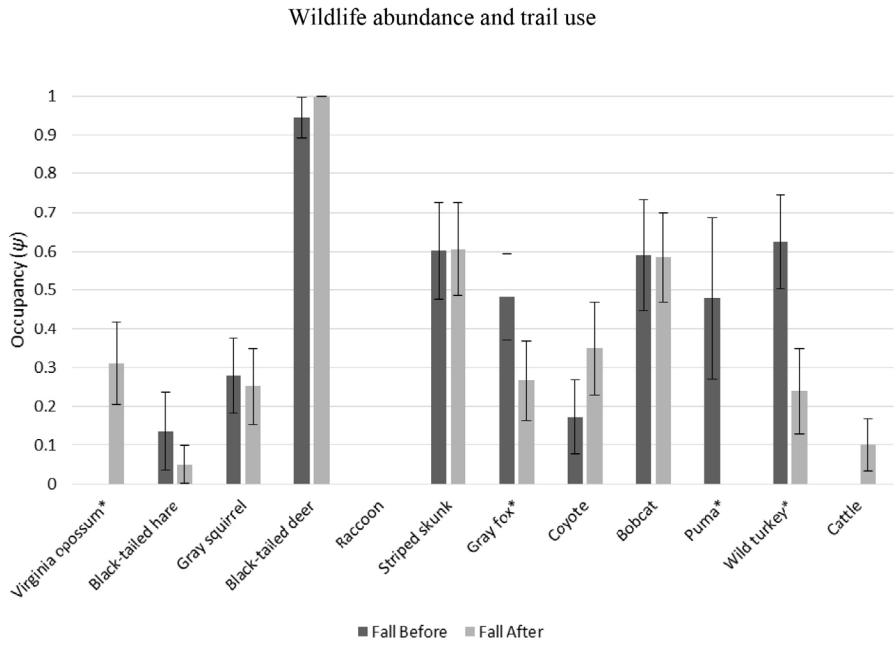


Figure 2c.

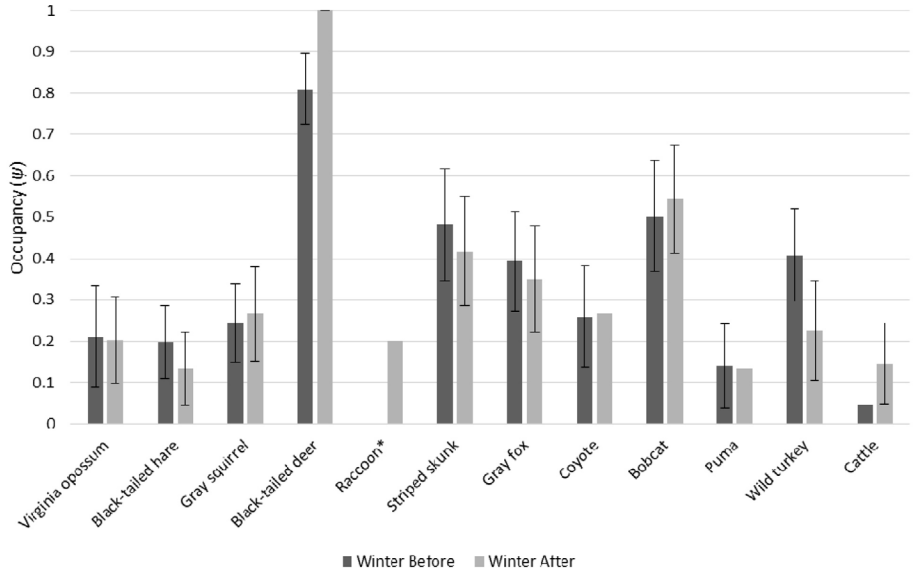


Figure 2d.

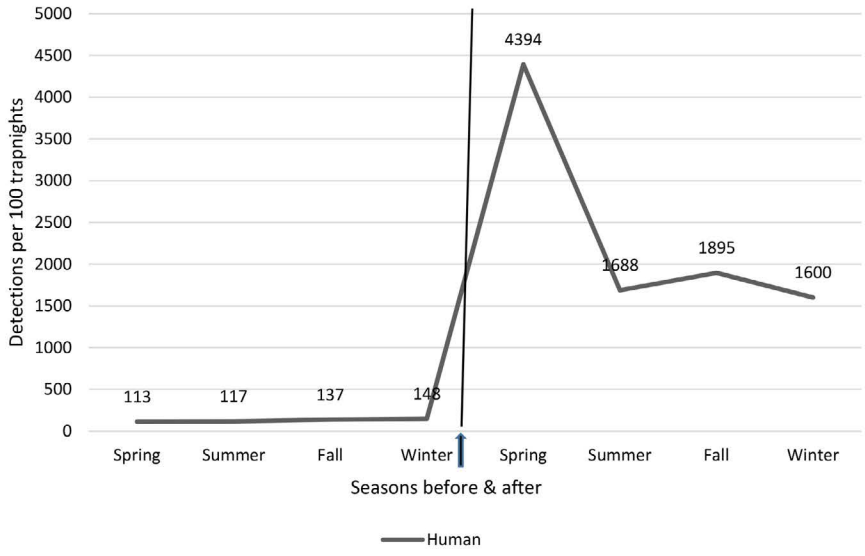


Figure 3a.

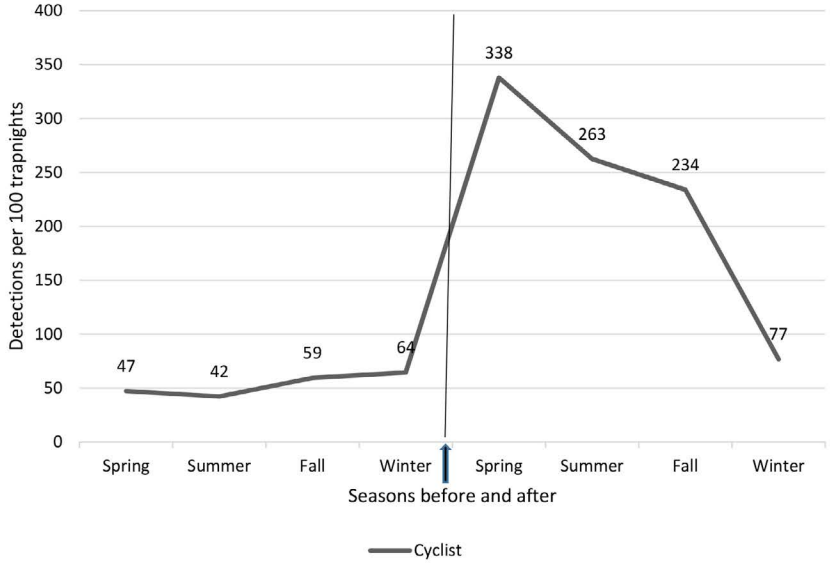
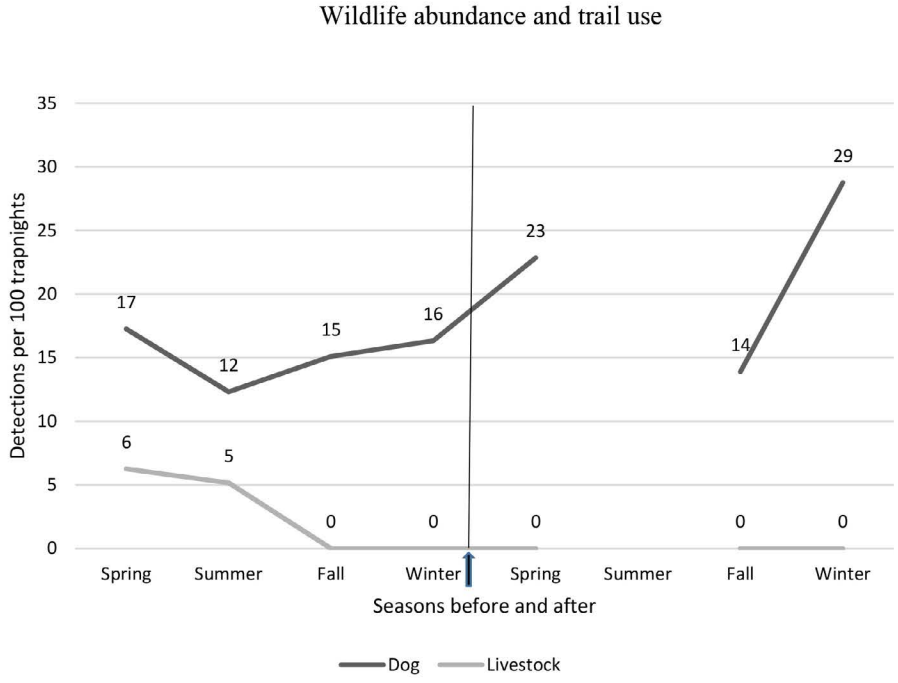


Figure 3b.

Figure 3a-d. Seasonal trail detections rates (detections per 100 trapnights) for before (spring 2014-winter 2015) and after (spring 2015-winter 2016) park opening (vertical line and arrow indicating 14 February 2015) for a) humans (non-cyclists), b) cyclists, c) domestic dog and livestock, and d) wildlife (linear = linear trend line) in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA.



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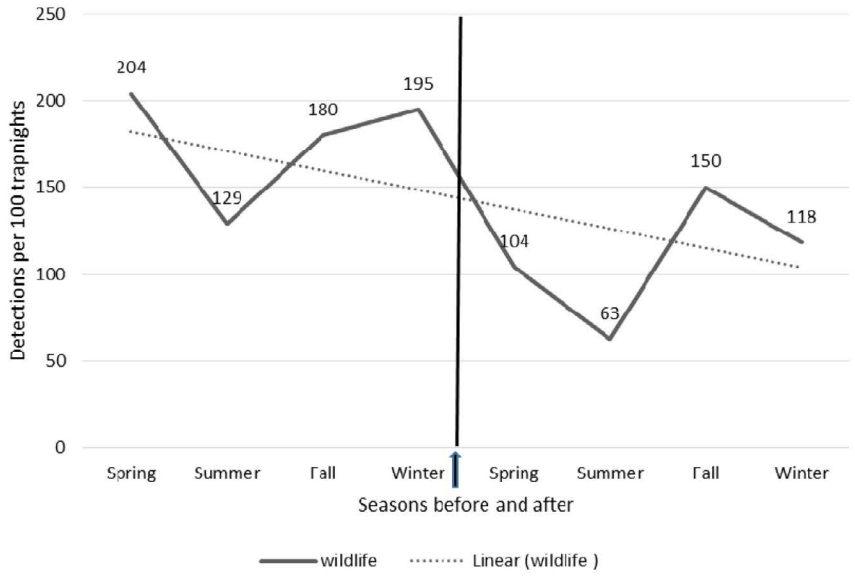


Figure 3d.

(Figure 5a). Striped skunk trail detection rates were the same post-opening for two seasons then increased to rates greater than pre-opening (Figure 5c).

Wild turkey.—Wild turkey increased in occupancy in the spring following Park/Preserve opening and decreased trail use (detection rates) post-opening (Figure 5b and 5d). Wild turkey had lower occupancy estimates and trail detection rates for post-opening summer, fall and winter.

Puma.— Puma occupancy fell to zero post-opening then increased after 3 seasons ($\psi = 0.13$, Figure 6a), potentially indicating some latency to recover. Puma decreased trail use post-opening (Figure 6c).

Bobcat.—Bobcat occupancy increased slightly in the Park/Preserve (Figure 6b) and decreased slightly in trail use (Figure 6d) post-opening.

Coyote.— Coyote occupancy decreased prior to the Park/Preserve opening and then remained relatively stable (Figure 7a). Trail use remained stable with a slight increase post-opening (Figure 7c); trail use was similar to patterns of occupancy.

Gray fox.— Gray fox occupancy was stable and similar to pre-opening occupancy (Figure 7b). Trail use was similar to patterns of occupancy (Figure 7d).

DISCUSSION

By our measures within this one study area, the wildlife that were the most affected by increased human trail use were puma and wild turkey, both decreasing in study area occupancy estimates, which we are using to detect changes in abundance and detection rates, which we are using as a measure of intensity of trail use. Additionally, the striped skunk notably increased trail use the third (fall) and fourth (winter) season after Park/Preserve opened. After two seasons post-opening, bobcat, gray fox, and coyote (three common mesocarnivores) appeared to be unaffected by public trail use both in abundance (as measured by occupancy estimates as an index of prevalence in the Park/Preserve) and trail use; these findings are consistent with a recent San Francisco Bay Area study (Reilly et al. 2016). The puma, which was present before the Park/Preserve opened, was then notably absent for three subsequent seasons post-opening. The majority of wildlife with the exception of the raccoon returned to previous occupancy levels the winter following opening (that is, after 9 months, Figure 2d).

Bobcat, coyote, and gray fox (mesocarnivores) showed little change in trail use, measured by camera detection rates on trail,and within the study area as indicated by by occupancy estimates from pre-opening measures, which support the null hypothesis, $H_{\emptyset}$ (Table 2); that is, that public trail use (at the rates we measured) did not appear to affect these species. Deer and gray squirrel showed decreased trail use despite no change in study area abundance post-opening, supporting H_1 that states that species change their trail use but not their overall use of the study area as measured by occupancy estimation. Puma and wild turkey decreased both trail use and abundance supporting H_2, which states that species will be affected by human trail use both on the trail and in the study area. Striped skunk increased trail use two seasons after opening and slightly decreased in abundance in the study area (see Table 2, Figures 5a and 5c). Deer may also have exhibited latency to habituation because their trail use resumed to pre-opening rates after two seasons (although it should be noted that human use declined; Figure 2a). Puma indicated latency to habituation for Park/Preserve abundance (Figure 6a).

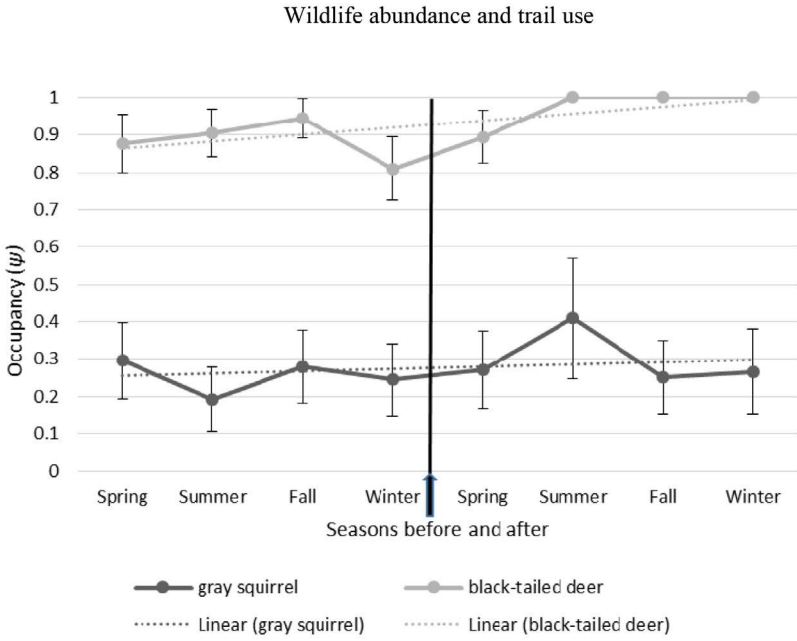


Figure 4a.

Figure 4a. Black-tailed deer and gray squirrel single-season occupancy estimates (ψ; error bar = ±SE, no error bar = no standard error) for seasons before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line and arrow indicating 14 February 2015) in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA.

In contrast to our findings, Reed and Merenlender (2008) conducted a study in the same region and found coyote and bobcat scat prevalence, as an indicator of animal presence, to be five times lower in protected areas that allowed recreation compared to sites that did not. Reilly et al. (2016), however, point out that carnivore scats are problematic as a surrogate for carnivore density because domestic dogs can consume these scats. Additionally, the human ability to visually detect scat is extremely low when compared to trained scat dogs for this purpose (i.e., humans detect only a very small fraction of scat that are present; Smith et al. 2005, Oliveira et al. 2012). Our findings were consistent with Reilly et al. (2016) that mesocarnivores appeared largely unaffected by public access and, additionally, that striped skunks increased trail use with recreational trail use.

The puma is the largest carnivore in the San Francisco Bay Area and is thought to play an important role in the ecosystem. Pumas are used as a surrogate to examine overall connectivity in the landscape due to its large body and home range size. Wang et al. (2015) examined puma behavioral responses to development and roads. According to their study, communication and denning required a four times larger buffer from human development. Findings from our study show a pattern of avoidance, at least, initially; pumas were detected very infrequently or not at all from the study area with commensurate lower trail use for three seasons post-opening; this finding was in contrast to puma adults and young consis-

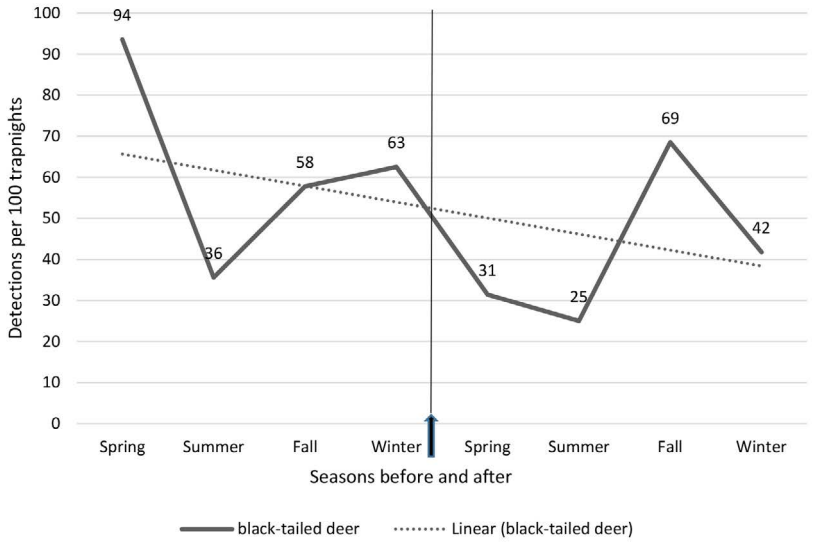


Figure 4b.

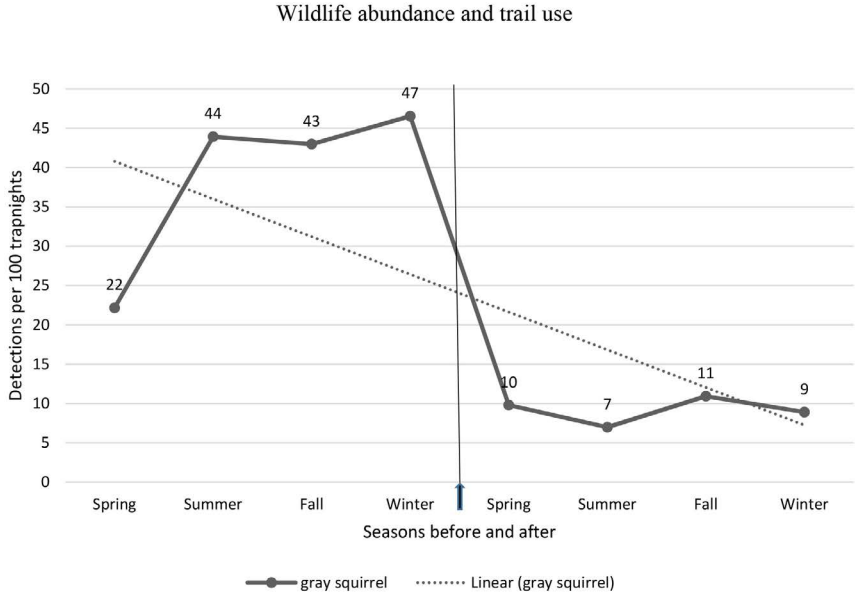


Figure 4c.

Figure 4b-c. Trail detection rates (detections per 100 trapnights) for b) black-tailed deer and c) gray squirrel for seasons before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line and arrow indicating 14 February 2015) in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Linear indicates linear trend line.

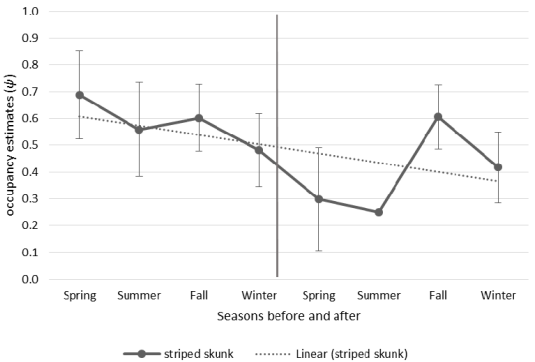
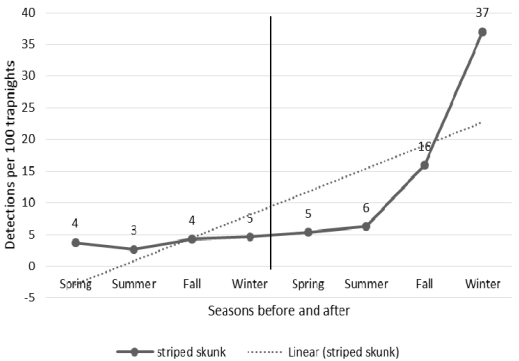


Figure 5a.



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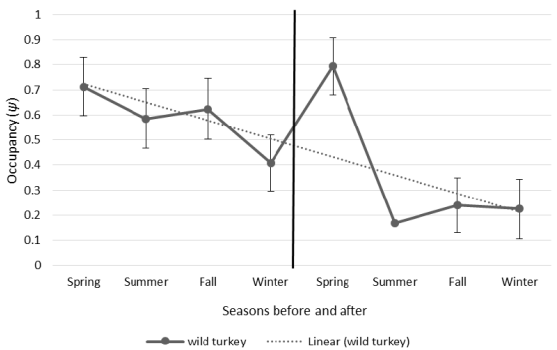


Figure 5b.

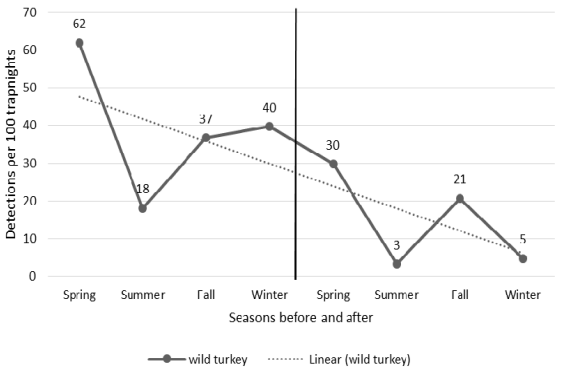


Figure 5d.

Figure 5a-b. Single-season occupancy estimates (ψ; error bar = ±SE, no error bar = observed occupancy) before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for a) striped skunk and b) wild turkey in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. **Figure 5c-d.** Trail detection rates (detections per 100 trapnights) before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for c) striped skunk and d) wild turkey in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Linear indicates linear trend line.

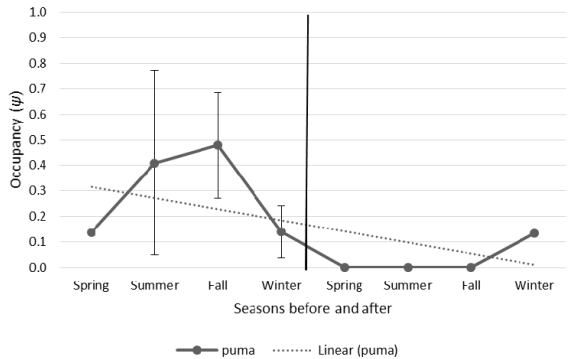
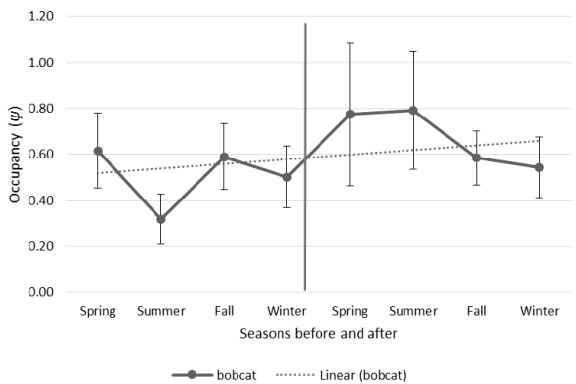


Figure 6a.



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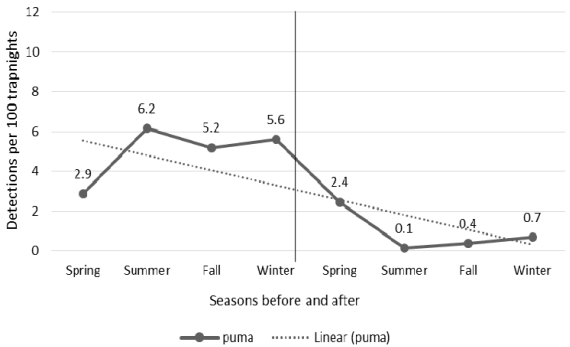

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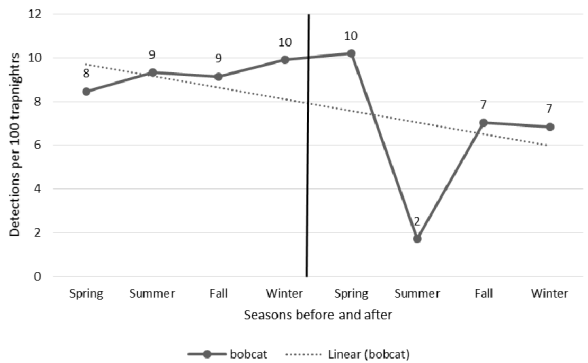


Figure 6d.

Figure 6a-b. Single-season occupancy estimates (ψ; error bar = ±SE, no error bar = observed occupancy) for seasons before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for a) puma and b) bobcat in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Figure 6c-d. Trail detection rates (detections per 100 trapnights) before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for c) puma and d) bobcat in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Linear indicates linear trend line.

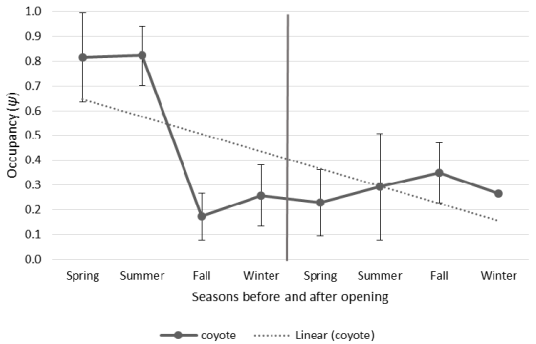
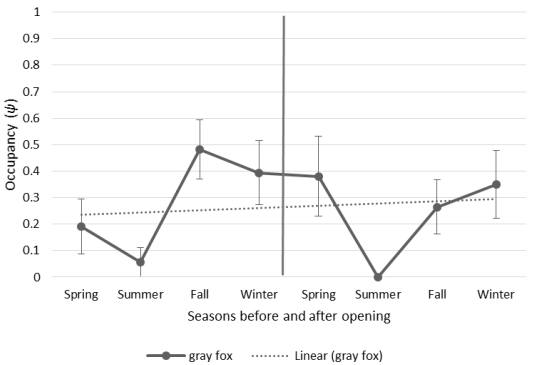


Figure 7a.



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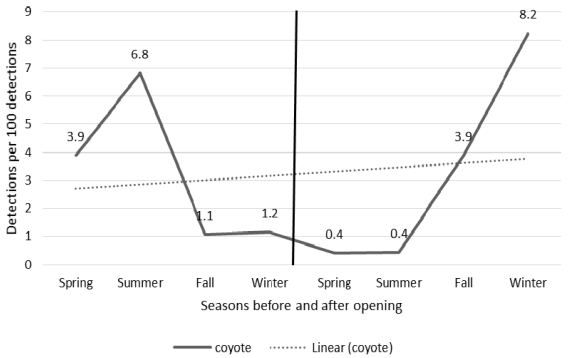

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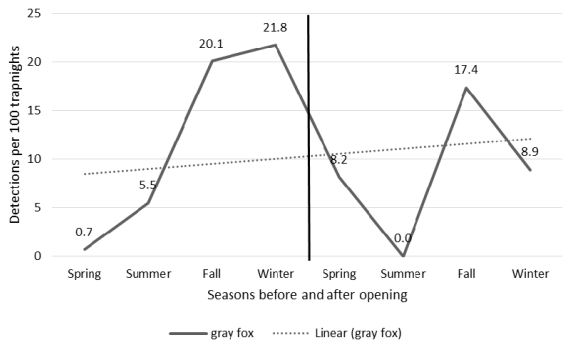

Figure 7d.

Figure 7a-b. Single-season occupancy estimates (ψ; error bar = ±SE, no error bar = observed occupancy) before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for a) coyote and b) gray fox in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Figure 7c-d. Trail detection rates (detections per 100 trapnights) before (spring 2014–winter 2015) and after (spring 2015–winter 2016) opening (vertical line indicating 14 February 2015) for c) coyote and d) gray fox in North Sonoma Mountain Regional Park and Open Space Preserve, California, USA. Linear indicates linear trend line.

Table 2. Which hypotheses are supported for selected wildlife species [Column headings: No change = no difference in trail use or Park/Preserve occupancy, Trail only = differences observed in trail use but not in Park/Preserve occupancy, Trail/Grid = differences observed in trail use and Park/Preserve occupancy, and Latency = recovery to pre-opening trail use and/or Park/Preserve occupancy values]. Under "Trail/Grid," minus sign indicates a decline and a plus sign indicates an increase for each respective array. An "X" indicates findings support the hypothesis. North Sonoma Mountain Regional Park and Open Space Preserve, California, USA, 2014-2016.

	Hypotheses			
Common name	No change ($H_{ø}$)	Trail only (H_1)	Trail/Grid (H_2)	Latency (H_4)
Bobcat	X			
Coyote	X			
Gray fox	X			X?
Deer		X		X
Gray squirrel		X		
Puma			X-/-	X?
Striped skunk			X+/-	
Wild turkey			X-/-	

tently present in all seasons before the trail opened. Camera trap images of puma from the pre-opening year frequently had a mother with cubs or almost fully adult offspring.

Our study area represents an area with low to moderate human disturbance (both recreational and agricultural); therefore, the wildlife in our study have had exposure to humans, roads and other infrastructure. Naïve wildlife from more pristine areas (free from human influence) may behave differently to human presence on trails and may be affected for longer period of time and in a larger area; this factor (exposure to human influence) should be accounted for when planning trails and increasing recreational access. Undeveloped open space surrounding trails provides a buffer so wildlife can (initially) move away from novel human presence or disturbance even if they are able to habituate to human trail use over time. Certain species such as pumas may require large trail free "zones" near trails to habituate over time and to successfully fulfill the full suite of life history activities such as hunting, reproduction and raising young.

Finally, for this specific study area and trail, wildlife was documented using trails even with a marked increase in human use (pedestrians, cyclists and equestrians); wildlife trail use did not drop to zero with the exception of wild turkeys and puma (at least for 3 of the 4 seasons following opening). Additionally, the apparent habituation after a period of time indicated that much of the local wildlife community, but not all, may be resilient to an increased presence of humans on a trail given time to adjust; it also should be noted that the cyclist detection rates decreased to pre-opening levels of use by the 4th season after opening, so as an alternative explanation, wildlife trail use may be able to tolerate relatively high levels of human use (1600 detections per 100 trapnights) with lower levels of cyclists (77 detections per 100 trapnights compared to a high of 338 after opening)

Land acquisition and preservation can go a long way toward ensuring future open space for wildlife; however, without commensurate wildlife monitoring, particularly for things like trail building and increased human access, with concomitant changes occurring in the surrounding landscape (e.g., traffic intensity, climate change, development, fencing), the actual benefit of that land to wildlife over time will remain unknown. From a management perspective, this "unknown" is a lost opportunity. Identifying thresholds of human use beyond which wildlife or particular species are unable to adjust may differ with various disturbance regimes and for different life history needs (e.g., foraging and movement versus breeding). Determining these thresholds and for which species are important next steps in understanding the impacts of recreationalists on wildlife. Through studies that capture pre-impact conditions as well as a post-impact timeframe that is meaningful for wildlife, open space effectiveness as a conservation tool can be measured, evaluated and improved.

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Author Contributions
Conceived and designed the study: SET
Collected the data: SET, SH, MH
Performed the analysis of the data: SET
Authored the manuscript: SET
Provided critical revision of the manuscript: SH, MH, SH

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APPENDIX I. Human categories and wildlife species detected before and after park opening in each camera array for the North Sonoma Mountain Regional Park and Open Space Preserve, California, USA, 2014-2016.

Common name	Species	Grid before	Grid after	Trail before	Trail after
Human Cyclist			•	•	•
Domestic cat	*Felis sylvestris*		•		
Domestic dog	*Canis familiaris*	•	•	•	•
Equestrian		•		•	•
Hiker		•	•	•	•
Hikers with >2 dog				•	n/a
Human with dog				•	n/a
Staff				•	•
Vehicle		•	•	•	•
WPI crew		•	•	•	•
Ranger				•	n/a
Livestock					
Goats	(Goats)	•		•	•
Cattle	(Cattle)	•	•	•	
Wildlife					
Unknown	Unknown	•	•	•	•
Badger	*Taxidea taxus*		•		
Bird	(Bird)	•	•	•	•
Bat	(Bat)	•			
Black-tailed deer	*Odocoileus hemionus*	•	•	•	•
Black-tailed hare	*Lepus californicus*	•	•	•	•
Bobcat	*Lynx rufus*	•	•	•	•
Coyote	*Canis latrans*	•	•	•	•
Gray fox	*Urocyon cinereoargenteus*	•	•	•	•
Gray squirrel	*Sciurus griseus*	•	•	•	•
Opossum	*Didelphis virginiana*	•	•	•	•
Puma	*Puma concolor*	•	•	•	•
Raccoon	*Procyon lotor*	•	•	•	•
Striped skunk	*Mephitis mephitis*	•	•	•	•
Wild turkey	*Meleagris gallopavo*	•	•	•	•
Small rodent	(Small rodent)	•	•		•
Red fox	*Vulpes vulpes*			•	
Insect	(Insect)	•	•	•	
Lizard	(Lizard)	•			
Snake	(Snake)	•			

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A review of trail-related fragmentation, unauthorized trails, and other aspects of recreation ecology in protected areas

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Expanding levels of authorized and unauthorized non-consumptive recreation increasingly threaten sensitive biological resources in areas protected primarily or solely to conserve them. The majority of the documented effects on wildlife from non-consumptive recreation are negative. From a review of 84 papers in the recreation ecology literature about the effects of recreation on wildlife, the following topics emerged as warranting full consideration: trail-related internal fragmentation and expansion of the effect zone; the proliferation and use of unauthorized trails; disturbance thresholds; population-level effects; distinguishing facets of mountain biking; interpretation of observed behavioral responses by wildlife to recreation; magnitude and duration of responses; comparisons of effects among types of recreation and of results among studies; cumulative and synergistic effects; habituation; and the complexity of recreation ecology. Knowledge of these topics must inform efforts to cease the extant recreation-related exploitation of protected areas and to prevent it in the future. These efforts include: securing urgently needed perpetual monitoring, management, and enforcement commensurate with recreational pressure in dual-role protected areas to ensure the perpetuation of viable populations of focal sensitive species; preventing further use and proliferation of unauthorized trails; restoring areas damaged by inappropriate trails (i.e., unauthorized trails, unnecessarily redundant designated trails, and trails to be decommissioned); using science-based disturbance thresholds to develop management measures for recreation; using the best available science to guide all policy and decision-making about (1) the siting, design, and alignment of trails, and (2) the types, levels, and timing of recreation under consideration; and, planning separate protected areas and recreational areas in the future.

Key words: dual-role protected areas, effect zone, disturbance thresholds, internal fragmentation, mountain biking, non-consumptive recreation, perpetual monitoring/management/enforcement, recreation ecology, recreation-related disturbance to wildlife, unauthorized trails

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Conservation of habitats is a key strategy for conserving biodiversity worldwide (Pickering 2010a; Soulé and Noss 1998). The core function of many areas in California

protected for conservation is to ensure that the wildlife species living in them thrive in what is the nation's most biologically diverse state (CDFW 2015).[1] Areas protected for conservation (protected areas) include locally owned lands (e.g., county and city reserves), state-owned lands (e.g., ecological reserves, wildlife areas, state parks), federally owned lands (e.g., national wildlife refuges, wilderness areas), and privately owned lands (e.g., conservation easements, conservancy lands, mitigation banks and lands). Here, the focus is on protected areas conserved primarily or solely for the perpetuation of viable populations of sensitive species (i.e., species whose persistence is jeopardized).[2] These protected areas often serve a dual role of conserving biodiversity and providing nature-based recreational and educational opportunities for millions of people, despite the evidence that even non-consumptive recreation[3] may not be compatible with protected areas' core function (Reed and Merenlender 2008; Larson et al. 2016; Dertien et al. 2018; Reed et al. 2019).

Recreation ecology is the scientific study of the ecological effects of outdoor recreation and nature-based tourism activities and their effective management in natural or semi-natural environments (Monz et al. 2013; Gutzwiller et al. 2017).[4] Studies in recreation ecology have shown that the majority of documented responses of wildlife species to recreation are negative (Steven et al. 2011; Larson et al. 2016; Hennings 2017; Patten and Burger 2018). Recreation-related disturbance to wildlife is recognized as a threat to global biodiversity, and as having wide-ranging and, at times, profound implications for wildlife individuals, populations, and communities (Dertien et al. 2018). Documented negative effects include detrimental changes to behavior, reproduction, growth, immune system function, and levels of stress hormones, and ultimately the survival of individual animals and persistence of wildlife populations and communities.

In this review, several topics about recreation ecology became apparent as warranting full consideration.[5] These topics are (1) the major issues of trail-related fragmentation and

1 Wildlife means all wild animals: insects, fish, amphibians, reptiles, birds, and mammals.

2 These areas include areas protected pursuant to Natural Community Conservation Plans and/or Habitat Conservation Plans (NCCPs/HCPs). An NCCP is a comprehensive, single- or multi-jurisdictional plan that provides for regional habitat and species conservation at an ecosystem level while allowing local land use authorities to better manage growth and development. Upon issuing an NCCP Permit, the California Department of Fish and Wildlife (CDFW) can authorize take of certain state listed species and other species of concern, subject to the terms of coverage under the NCCP (CDFW 2015). An HCP is the federal counterpart to an NCCP; the U.S. Fish and Wildlife Service prepares HCPs and issues HCP permits. The terms and conditions under which an NCCP/HCP's protected areas are conserved establish the types and levels of public access that are permitted (Burger 2012). The types and levels of public access vary among the NCCP/HCP protected areas from no access to guided-only access to open access.

3 In contrast to consumptive recreation (e.g., hunting, fishing), non-consumptive recreation is generally assumed not to directly extract a resource; it includes nature and wildlife viewing, beach-going, kayaking, hiking, biking, horseback riding, and wildlife photography (Reed and Merenlender 2008; CDFW 2016; Gutzwiller at el. 2017). From here forward, "recreation" means non-consumptive recreation, unless otherwise stated.

4 From here forward, "management" includes monitoring, management, and enforcement. The level of enforcement necessary depends on the level of continual management implemented; generally, the more the management, the less enforcement is necessary. In addition, monitoring and management encompass both the natural resources and human users of the protected areas.

5 The author read 71 articles and 13 reports about the recreation-related effects on wildlife; this paper does not cite all of them. All the articles are published in peer-reviewed journals. Some of the reports were peer reviewed and all were written by or contributed to by professionals in the fields of biology or ecology, though none of the reports were published in peer-reviewed journals to this author's knowledge (e.g., Burger 2012; Hennings 2017; Dertien et al. 2018; Reed et al. 2019). And, the totals exclude documents that are not explicitly about recreation-related effects on wildlife (e.g., Taff et al. 2019) and all newspaper articles.

expansion of the effect zone, unauthorized trail creation and use,[6] disturbance thresholds, population-level effects, and distinguishing facets of mountain biking, and (2) the following aspects of recreation ecology: the interpretation of observed behavioral responses by wildlife to recreation, magnitude and duration of responses, comparisons of effects among types of recreation and of results among studies, cumulative and synergistic effects, habituation, and the complexity of recreation ecology.

This paper discusses the issues identified above to inform efforts to cease the extant recreation-related exploitation of protected areas and to prevent it in the future. These efforts include: securing urgently needed perpetual management of recreation commensurate with recreational pressure to ensure the perpetuation of viable populations of focal sensitive species[7] as intended upon establishment of the protected areas; preventing further use and proliferation of unauthorized trails; restoring areas damaged by inappropriate trails (i.e., unauthorized trails, unnecessarily redundant designated trails, and trails to be decommissioned); using science-based disturbance thresholds; using the best available science to guide all policy and decision-making about the siting, design, and alignment of trails, and about the types, levels, and timing of recreation under consideration; and, planning separate protected areas and recreational areas in the future. This paper discusses the above-listed aspects of recreation ecology for consideration in designing field studies and while reviewing recreation ecology literature.

Trail-related disturbance: fragmentation, edge effects, and expansion of the effect zone

External fragmentation.—There is much peer-reviewed literature on the ecological effects of fragmentation, a process by which once-contiguous areas of habitat are physically separated by human disturbance creating a network of isolated habitat patches (Soulé et al. 1988; Ballantyne et al. 2014; Vickers et al. 2015; Cheptou et al. 2017). Most fragmentation research worldwide has concentrated on progressive losses of natural habitat through removal of vegetation as a result of development, agriculture, and resource extraction. Physical fragmentation, in conjunction with other related factors (e.g., duration of isolation of habitat fragments, low vagility of species, loss of genetic diversity), causes the isolated areas of habitat to experience a decay of species diversity over time due to local extinctions (Soulé et al. 1988). Consequently, fragmentation is a major threat to biodiversity (Cheptou et al. 2017). This fragmentation is considered external to the protected areas within a landscape, though it influences the viability of protected areas with respect to wildlife conservation.

Internal fragmentation.—Recreational trails themselves can fragment habitat, thereby causing fragmentation that is internal to the areas they traverse (Pickering 2010a; Leung et al. 2011; Burgin and Hardiman 2012; Pickering and Norman 2017). Because of their linear nature, trails can have a greater negative effect than if the affected terrain were consolidated in a more compact form (Pickering 2010a). Complex networks of trails within protected areas

6 The literature refers to illegally created trails and constructed trail features variously as unauthorized, informal, social, unofficial, off-trail, visitor-created, user-created, and demand trails. "Unauthorized" is the term of choice here because it is the only term among these that clearly denotes the illegality of the creation and use of such trails and features.

7 Focal species are organisms whose requirements for survival represent factors important to maintaining ecologically healthy conditions; types of focal species include keystone species, umbrella species, flagship species, and indicator species. Focal species are identified for the purpose of guiding the planning and management of protected areas in a tractable way (Soulé and Noss 1998, Marcot and Flather 2007). Here, the term "focal species" is intended to include those species encompassed by the guild surrogate approach of conservation; this approach entails one member or a subset of members serving as a surrogate for other members of the guild (Marcot and Flather 2007).

can cumulatively affect nearly as much area as the above-mentioned external fragmentation (Ballantyne et al. 2014). Substantial evidence exists that trails may act as barriers to the movement of animals due to behavioral avoidance, the presence of a physical barrier, or development of a home range along the physical barrier (Burgin and Hardiman 2012). Trail density is a main factor influencing how wildlife respond to trail users and the ability of wildlife to disperse or reach seasonally important habitats such as breeding grounds (D'Acunto et al. 2018). Particularly when resulting from unauthorized trails or poorly sited and/or designed official trails, internal fragmentation can compound the negative effects of the external fragmentation in the surrounding landscape. The arterial spread of multiple cleared areas for trails within protected areas may cause losses of plant communities and ultimately result in long-term degradation of protected areas across large areas (Ballantyne et al. 2014).

Effects of trail presence on wildlife.—A likely consequence of internal fragmentation within protected areas is that the mere presence of trails, even in the absence of humans, can compromise protected areas' ability to sustain sensitive species (Pickering and Norman 2017; Baker and Leberg 2018). This is partly due to edge effects in the area of transition between two contrasting habitats, where resulting changes can occur in species abundance, community structure, and/or predation and parasitism (Zurita et al. 2012). Edge effects are major drivers of change in many fragmented landscapes (Laurance et al. 2007) and factor into the observations that internal fragmentation can restrict movement of some native animals and plants among habitat fragments and enhance the movement of invasive species along the trails (Barros and Pickering 2017). Baker and Leberg (2018) found that the presence alone of roads and trails, and not necessarily how often humans use them, had a significant negative effect on the occupancy of most of the 11 mammalian carnivore species they studied. Trails also potentially expose native animals to predators, including feral species such as the red fox (Vulpes vulpes), that penetrate natural areas by moving along the trails (Burgin and Hardiman 2012): a study on the effects of mountain biking on golden-cheeked warblers (Dendroica chrysoparia) found that the indirect effects from fragmentation and alteration of habitats from mountain biking trails may reduce the quality of the warblers' nesting habitat by increasing the vulnerability of warbler nests to predation by rat snakes (Elaphe obsoleta) and other edge-adapted predators (Davis et al. 2010). Edge effects associated with trails are known to affect other avian species similarly and to reduce the local abundance and nesting frequency of certain avian species, increase the incidence of nest parasitism by cowbirds, and affect avian vocalizations (Hennings 2017). The penetration of edge effects into the areas adjacent to trails is an aspect of internal fragmentation that underscores the ecological cost of unauthorized trails (Pickering and Norman 2017).

Trails expand the zone of effect.—Another notable consequence of trails is the expansion of the zone of effect of recreational disturbance to wildlife as habitats become more open, as occurs from the proliferation of unauthorized trails (Reed et al. 2019). In this context, "effect zones" are areas within which wildlife is disturbed by recreational activities on trails; effect zones encompass and extend beyond the area influenced by edge effects. The expanse of effect zones likely varies depending on the types and intensities of recreation and therefore may not be consistent across a trail network (Reed et al. 2019). Particularly in urbanized areas where protected areas are already highly confined in the surrounding urban matrix, the expansion of the effect zones further dissects and internally fragments what are already essentially habitat 'islands' (Balantyne et al. 2014; Pickering and Norman 2017).

The expansion of effect zones occurs in all protected areas with widespread trails irrespective of the sizes of the protected areas. For small protected areas (~300 ha) with dense trail networks, an effect zone of several hundred meters on either side of the trails can encompass a substantial proportion of the protected areas (Reed et al. 2019). In this way, effect zones reduce the proportion of a protected area that is suitable for various wildlife species (Reed et al. 2019), and can result in no contiguous areas across a protected area free from recreation-related disturbance to wildlife (Dertien et al. 2018).

The higher the level of recreation in protected areas, the greater the potential there is for the effects of trails and their use to extend beyond habitat loss and individual-level effects (behavioral and physiological) on wildlife into population- and community-level effects, including depletion of floral and faunal populations, alteration of trophic and community structures, and reduction of biodiversity (CDFW 2015). If habitat is available, wildlife may move to areas farther from trails, areas beyond the effect zone, to avoid recreation-related disturbance (Reed et al. 2019). However, the greater the proportion of a protected area occupied by effect zones, the fewer options there are for wildlife to move to areas outside the effect zones.

Unauthorized trails and technical trail features

General.—The implications to wildlife conservation of the disturbance to wildlife from trail-related fragmentation and expansion of effect zones are particularly grave with respect to unauthorized trails and recreational activities. The creation and use of unauthorized trails and technical trail features (TTFs) are commonplace and present concerns about the sustainability of biological resources in protected areas worldwide (Marion and Wimpey 2007; Newsome and Davies 2009; Ballantyne et al. 2014; Havlick et al. 2016; Barros and Pickering 2017).[8] Though most unauthorized trails and TTFs are readily visible and accessible, they are not officially planned or designed, approved for construction, managed, or part of a formally designated trail network (Davies and Newsome 2009; Leung et al. 2011; Hennings 2017). All user groups tend to create and use unauthorized trails, and there are several motivations for doing so, such as wanting access to trails closer to home or to engage in off-trail activities (Hennings 2017).

Though other recreationists venture off of designated trails, mountain bikers increasingly create unauthorized trails as they seek more challenging, wider-ranging, or free-riding opportunities (Havlick et al. 2016), or want a shortcut to reach specific destinations or to connect existing trails (Davies and Newsome 2009). If a trail is not sited in a place where bikers want to go, the off-trailing that results eventually forms trails (Davies and Newsome 2009).

Unauthorized trails expand the negative effects of human recreation on the flora and fauna of any protected area (Dertien et al. 2018). Similar to the above-discussed problems associated with internal fragmentation, unauthorized trails and recreational activities can negate the ecological benefits of both well-planned designated trails/trail networks and of prohibitions on access and activity (e.g., avoidance of breeding areas and seasonal access restrictions). The proliferation of unauthorized trails is often more responsible for trail-based fragmentation than formally designated trails (Ballantyne et al. 2014).

8 TTFs are created on mountain biking trails to increase the challenge of the ride. Examples of TTFs are jumps, ditches, mounds, bridges, ramps, ladders, drop offs, see saws, and 'skinnies' (i.e., narrow features that can be traversed) (Davies and Newsome 2009; Pickering et al. 2010c; Quinn and Chernoff 2010; Ballantyne et al. 2014; Havlick et al. 2016; Hennings 2017; Pickering and Norman 2017).

Even where unauthorized trails occupy a relatively small proportion of a landscape, they can be quite detrimental if in vital habitat; sensitive species whose territories or home ranges include the affected area(s) may be prevented via displacement or loss of habitat connectivity from accessing limited and essential resources (Gutzwiller et al. 2017). Wildlife can be more disturbed by off-trail than on-trail recreationists. For example, Taylor and Knight (2003) compared how mule deer (*Odocoileus hemionus*) respond to hikers and bikers using designated trails and one randomly chosen off-trail route. The deer exhibited a 70% probability of flushing from on-trail recreationists within 100 m from designated trails, whereas they exhibited a 96% probability of flushing within 100 m of recreationists located off trails, and their probability of flushing did not drop to 70% until the distance from the recreationists reached 390 m.

Examples.—Examples of protected areas affected by unauthorized trails include: 19 Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP; see footnote #2) protected areas in San Diego County, California where unauthorized trails comprise a mean of 45% (range: 8–85%) of the 1,206 km of trails mapped (Reed et al. 2014); an 829-ha area of the endangered Tall Open Blackbutt Forest in southeast Queensland, Australia, where 57% (26.5 km) of the 46.1 km of recreational trails was unauthorized when mapped in 2013 (Ballantyne et al. 2014); and, a 237-ha protected area in Argentina where 94% of the 19 km of trails found was unauthorized, resulting in landscape-level fragmentation and loss of vegetation (Barros and Pickering 2017). Another example of a protected area affected by unauthorized trails is the 191-ha Carlsbad Highlands Ecological Reserve in San Diego County. Though mountain biking is prohibited in this reserve, in addition to the 4 km of legal hiking trails in the reserve are also 27.4 km of unauthorized mountain biking trails and TTFs (E. Pert, South Coast Region, Regional Manager, California Department of Fish and Wildlife [CDFW], personal communication, 2019; Figure 1). This ecological reserve, so designated in 2000, comprises a critical component of an NCCP/HCP protected area and supports coastal sage scrub (a sensitive plant community), grasslands, thread-leaved brodiaea (*Brodiaea filifolia*, listed as threatened and endangered under the Federal and California endangered species acts, respectively), and several sensitive wildlife species: the federally threatened coastal California gnatcatcher (*Polioptila californica*), sharp-shinned hawk (*Accipiter striatus*), golden eagle (*Aquila chrysaetos*), white-tailed kite (*Elanus leucurus*), turkey vulture (*Cathartes aura*), and grasshopper sparrow (*Ammodramus savannarum*).[9]

Managing unauthorized trail creation and use.—Managing the rapid proliferation of unauthorized mountain biking trails and TTFs and their use is challenging. Even if only a small proportion of bikers is involved, the resulting vandalism can have serious ecological consequences as is well reflected in the statement, "[g]enerally when you ask people to stay out of the area no matter what the reason is, 80-90% obey you, [b]ut if you get 10% who don't obey you, you haven't done any good" (Bill Andree, retired district wildlife manager of Colorado Parks and Wildlife; Peterson 2019).

In the aforementioned Carlsbad Highlands Ecological Reserve, enforcement and education are necessary to substantially reduce the illegal riding, but the bikers monitor

9 Of CDFW's 136 ecological reserves (ER) statewide, biking is allowed on eight. About ERs, Title 14, California Code of Regulations §630(a) states, "All ecological reserves are maintained for the primary purpose of developing a statewide program for protection of rare, threatened, or endangered native plants, wildlife, aquatic organisms, and specialized terrestrial or aquatic habitat types. Visitor uses are dependent upon the provisions of applicable laws and upon a determination by the [Fish and Game] commission that opening an area to such visitor use is compatible with the purposes of the property."

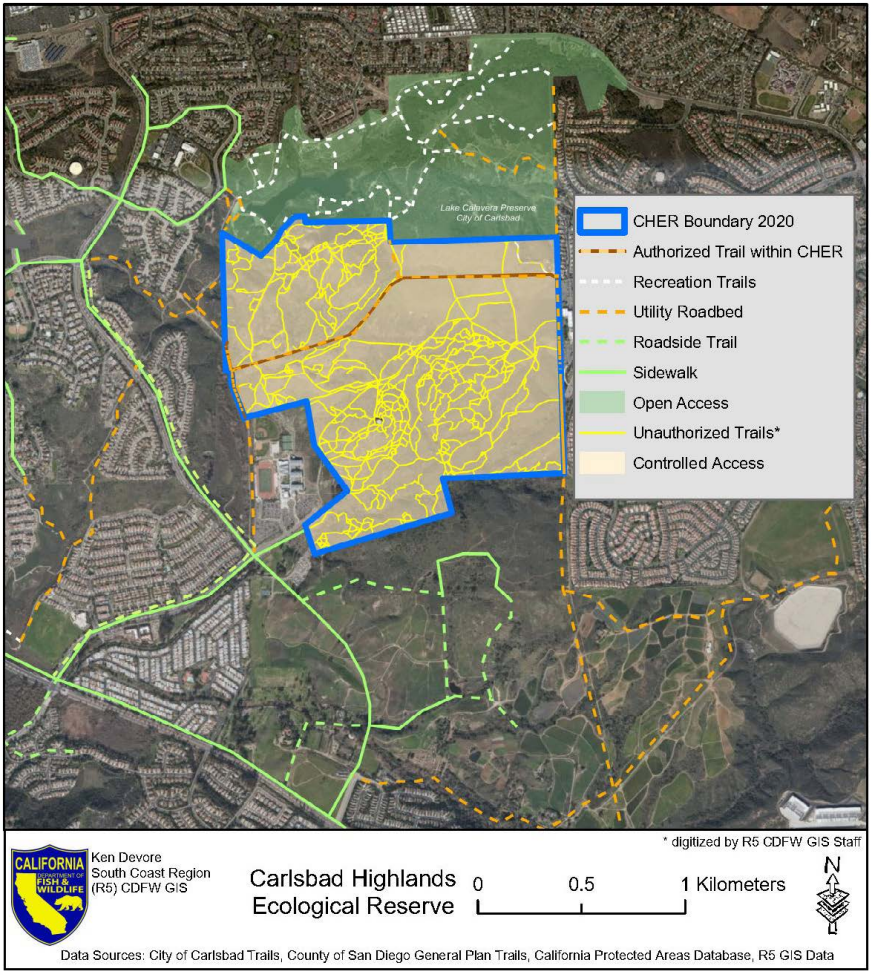

Figure 1. Carlsbad Highlands Ecological Reserve, Carlsbad, California. The yellow lines represent the unauthorized trails. Their associated effect zones occupy most, if not all of, the Ecological Reserve. (Credit: Ken Devore, South Coast Region (R5), GIS, CDFW 2017).

enforcement activity and recommence riding in the ecological reserve when enforcement officers leave (E. Pert, CDFW, personal communication, 2019). A similar protected area is the 350-ha Del Mar Mesa Preserve (Preserve) in the City of San Diego; the Preserve supports rare and endangered species such as Del Mar Manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia)*, Orcutt's brodiaea (*Brodiaea orcutti)*, San Diego button celery (*Eryngium aristulatum* var. *parishii)*, San Diego mesa mint (*Pogogyne abramsii*), San Diego fairy shrimp (*Branchinecta sandiegonensis)*, and the California gnatcatcher, and was the subject of a study the City conducted to determine whether enforcement by CDFW Wildlife Officers (wardens) is an effective method to curb unauthorized trail uses (SANDAG 2015; Greer et al. 2017). Of the 32.22 km mapped trails on a 257-ha portion of this Preserve, 21.98 km are considered unauthorized (Reed et al. 2014). Prior to the study, City Park Rangers had

conducted regular educational efforts in the field an average of 3–4 times monthly over a 17–month period. Despite the Rangers' efforts, non-compliance became the social norm as more users followed expanding numbers of unauthorized trails (Greer et al. 2017). The subsequent period of the CDFW Wildlife Officers' enforcement comprised 810 hours during a 12-week period with an unpredictable schedule. Prior to enforcement activities, the majority (78.7%) of the use within the study area was illegal, and over 85.5% of the illegal use was mountain biking. Illegal mountain biking decreased quickly during the enforcement period by 66.0% over the study period and stayed low during the 43-day post-enforcement period, while legal mountain biking remained the same. Other illegal use also decreased significantly, while other legal uses doubled (Greer et al. 2017). Greer et al. (2017) cite decades of research indicating that a combination of soft (i.e., education) and hard (e.g., warnings, citations, arrests, confiscation of bikes) enforcement is the most effective approach to promoting compliance. They assert that education becomes less effective in areas with chronic unauthorized trail creation and use.

Overall conclusions from Greer et al.'s (2017) study follow: (1) soft enforcement aimed at public education and redirecting social norms was not sufficient to curb unauthorized trail use in the Preserve; (2) open space enforcement by CDFW Wildlife Officers was determined to be effective in reducing unauthorized use in the Preserve; (3) the threat of sanctions (hard enforcement) has a more general utility and effectiveness in curbing non-compliant behavior than outreach to promote "awareness-of-consequence" of user actions (soft enforcement). The authors also concluded that social media has great potential to engage and educate the public on environmental issues, and that its use in combination with community policing can be a powerful tool to: redirect user attitude and subsequent behavior through peer-to-peer education about environmental impacts; answer questions regarding authorized uses; and, warn users of potential sanctions for non-compliance. They recommend the implementation of a social media component prior to and during enforcement efforts to help educate recreationists and reduce misinformation and recreationists' distrust of managers and enforcement personnel (Greer et al. 2017).

Paucity of information available.—Despite the global proliferation and use of unauthorized trails and TTFs and their far-reaching effects on wildlife in protected areas, there is a paucity of information of any depth available on such effects. The impacts of unauthorized trails and TTFs have been rarely documented (Marion and Wimpey 2007; Davies and Newsome 2009). A comprehensive literature search prior to 2010 produced only eight studies documenting the effects of unauthorized trails (Pickering et al. 2010c). Since then, additional studies have assessed the effects on vegetation from unauthorized trails, with little elucidation about their effects on wildlife. The proliferation, use, and wildlife-related effects of unauthorized trails remain understudied and insufficiently addressed. For protected areas where the creation and use of unauthorized trails and TTFs are prevalent, it is infeasible to fully assess the recreation-related effects on wildlife without including these activities and their effects. Yet, these effects have a great potential to impair the ability of protected areas to meet their conservation objectives.

Disturbance thresholds

Disturbance thresholds are predetermined levels of various measurable indicators above or below (depending on the indicator) which wildlife is disturbed (Hennings 2017).

These thresholds may be used to establish management measures such as minimum widths of spatial buffers between recreational trails and wildlife. Exceedance of a threshold may trigger the implementation of further management measures (Hennings 2017). Examples of disturbance thresholds are distance between people and wildlife or between trails and nesting sites (i.e., the distance within which wildlife species avoid people or trails), density of active trails above which wildlife alters its use of habitat, number of recreationists per day over which wildlife abundance decreases, duration of recreation, and number of recreational events per unit time (Hennings 2017; Dertien et al. 2018).

Thresholds should be set at levels equal to or more protective of predetermined levels of disturbance, and should be responsive to trends in changing conditions as identified by monitoring (Hennings 2017). Data from studies of recreational activities can be used to estimate quantitative thresholds of disturbance to wildlife (Dertien et al. 2018); however, determining these thresholds requires very specific empirical data (Rodríguez-Prieto et al. 2014).

While determining and using disturbance thresholds would be ideal for managers to optimize management decisions (Rodríguez-Prieto et al. 2014), they are difficult to determine for broad application. For example, thresholds established for distance to trail are not necessarily adequately protective of the focal species under all conditions in which they occur; a general rule of minimum thresholds for distance to trail cannot be established for some species, as individual variability within species can be high and can differ among populations, types of topography, and frequencies and types of human intrusion (González et al. 2006). As a result, the literature about recreation-related disturbance to wildlife provides limited information about quantitative thresholds for distance to trail (Dertien et al. 2018). Though their sample sizes (i.e., number of articles reviewed with such information) are accordingly small, Dertien et al. (2018) found the following examples of such thresholds: wading birds and passerines were generally affected at distances less than 100 m; larger-bodied species such as hawks and eagles had threshold effect distances greater than 400 m; small rodent species avoided areas within 50-100 m of trails or people; and some carnivores and ungulates had minimum effect distances up to 350-1000 m from trails and people.

As another example of a spatial buffer, Dertien et al. (2018) recommend a 200-m minimum buffer for ungulates; however, this would be insufficient for the circumstances of Taylor and Knight's (2003) study in which they found that mule deer showed a 96% probability of flushing within 100 m of recreationists located off trails, and the probability of their flushing did not drop to 70% until perpendicular distance reached 390 m. Two additional factors that influence the determination of spatial buffers are the density of the trail networks and the above-discussed effect zones. The smaller a protected area is and the denser its trail networks are, the greater the proportion of the protected area is occupied by effect zones, and the less likely it is that spatial buffers will protect the focal species from recreational disturbance (Wilcove et al. 1986; Ballantyne et al. 2014).

Land managers should consider both trail density and the level of human recreation before deciding on disturbance thresholds, since thresholds that work at lower levels of human activity may be ineffective when activity levels increase (D'Acunto et al. 2018). D'Acunto et al. (2018) simulated the success of trail closure strategies on reducing disturbance from Off Road Vehicles and pedestrians to nesting golden eagles during laying and incubation, focusing on eagle flushing behavior from the nest and alteration of foraging flight. They found that, for current levels of human recreation, the restrictive buffer (i.e. all trails closed

within the buffer) was best at reducing flushing of incubating eagles, while closing all but the popular trails was best for foraging eagles. When the simulated human recreation was increased, trail density was the main factor influencing eagle flushing frequency.

Hennings (2017) reports the following thresholds for levels of human recreation (i.e., number of users) from four studies: for guanacos (*Lama guanicoe*), about 250 visitors per day, above which the number of birds observed declined; for sanderlings (*Calidris alba*), 20 visitors per day; for songbirds, eight out of 13 species showed thresholds ranging from 8-37 visitors per ha; and, for Mexican spotted owls (*Strix occidentalis lucida*), around 50 hikers per day. Regardless of any threshold effects, the majority of the research indicates that more visitors will generally cause more wildlife effects (Hennings 2017). However, since recreational impacts vary nonlinearly with use in a variety of ecosystems, a small number of visitors can have a disproportionate impact on sensitive species (Reed and Merenlender 2008).

Other aspects of recreation ecology to consider

Interpretation of observed behavioral responses.—It is possible to misconstrue the reasons for and implications of observed responses by wildlife to recreational activity. Traditionally and intuitively, species or individuals showing strong negative responses (e.g., readily flee or avoid) to human disturbance are those assumed to most need protection from disturbance. However, species with little suitable habitat available nearby cannot show marked avoidance of disturbance even if the fitness costs of the disturbance are high (e.g., reduction of survival or reproductive success; Gill et al. 2001). Conversely, species with many nearby alternative sites to move to are likely to move away from disturbance even if the fitness costs of the disturbance are low (Gill et al. 2001). It should not be assumed that the most responsive animals are the most vulnerable (Beale and Monaghan 2004). For example, in a controlled study of the behavioral responses of a shorebird (ruddy turnstone, *Arenia interpres*) to human disturbance (an approaching observer), Beale and Monaghan (2004) found that birds in better condition (i.e., supplemented with food) had longer flight initiation distances (i.e., flushed sooner) from the disturbance and searched for predators more frequently than control birds (i.e., not supplemented with food).[10] That is, birds responding most were actually the least likely to suffer any fitness consequences associated with the human presence; this is opposite from the response generally expected when behavior is used as an index of disturbance effects. Birds that had the most to lose by flushing, or otherwise changing their behavior in a manner that reduced feeding time, showed the least behavioral response; this could be interpreted incorrectly as meaning that these birds were not disturbed. Gill et al. (2001) assert that the absence of an obvious behavioral response does not rule out a population-level effect. In the same vein, it may be that species occurring in protected areas that are remnant fragments within urban landscapes are forced to utilize all components of the fragments, irrespective of their land-use intensity and land cover. This may occur if animals have nowhere else to go, and may be an explanation for instances when total relative abundance of birds is greater in urban and suburban reserves than in exurban reserves (Markovchick-Nicholls et al. 2008).

In addition to the reasons Gill et al. (2001) provide for an absence of detected effects, other possible reasons for finding no recreation-related effects include that there

10 Flight initiation distance is the distance from an approaching threat (e.g., recreationist) at which an animal begins to move away to escape from the threat.

may be a negative effect but it is not detected due to methodological issues. For example, the response variable examined (e.g., behavior versus physiology) and/or the number of replicates used compared to the amount of variation in the traits measured may not reveal the actual response of the species studied or the associated longer-term population-level effects (Steven et al. 2011). Furthermore, some studies may not include sufficiently high levels of human activity to detect responses from species that can tolerate lower levels of disturbance (Reed et al. 2019).

Threatened, endangered, and sensitive species.—Current research of recreation-related effects on wildlife does not include many species of urgent conservation concern (Larson et al. 2016). As many rare and isolated species tend to be specialists, anthropogenic activities could have a greater detrimental effect on the distribution, breeding success, and survival of individuals of these species (Beale and Monaghan 2004b; Bennett et al. 2013) than found in studies involving less sensitive species. Studies do not always reveal the strongest effects because the most disturbance-sensitive species are naturally rare in number or are already gone from disturbed sites (Hennings 2017). While recreation may not be the primary reason for the sensitive status of such species, it is a threat worth understanding for types of recreation that occur in the protected areas designated to conserve them (Larson et al. 2016).

Magnitude and duration of wildlife responses to recreation.— It is known that the nature (e.g., behavioral, physiological), magnitude, and duration of recreation-related disturbance to wildlife depend on a variety of factors, including, but not limited to, frequency and type of recreation, distribution of recreational use, season(s) of use, and environmental conditions (Marzano and Dandy 2012). Evaluating the effectiveness of measures to manage recreation can be complicated by the intensity of recreational use of a protected area because levels of use influence the magnitude of recreation-related effects on wildlife (Reed and Merenlender 2011). But studies do not always quantify the levels of recreational uses. Likewise, research seldom provides insight to the duration of wildlife species' response (e.g., nest abandonment, interruption of foraging/hunting, breeding, fleeing) to human disturbance (Marzano and Dandy 2012; Burger 2012; Larsen et al. 2016) or degree of response (e.g., how far wildlife moves away from human disturbance at a greater energetic cost and resulting in less availability of habitat). The same is true for the spatial scale at which wildlife response occurs (Burger 2012).

Generalized comparisons of effects among types of recreation.—It is clear from the literature that recreation in protected areas, particularly in more urbanized areas, can negatively affect wildlife (Larsen et al. 2016). However, it is difficult to make defensible generalized comparisons of the effects on wildlife among different types of recreation, partly because of the diversity of recreational activities, study methodologies, and observed responses (Monz et al. 2013). A comparison of results among similar studies indicates that sweeping conclusions about the effects of urbanization and human activity on wildlife need to be made with caution and are likely to be species-specific (Markovchick-Nicholls et al. 2008). For example, applying this caution to one species, the U.S. Fish and Wildlife Service (2000) concludes that attempts to ascribe relative importance, distinguish among, or generalize the effects of different human activities on bighorn sheep (*Ovis canadensis*) behavior are not supportable, given the range of potential reactions reported in the literature and the different variables impinging on given situations. Therefore, generalized comparisons of the effects on wildlife among different types of recreation are ill advised. The differences among types of recreation in their effects on wildlife are less important than the negative association for wildlife of human presence, irrespective of type of recreation (Patten and Burger 2018).

Despite the difficulty of making well-founded comparisons of the effects on wildlife among different types of recreation, comparisons are made. Among the types of recreation examined in the literature, the ecological effects of hiking and biking are most often compared. For studies done in the United States, this reflects the 22% increase to 8.3 million from 2006 to 2015 in mountain bikers, and the 24% increase to 37.2 million hikers during the same time period (Hennings 2017). And, notwithstanding the foregoing caveat about generalized comparisons, Hennings (2017) underscores that photographers, people with small children, bird watchers, and people engaging in loud conversations may be especially detrimental to bird communities because they are unpredictable and generally alarming. Photographers and wildlife watchers tend to stop, look directly at wildlife, and even follow them around, triggering stronger antipredator responses than people who simply pass by; photographers also tend to seek out rare species and look for nests. Also, curious, excited children tend to run around and shout in an unpredictable fashion (Marzano and Dandy 2012; Hennings 2017).

An absence of differences among effects.—The absence of differences among recreational activities' effects on wildlife does not equate to no effects. There can be similar levels of both benign or significant effects. For instance, in a study of bison (*Bison bison*) and pronghorn (*Antilocapra americana*), the authors found little difference in wildlife response (i.e., alert distance, flight initiation distance, or distance moved)[11] to hikers versus mountain bikers, but both species exhibited a 70% probability of flushing when within 100 m from trails with recreationists present (Taylor and Knight 2003).

Cumulative and synergistic negative effects.— The negative effects of recreation on wildlife compound, and may also act synergistically with, those from other influences (Larson et al. 2016; Reed et al. 2019). The cumulative negative effects of all anthropogenic influences on wildlife complicate efforts to minimize the effects and assess their population-level consequences (Pirotta et al. 2018). However, recreation ecology studies typically do not factor in other anthropogenic influences to which wildlife in protected areas are exposed (Pickering et al. 2010c; Erb et al. 2012; Messenger et al. 2014; Reed et al. 2019). Other anthropogenic influences include climate change and its associated effects on natural disasters; fires and other natural or human-caused disasters; consumptive recreation; non-recreational human activity such as habitat loss or alteration, the associated lack of connectivity, and the resulting loss of genetic diversity; poor air and/or water quality; invasive species; roads; vehicles; artificial light; prey declines; reverse zoonoses; drones; and noise (e.g., from vehicles, planes, ships, and boats). Recreation-related cumulative effects may be important if, for instance, the densities of different types of recreationists influence predator use of sites more than does the density of any one type of recreationist alone (Gutzwiller et al. 2017).

Wildlife habituation to human activity.—Habituation is a form of tolerance in which, as the result of a lack of negative consequences, there is a waning of response to a repeated, neutral stimulus (Whittaker and Knight 1998; Pauli et al. 2017). Habituation allows wildlife to use their energy for normal fitness-enhancing behaviors such as resting, foraging, and mating instead of fleeing when confronted with human activities that result in neutral outcomes (Whittaker and Knight 1998; George and Crooks 2006; Reilly et al. 2017). Habituation is

11 Alert distance is the distance from a stimulus at which an animal initiates vigilance behavior (Guay et al. 2016 in Reed et al. 2019); more specifically in this context, it is the distance between a recreationist and an animal when the animal first becomes visibly alert to the recreationist. Distance moved is the distance an animal travels from its initial position until it stops (Taylor and Knight 2003).

an apt description for crows (*Corvus* spp.) ignoring a scarecrow, or a red fox ignoring the human activity in a suburban area (Whittaker and Knight 1998). Citing several authors' work, Martínez-Abraín et al. (2008) identify level and frequency of disturbance, species, location, size and diet of species, and age of individual animals as factors that affect the degree of wildlife habituation to human disturbance.

The ability to habituate to predictable and recurrent human use of recreational trails may be an important behavioral adaptation for wildlife (González et al. 2006; Martínez-Abraín et al. 2008). However, habituated urban wildlife might be less likely to avoid contact with humans, which may increase the probability of human-wildlife conflicts and of attraction to anthropogenic food sources; both circumstances are considered problematic in many urban areas (Whittaker and Knight 1998; George and Crooks 2006). Wildlife habituation to humans may also increase wildlife aggression toward humans, or render wildlife more vulnerable to predators, hunters, poaching, or roadkill (Whittaker and Knight 1998; George and Crooks 2006; Marzano and Dandy 2012). Habituation of adult individuals may be associated with negative consequences for their offspring since habituation of adult animals does not translate to immediate habituation of juveniles (Reilly et al. 2017).

True habituation is not easily measured, and what appears to be habituation is often not (Hennings 2017). Apparent habituation is not a true measure of whether people are disturbing wildlife (Hennings 2017). Wildlife can experience significant stress without fleeing, and when this is misconstrued as habituation, disturbance effects on wildlife are underestimated (Hennings 2017). Care must be taken to avoid attributing a lack of observable response by wildlife to human presence as habituation (Beale and Monaghan 2004). Wildlife that seem not to avoid recreational disturbance may experience stress or be unable to leave a site if, for example, there is no suitable habitat nearby (Gill et al. 2001; Beale and Monaghan 2004; Markovchick-Nicholls et al. 2008).

While habituation to human disturbance could result in development of tolerance within a population (Pauli et al. 2017), Bötsch et al. (2018) infer from their findings on the recreation-related disturbance to birds in forests where recreation has occurred for decades that habituation to humans has not outweighed the effects of the disturbance. A long-lived species with low recruitment, such as the golden eagle, may be unable to experience individual learning or population-level evolutionary adaptation at a rate sufficient to compensate for a rapidly shifting anthropogenic landscape (Pauli et al. 2017).[12]

In a study subjecting captive female elk to four types of recreational disturbances (all-terrain vehicles riding, mountain biking, hiking, and horseback riding) over a two-year period, the elk showed no evidence of habituation to mountain biking. Similarly, elk travel time in response to hiking was generally above that of control periods, suggesting elk also did not habituate to hiking disturbance (Naylor et al. 2009).

In a study of how bison, mule deer, and pronghorn responded to hikers and bikers on designated recreational trails, Taylor and Knight (2003) found little evidence of habituation to recreationists among the species at the time of the study (summers of two consecutive years). In fact, the pronghorn at the study site did not habituate to largely predictable recreational use over a three-year period following the opening of trails at the site, and used areas that were significantly farther from trails than they had prior to the start of recreational use.

12 Evolutionary adaptation is the hereditary alteration or adjustment in structure or habits, the process by which a species or individual improves its ability to survive and pass on its genes in relationship to the environment (Ha and Campion 2019); unlike habituation, evolutionary adaptation does not result from learning during an individual's lifetime.

Hennings (2017) asserts that wildlife do not appear to habituate to the presence of dogs; impacts potentially linger after dogs are gone because the scent of dogs repels wildlife. It may be too that wildlife do not habituate to dogs (particularly off-leash dogs) because wildlife perceive dogs as predators and because they are unpredictable (Hennings 2016). Dog-specific disturbance has been studied for birds, with no evidence of habituation even with leashed dogs and even where dog-walking was frequent; the disturbance was much weaker for people without dogs (Hennings 2016).

The challenge of research.—Recreation ecology, similar to other fields of ecology, faces challenges in conducting statistically valid research (Quinn and Chernoff 2010). The degree to which and how the biotic and abiotic resources present in any one location respond directly or indirectly to recreational activities depends on many variables, some of which may be confounding (Figure 2, Table 1). Measuring the effects of human activity on wildlife is difficult because of the variability in the underlying spatial, diurnal, seasonal, and even the type of, indices being measured (Burger 2012). Recreation-related effects on wildlife vary among species (Larson et al. 2016) as different wildlife species respond differentially to visual, auditory, olfactory, and tactile stimuli (Hennings 2017). Wildlife responses to recreationists are likely influenced by a suite of variables that may differ in each field setting (Steidl and Anthony 1996; Taylor and Knight 2003), including level of human presence/activity that evokes a response as well as feedbacks and interactions with other factors (e.g., edge effects, availability of cover, exposure to disturbance, or time since fire; Patten and Burger 2018). Study methodology (i.e., design, sampling, data collection, and data analysis) itself encompasses many variables that dictate how other variables will influence the study outcomes. Even if methodology is consistent between/among two or more studies, other variables can result in different study results (Taylor and Knight 2003). Methodological issues may limit the inferences that can be made from the results (Pickering et al. 2010c).

Study design and statistical analyses can utilize methods to control for the effects of confounding variables (e.g., by using covariates). Statistical analyses can be used to examine alternative use-impact or use-response relationships between recreational activity and wildlife responses to assess the effects of recreational activity relative to other known drivers (e.g., habitat fragmentation, invasive species) of species occupancy, distribution, physiology, reproduction and survival (Monz et al. 2013; Reed et al. 2014).

Differences among study results.—Differences among studies' results can be due more to differences in variables not accounted for (e.g., space, diet, competition; Markovchick-Nicholls et al. 2008), study design, and/or analytical methodologies than to actual differences among species' responses to recreational disturbance. As to methodology, for instance, some studies may not include sufficiently high levels of human activity to detect responses from species that can tolerate lower levels of disturbance (Reed et al. 2019).

Reilly et al.'s (2017) study using camera trap data to quantify how hiking, mountain biking, horseback riding, and dog-walking affect habitat use/occupancy and diel shifts in activity patterns of ten mammalian species is illustrative for this discussion because some of its results differ markedly from those of other studies. For example, the authors found no negative association between recreation and habitat use by bobcats (*Lynx rufus*) and coyotes (*Canis latrans*), whereas Reed and Merenlender (2008) documented (in the same study area as Reilly et al.) densities of these two species more than five times lower in protected areas that permitted recreation versus those that did not. Dertien et al. (2018) identify differences in the following aspects of the two studies: field study methods, statistical analyses,

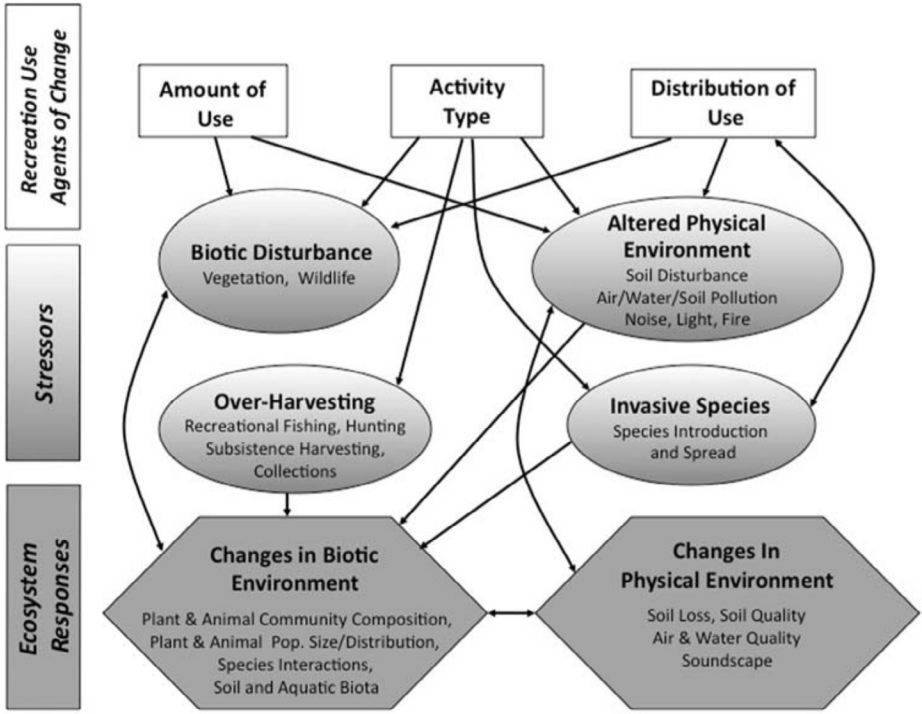

Figure 2. A conceptual model of ecological effects of outdoor recreation (Credit: Monz et al. 2010).

and research design – namely, types of study sites selected, treatment of data sources as replicates or independent of one another, and duration of data collection (one versus three years). These differences may have contributed to the greater variability observed in Reilly et al.'s (2017) study compared to Reed and Merenlender (2008).

Strong variability in other factors that are well known to influence mammalian distributions (e.g., habitat type, human development, or seasonal effects) make it difficult to conclude whether the potential effects of recreation on the target species were truly absent or simply undetected (Dertien et al. 2018). In addition, studies that use abundance, relative abundance, or species richness generally observe stronger effects of recreation than do studies such as Reilly et al.'s (2017) that use occupancy as a response variable (or occupancy interpreted as habitat use; Reed et al. 2019).

Reilly et al. (2017) acknowledge that: species vary widely in their responses to human activities; recreation-related effects on mammalian species that are rare or declining may be greater than on those that are more common or widely distributed; and birds, reptiles, amphibians, and small mammals may respond differently than the large and medium-sized mammals they studied. Finally, in contrasting their results with those of George and Crooks (2006), Reilly et al. do not acknowledge Gill et al.'s (2001) assertion that proximity to other suitable habitat influences how wildlife will respond to human disturbance; George and Crooks (2006) not only acknowledge but give credence to Gill et al.'s work.

Population-level effects

The foregoing discussion reveals many complexities of recreation ecology and provides a sense of why the population-level effects of human disturbance to wildlife are still poorly known (Burger 2012; Hennings 2017). Parameters used to measure population-level effects include population size, density, age structure, fecundity (birth rates), mortality (death rates), and sex ratio (Tarsi and Tuff 2012). Comprehensive assessments of the nonlethal effects on wildlife at the population level are rarely undertaken due to several constraints, including that robust assessment of these effects is challenging (Pirotta et al. 2018). Nonetheless, from a strictly conservation standpoint, human disturbance to wildlife is important only if

Table 1. Variables that influence the outcome of studies designed to assess the ecological effects of recreational activities. Each variable is mentioned in one or more of the cited articles (Taylor and Knight 2003; Beale and Monaghan 2004; Markovchick-Nicholls et al. 2007; Davis et al. 2010; Monz et al. 2010; Pickering 2010a; Quinn and Chernoff 2010; Burger 2012; D'Acunto 2018).

a. regional geophysical traits
b. size(s) of protected area(s) where research occurs
c. type(s) of vegetation present
d. area and density of vegetative cover
e. surrounding environment, including vegetation between the recreational activity and the target species
f. edaphic conditions (e.g., soil type, level of compaction, moisture, composition)
g. weather (temperature, precipitation, wind, shade, sun etc.)
h. timing (day / night / season)
i. time of day x location
j. design of trails (e.g., steepness of trails)
k. placement of trails (orientation to terrain - on flat, along a slope, across a slope)
l. direction of trails (ascending or descending)
m. spatial relationship between trails and target animals
n. trail density
o. wildlife present, target and non-target
p. total # of target wildlife individuals
q. spatial distribution of target wildlife
r. age classes and genders of target wildlife present (adult males/females, subadults, young of year)
s. reproductive status of target wildlife
t. fitness of target wildlife
u. predictability of recreational activity
v. degree of target animals' habituation to tested activities
w. duration of target animals' exposure
x. whether the target animals have the ability to retreat
y. type(s) of recreation
z. duration of recreational activity
aa. # of humans present (e.g., individuals or groups)
bb. # of human disturbances per day
cc. whether recreational activity is on or off an official trail
dd. recreationists' positions
ee. angle / trajectory of recreationists' approach to wildlife
ff. speed and style (e.g., 'aggressive') of recreationists' approach
gg. distance of recreational travel
hh. whether the recreationists apply best practices
ii. recreationists' behavior (e.g., talking or silent, continuous movement or stopping)
jj. encounter distance
kk. perpendicular distance
ll. encounter x perpendicular
mm. researcher bias
nn. study methodology (e.g., is recreationists' approach to wildlife direct or tangential, on or off trail; includes statistical analyses)

it affects survival or fecundity such that a population declines (Gill et al. 2001). Assessing and managing the nonlethal effects on wildlife populations has long been a goal of ecologists, land managers, and decision makers (Pirotta et al. 2018). The management of human activities that cause nonlethal effects on wildlife presents a fundamental ecological problem: how to understand the population-level consequences of changes in the behavior or physiology of individual animals that are caused by external stressors (Pirotta et al. 2018). Given the expansion of recreational activities that can disturb wildlife, quantitatively linking the effects of this disturbance to population dynamics is a major objective for modern conservation (Pirotta et al. 2018).

While behavioral responses, which are studied far more often than other types of responses (e.g., physiological; Larson et al. 2016), have the potential to affect survival or reproductive success, the actual fitness[13] costs of behavioral responses need to be quantified before the responses can be used as reliable estimates of population-level perturbations (Gill et al. 2001).

In most situations when statistical models are used to estimate or forecast the population-level effects of disturbance, selection of a model structure is likely to be driven by data availability (Pirotta et al. 2018). Collecting recreation data in conjunction with ongoing animal population monitoring efforts would be a valuable way to improve the understanding of the effects of human disturbance on demographic trends; and, studies that combine behavioral responses with physiological or demographic metrics would help calibrate the relationships between behavioral responses and population-level effects (Reed et al. 2019). Whichever models are used, uncertainty in the estimated population consequence can be reported as a distribution of potential outcomes, allowing the application of the precautionary principle if the results are used to make management decisions (Pirotta et al. 2018).[14] Application of the precautionary principle is warranted given that any simulation model simplifies reality (D'Acunto et al. 2018).

The dearth of conclusive evidence of recreation-related population-level effects in the literature does not mean that such effects are rare; logic dictates that, if the negative consequences of some observed behaviors or physiological changes in wildlife persist, negative population-level effects will eventually follow. For example, negative population-level effects on desert bighorn sheep (*Ovis canadensis nelsoni*) from recreational disturbance have been documented and are implicated in the bighorn sheep abandonment of habitat (and extirpation of the population) in the Pusch Ridge Wilderness in Arizona, USA (Longshore et al. 2013). And, recreation is one reason cited for the population of bighorn sheep in the Peninsular Ranges of California being listed in 1998 as endangered under the Federal Endangered Species Act (USFWS 2000).

The effects of hikers on elk (*Cervus elaphus*) provide another example of recreation-related population-level effects. Based on a two-year study of the response of female elk to the presence of back-country hikers during the calving season, Shively et al. (2005) recommended that some recreational closures be continued because, despite the evidence that elk reproduction can rebound from depressed levels when hikers are removed or reduced in

13 Fitness refers to reproductive success and reflects how well an organism is adapted to its environment (Hennings 2017).

14 The central tenet of the precautionary principle is that precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. Generally, the four central components of the principle are: taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making (Kriebel et al. 2001).

number, they could not determine if there is a threshold level of reproductive depression from which elk cannot recover. In fact, a 2019 article in *The Guardian* reported that the number of elk in the same herd Shively et al. (2005) studied had dropped precipitously since the early 2010s with the steady increase in recreation; what was once a herd of 1,000 head of elk, had dropped to 53 at last count in February of 2019 (Peterson 2019). The article explains that, for Bill Alldredge, one of the authors of the study, there is no other explanation than the increased levels of trail users in the area that supports this elk herd (Peterson 2019).

In a study to assess the effects of recreational activities on Iberian frogs (*Rana iberica*), an endemic species in decline and listed as vulnerable in the Spanish Red Data Book, Rodríguez-Prieto and Fernández-Juricic (2005) concluded that (1) the decrease in Iberian frog abundance with the proximity to recreational areas suggests that direct human disturbance affects this species at the population level, and (2) overall, the results suggest that direct human disturbance needs to be considered as a potential factor affecting amphibian populations with low tolerance for disturbance.

From the peer-reviewed recreation ecology literature, Steven et al. (2011) compiled 69 journal articles that describe the results of original research examining the effects of non-motorized nature-based recreation on birds. Among the articles were 33 that examined population-level avian responses (i.e., reproductive success including number of nests, number eggs laid, and number of chicks that hatched or fledged). Negative effects were reported in 85% of these 33 articles.

Patten et al.'s (2017) 10-year study of mammalian populations across the County of Orange Central and Coastal NCCP/HCP protected areas coincided with a marked increase of human activity and provides insight to potential population-level effects. Though the authors did not discern a decline in the populations studied, they did discern temporal and spatial shifts by wildlife due to human presence, and they suggested that the associated losses in prey populations are unsustainable in light of additional stressors these populations face, which range from continued loss of habitat to human disturbance in the protected areas. Furthermore, given the avoidance behavior and temporal shifts of the various mammalian species, any further increase in human disturbance may yet drive mammalian populations downward (Patten et al. 2017).

With regard to population-level effects of anthropogenic fragmentation, evolutionary adaptation to such fragmentation has received some attention. Even when adaptation to fragmentation occurs, it may not be enough to fully compensate for the environmental effects from fragmentation, and in some cases may even exacerbate them (Cheptou et al. 2017).

Distinguishing facets of mountain biking

Together with the extent of the above-discussed creation and use of unauthorized trails and TTFs by mountain bikers, the mass-marketing of the sport, and the very large numbers of mountain bikers (Burgin and Hardiman 2012), at least four facets of mountain biking distinguish it from other recreational activities such that it may be of potentially greater concern with respect to its effects on wildlife than yet accounted for in the literature. These facets are distance traveled, speed of travel, biking in the dark, and political lobbying and advocacy.

Distance traveled.—Bikers traveling faster obviously travel farther than hikers per unit time and could therefore disturb more wildlife than hikers per unit time (Taylor and Knight 2003; Burgin and Hardiman 2012); the same applies to bikers and equestrians when bikers travel faster than equestrians. Larson et al. (2016) reasoned that, since motorized activities

often cover larger spatial extents than non-motorized activities, it is possible that the effects of motorized activities have been underestimated. The same logic applies to the distances traveled by bikers and hikers. For valid comparisons among recreation-related ecological effects, the comparisons must account for distances traveled and the associated levels of disturbance to wildlife along the entire route traveled.

Speed of travel.—While recreation-related effects on wildlife are generally assumed to be indirect (Dertien et al. 2018), the speed at which mountain bikers travel, combined with their relatively quiet mode of travel, can result in direct disturbance to wildlife. A relatively fast moving, quiet mountain bike may approach an animal undetected until well within the animal's normal flight response zone. The result may be a severe startle response by the animal with significant consequences to the animal and/or the mountain biker (Quinn and Chernoff 2010). The sudden encounter is the most common situation associated with grizzly bear (*Ursus arctos horribillis*) inflicted injury (Quinn and Chernoff 2010). Biking-caused wildlife fatalities likely resulting because of bikers' speed occur with amphibians and reptiles that may be attracted to trails for thermoregulation and are thus exposed to collision with bikes' wheels (Burgin and Hardiman 2012); photo-documentation provides evidence of three such fatalities in CDFW's Del Mar Mesa Ecological Reserve in San Diego where a San Diego horned lizard (*Phrynosoma coronatum blainvillii*, a species of concern under CDFW and the U.S. Fish and Wildlife Service), three western toads (*Anaxyrus boreas*), and two Baja California treefrogs (*Pseudacris hypochondriaca*) were killed by mountain bikes (J. Price, CDFW, personal communication, 2019). The treefrogs appear to have been mating when run over—the photo documentation shows eggs spilling out of the female. Biking is prohibited in this ecological reserve, and two of the run-overs occurred on unauthorized trails (J. Price, CDFW, personal communication, 2019).

Though there are methods (e.g., bells attached to bikes) for mountain bikers to give warning of their approach to other trail users, and these can be effective for this purpose, these methods themselves can introduce additional disturbance to wildlife. And, such warning sounds are ineffective for wildlife whose hearing range does not detect them or who do not hear them soon enough to avoid a collision. Moreover, when recreationists are visible on approach to wildlife, the more threatening (e.g., faster, more direct) the recreationists appear to wildlife (as potential predators), the greater the flight initiation distance from the recreationists (Stankowich 2008). Fleeing from a perceived predator represents potentially needless expenditure of valuable energy.

Biking in the dark.—Mountain biking in the dark (i.e., night riding), which is on the rise in protected areas, can disrupt the natural balance between diurnal and nocturnal wildlife. Consequently, night riding poses a dual threat to wildlife that exhibit diel shifts toward night: night riding can compound the pressure such wildlife experience from daytime recreational activities by increasing encounters with competitors and even further reducing the time available for foraging and breeding (Reilly et al. 2017). Night riding can also startle naturally nocturnal wildlife and wildlife that has become increasingly nocturnal to avoid daytime recreationists and other anthropogenic disturbances. Generally, temporal shifts by wildlife involve disruptions to both the shifting wildlife and to the wildlife naturally active during the time frame the shifting wildlife move into. In this way, such shifts set both groups of wildlife up for conflict and competition, disrupt predator/prey relationships, reduce feeding/hunting time and success, and disrupt breeding and other activities (Gaynor 2018). Temporal shifts can also result in spatial shifts and thus potentially cause further ecological

disruptions. Thus, temporal shifts are disruptive not only to individuals, but also to communities, and ultimately, populations (Gaynor 2018).

Political lobbying and advocacy.—In part due to the markedly different motivation driving mountain bikers compared to other recreationists in protected areas, especially in the more extreme forms of mountain biking (Burgin and Hardiman 2012), the mountain biking community has come to wield significant lobbying and advocacy pressure throughout the United States. Networking among members if the mountain biking community has resulted in changes in land managers' decisions (Bergin and Hardiman 2012). In California, a newly formed mountain biking nonprofit aims to gain a voice at the capital with lawmakers to put trail access and trail development front and center (Formosa 2019). And, the community has much experience in planning trail networks, experience that is necessary to negotiate areas appropriate for mountain biking. In San Diego County, the local mountain biking coalition and the United States Forest Service (USFS) work in partnership to build trail networks on national forest lands; because the USFS does not have a budget for recreation, the only way trails will be built on national forest lands within the County is if the coalition pays the USFS for the agency's staff time, studies and environmental review, and project-processing needed to approve the trail networks (SDMBA 2017). While the USFS-biking coalition partnership may be similar to the accepted practice of an applicant (e.g., utility) paying a lead/permitting agency to dedicate personnel to the applicant's project(s) or a certain body of work, conflicts of interest are usually inherent in such collaborations. In addition, much of the USFS-biking coalition partnership's planning process occurs outside of public view, prior to the public knowing anything about it. It is notable that, while not all USFS lands are considered protected areas in the meaning of this paper, the wilderness areas the USFS manages are.[15]

Recommendations and conclusions

Conservation of habitats is critical to the perpetuation of viable populations of sensitive species. California is home to several types of protected areas whose primary or sole purpose is conservation of sensitive species. After conserving these protected areas, the next crucial step in biological conservation is managing how, where, and when humans use the land. However, there is rarely adequate management to control the allowed types and levels of recreation such that they are compatible with conservation, much less prevent the illegal recreation. The following discussion provides recommendations related to the major issues of recreation ecology addressed above. The implementation of most of these recommendations is considered management as the term is used in this paper (footnote #4), and land managers are familiar with most, if not all, of them. Still, it is hoped that the recommendations provide some new insights and even useful guidance for practical application in the management of dual-role protected areas, the wildlife they support, and the recreationists they serve. For simplicity, clarity, and brevity, several of the recommendations are in imperative sentences. For some of the aspects about recreation ecology discussed

15 The USFS manages approximately 33% of the acreage within the National Wilderness Preservation System (https://wilderness.net/learn-about-wilderness/agencies.php) and describes wilderness areas as places where nature "still calls the shots… They are final holdout refuges for a long list of rare, threatened, and endangered species, forced to the edges by modern development… They are places where law mandates above all else that *wildness* be retained for our current generation, and those who will follow" (https://www.fs.usda.gov/managing-land/wilderness).

above, there are no discrete recommendations.

Continual management is imperative.—Continual management (footnote #4) of recreation is imperative for dual-role protected areas to meet their conservation objectives. The chronic insufficiency of management resources for protected areas is of obvious concern. It is urgent that action be taken to address the chronically underfunded management of protected areas by securing perpetual fiscal support that is sufficient for the management needs in perpetuity; the perpetual fiscal support to be secured includes all costs for personnel and all program costs. The level of management must be commensurate with expanding levels of authorized and unauthorized non-consumptive recreation. Given the upward trajectory of recreational activities in protected areas, garnering broad support for securing the perpetual fiscal support requires a societal course change to a collective perspective of respecting and tending to other species in need of protection. Management that is effective for the biological resources would also improve the often cited economic, educational, and health benefits of protected areas.

Prevent further use and proliferation of unauthorized trails.—Prevent the creation and use of unauthorized trails in the first place. This approach would be far preferable to having to contend with the damage to the ecological resources and cultural ecosystem services (discussed below) from the creation and use of unauthorized trails in protected areas. Here, prevention requires continual management. Consider the lessons learned from the work Greer et al. (2017) describe, as summarized above. Where feasible, gain the trail user community's support for and involvement in proactive efforts to prevent vandalism.

Restore habitat to reverse internal fragmentation.—It is reasonable to assume that the disturbance to wildlife from internal fragmentation associated with authorized trails and from legal recreation on them, occurs at least as much from fragmentation associated with unauthorized trails and recreation on them. The internal trail-related fragmentation and expansion of the effect zone most negatively affects those species for which the fitness costs of disturbance are high but have little or no excess habitat to move to; these species are thus constrained to stay in disturbed areas and to suffer the costs in terms of reduced survival or reproductive success (Gill 2001). For these species, restoring the habitat lost to inappropriate trails (i.e., unauthorized trails, unnecessarily redundant designated trails, and trails to be decommissioned) is critical from the standpoint of the negative recreation-related population-level effects. Using restoration to minimize the effects of recreation within fragmented protected areas in urban areas might enable the fragments to better support the focal species (Reed et al. 2019).

Therefore, though the effects on wildlife from unauthorized trails and recreation, per se, have received comparatively little formal study, the precautionary principle (Kriebel et al. 2001; footnote #14) dictates that there seems no need for further study to justify prioritizing restoration of habitat lost to inappropriate trails. So, for levels or habitat loss and the associated internal fragmentation that meet some yet-to-be-established criteria, the restoration should occur. If there is competition for resources (budget/funding, personnel) between (1) research on recreation-related disturbance to wildlife and (2) restoration of habitat lost to inappropriate trails to stop the disturbance, the latter should take priority to reverse internal fragmentation.

To assess the effects of the restoration on the wildlife communities within the protected area, conduct biological surveys within a year prior to the restoration and three to five years after the completion of the groundwork and planting. For this assessment, valid pre-disturbance wildlife survey data collected prior to the loss of habitat within the footprint

of the trails that will be restored and associated effect zone will help. But if there are no pre-disturbance data for the protected area or a nearby undisturbed control area, care must be taken in the interpretation of the results of the survey conducted a year prior to the restoration (i.e., the first survey). This is because the results of the first survey will likely represent wildlife communities altered from the pre-disturbed condition (Hennings 2017). It may be that the level of fragmentation, recreation, and many other factors, have caused conditions in which there are no or very few individuals of the focal species (Hennings 2017). These are reasons to be conservative in estimating the recreation-related effects on wildlife in disturbed protected areas without pre-disturbance data; if wildlife have already vacated the disturbed site before the first survey is done, the results will underestimate disturbance effects on wildlife (Hennings 2017). Here, the purpose of the survey data is to aid in determining how the restoration affects the occurrence and/or density of species (depending on the survey methodology), all other factors being equal. The assessment must account for whether the restoration involves the cessation of recreational activities on and/or in the vicinity of the trails to be restored, especially if no other recreational activities begin elsewhere within the species' effect zone throughout the restoration period. If there is funding available and a desire to monitor human activity and wildlife within the restoration areas, deploy camera traps within the areas; camera traps are the most cost-effective method currently available to monitor wildlife activity (Burger 2012).

Minimally, include the following tasks in the restoration: track the actual and in-kind costs (personnel, capital costs, volunteer hours, etc.) for the entire process; map the inappropriate trails and constructed trail features (some use of aerial imagery may work, but on-the-ground mapping validation is essential; Dertien et. al. 2018); prioritize the order of their restoration; determine the best approach for restoring each trail (e.g., passive, active, or a combination); do the restoration itself;[16] and, monitor for several years. Finally, publicize the costs of the restoration to inform the public (F. Landis, California Native Plant Society, personal communication, 2017); for this, compare the costs of the restoration with the costs of the management (footnote #4) that would have been necessary to prevent the damage requiring the restoration. Reasons for documenting the costs include being able to provide to local and state elected officials comparisons of the costs of reactive and proactive approaches to management, and to inform the public about the costs of repairing ecological vandalism.

If possible and logistically advantageous, it would be prudent and economically beneficial to collaborate with recreationists to volunteer with the restoration. For example, this would be an opportunity to mobilize well-organized volunteer contingents of the mountain biking community that are dedicated to building trails. In fact, in some areas, the mountain biking community provides well-organized volunteer assistance in the designing, building, and/or maintenance of officially designated trails in and outside of protected areas. Such volunteer dedication to the restoration of unauthorized trails is sorely needed.

In addition to the biological benefits, another motivation for this habitat restoration in protected areas is its potential to improve the human experience in protected areas open to public access. California's State Wildlife Action Plan (CDFW 2015) and much of the literature about recreation-related ecological effects point to the economic, educational, and recreational/health benefits (i.e., cultural ecosystem services) of protected areas and the species they support. Regarding the human health benefits, the visible recreation-related

16 Here, restoration encompasses decompacting the soil, building back and stabilizing the damaged or destroyed terrain and soil, and restoring the affected native plant communities.

damage to the terrain requires consideration beyond its ecological effects—it also affects the level of benefit people enjoy while being in nature, as illustrated by a study examining the relationship between recreational impacts in protected areas and human mental/emotional states (Taff et al. 2019). The study's results demonstrate that, as visible recreation-related ecological impacts increased, sense of wellbeing and mental state decreased, especially in response to settings with unauthorized trails. Collectively, the results show that managing tourism in protected areas in a manner that reduces such impacts is essential to optimizing beneficial cultural ecosystem services related to human health and wellbeing (Taff et al. 2019). Also diminishing the human experience is the risk of injury when using unauthorized trails and TTFs (Davies and Newsome 2009), a risk that restoration would remove. The benefits of the cultural ecosystem services from habitat restoration may increase the potential to obtain funding for such restoration.

Use science-based disturbance thresholds and the precautionary approach.—Establish and use science-based disturbance thresholds to guide management, recognizing and accounting for the notion that the imprecision of thresholds applies to all species, even those for which quantitative thresholds for known sources of disturbances under specific conditions have been identified; thresholds may not adequately protect the target focal species under all conditions in which they occur. The determination of disturbance thresholds must consider the influence of trail-related expansion of effect zones, especially with respect to reductions in the proportions of protected areas that are suitable for wildlife.

To compensate for the imprecision of thresholds when using them to guide management, (1) apply a precautionary approach that adopts maximum values of quantitative disturbance thresholds observed for the taxa of concern, while excluding the extreme values of the thresholds (Dertien et al.'s 2018),[17] (2) take into account that the default position should be a precautionary approach that assumes a priori that the functional value of species' abundance is high (Baker et al. 2018), (3) employ continual proactive and adaptive management to protect wildlife from recreational disturbance,[18] and (4) restrict access if the management fails. The need for the precautionary approach stems from the gaps in knowledge about quantitative disturbance thresholds of recreation.

In trail and trail network planning, use the best available science.—When planning new or modifying existing trails and trail networks in protected areas, the best available science ought to guide policy and decision-making about the siting, design, and alignment of the trails, and about the types, levels, and timing of recreation under consideration. To protect the sensitive species, the policy and decision-making should factor in the capacity to manage the existing and planned trails and recreation in perpetuity. No matter how high the pressure from recreationists for more recreational trails and opportunities, it must be recognized that the majority of recreation-related effects on wildlife are negative. The implications of this necessitate thorough consideration as to whether recreational accommodations that are being considered (in conjunction with all other anthropogenic effects) are compatible with

17 The precautionary approach and the precautionary principle (footnote #14) have subtle differences between them, but consideration of the differences is beyond the scope of this paper.

18 Based on section 13.5 of the California Fish and Game Code (FGC) and the Natural Community Conservation Planning Act (i.e., section 2805 of the FGC), adaptive management generally means (1) improving management of biological resources over time by using new information gathered through monitoring, evaluation, and other credible sources as they become available, and (2) adjusting management strategies and practices accordingly to assist in meeting conservation and management goals (e.g., conservation of covered or focal species). Under adaptive management, program actions are viewed as tools for learning and to inform future actions. Adaptive management is a cornerstone of large-scale multiple species conservation (CDFW 2014).

the protected areas' conservation objectives. The planning should incorporate protective disturbance thresholds, allowing for adaptive modifications as needed. In situations where recreation has been assumed to meet the conditions of compatibility (e.g., as negotiated in NCCPs/HCPs), great care is needed to ensure the veracity of this assumption. The outcome of the planning process should be ecologically soundly designed, sited, and aligned trails and trail networks, with science-based restrictions on types, levels, and timing of recreation. In conjunction with new trail/trail network construction, restore the habitat lost to inappropriate trails within the area of the construction.

For future protected areas, plan separate recreational areas.—Planning for future protected areas and associated trail networks and recreational areas holds the greatest potential for successful collaboration among landowners, agencies, recreationists, and other stakeholders that allows for truly protective conditions for sensitive species with respect to recreation. Perhaps it is not too late for California to redirect the trajectory of the recreational juggernaut toward an inspirational conservation success story, where stakeholders come together in the planning process, and apply the prevailing science regarding recreation-related disturbance to wildlife to ensure the perpetuation of viable populations of wildlife in the very protected areas set aside primarily or solely for that purpose. Representatives of the recreation community should sit at the table when planning future protected areas and associated trail networks and recreational areas (Burgin and Hardiman 2012); if the outcome is acceptable to them, it may prevent or minimize the creation of unauthorized trails. For example, without a strong strategic approach to mountain biking that includes community engagement, the outcome will be further degradation of protected areas and, at the least, loss of individuals of wildlife, if not major threats to wildlife populations; it's likely that there will also be on-going conflict between mountain bikers and other recreationists and residents (Burgin and Hardiman 2013).

The limited availability of resources for management suggests that it may be more effective to allocate recreational uses and conservation targets among different sites, which will require a diverse suite of land conservation strategies (Reed and Merenlender 2008). At least until such time that there is management of recreation in protected areas commensurate with recreational pressure, planning for future protected areas should heed what has been commonly known for at least 60 years: if conservation of land occurs without enforcing quotas on visitors, then separate areas need to be provided to accommodate recreational activities elsewhere so that the protected land will not bear the burden of those activities (Wilson 2019). This sentiment applies far more today, principally to protected areas preserved primarily or solely for the perpetuation of sensitive species. While this approach is infeasible for many established protected areas (most protected areas in urban areas), going forward, this ought to be the paradigm of habitat and species conservation in areas of high recreational pressure.

Figure 3 depicts an idealized vision of conservation planning using this approach. For protected areas established pursuant to NCCPs/HCPs negotiated in urban settings within an already fragmented landscape, there is often limited latitude for separate areas for recreation; furthermore, sensitive species are typically distributed more evenly across the urbanized landscape than depicted in Figure 3. Nevertheless, it represents the fundamental approach of separating conservation areas from recreational areas. Even in constrained areas, if planning for recreational access occurs at the regional level, planners and land managers could ensure that protected area networks include some areas that are closed to recreation, thus

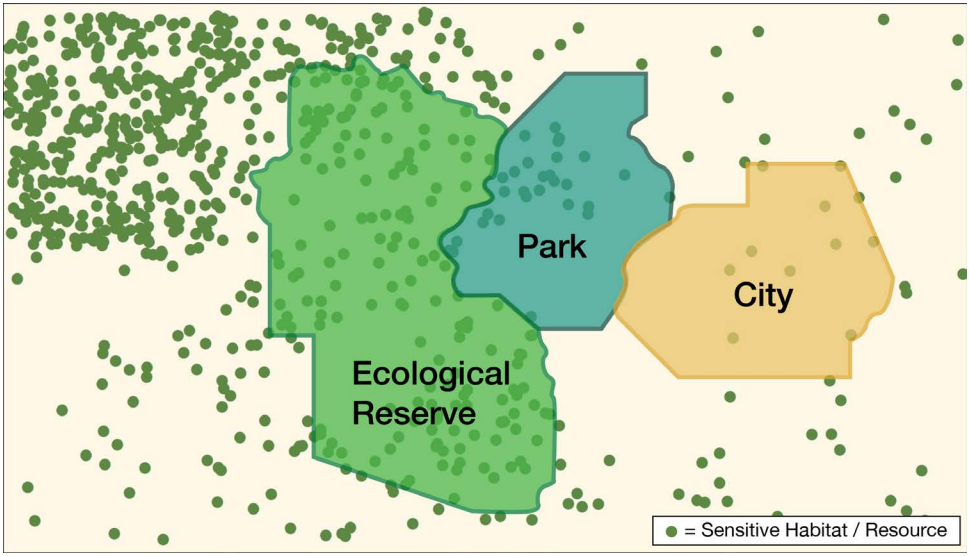

Figure 3. Effective planning for protected areas preserved primarily or solely for the perpetuation of viable populations of sensitive species: provide separate areas for conservation (e.g., ecological reserves) and recreational activities (i.e., parks). (Credit: Landscape Conservation Planning Program, CDFW 2020)

balancing the dual land uses of conservation and recreation at the scale of the protected area network instead of each individual protected area (Reed et al. 2019). Formally incorporating wildlife considerations into the trail planning process from the start is essential to reducing recreation-related disturbance to wildlife; if trail planning is well underway by the time wildlife is considered, it may be too late to gather sufficient wildlife information to inform the planning process (Hennings 2017).

A consideration often not made in conservation planning is the need to address the temporal aspect of human-wildlife interactions. For example, similar to seasonal restrictions, diurnal or nocturnal "temporal zoning" may be necessary to restrict certain human activities during times of the day when sensitive species are most active or when the likelihood of negative human-wildlife encounters is greatest (Gaynor 2018; Whittington 2019). The effectiveness of temporal closures likely depends on the amount and quality of habitat, and levels of human use and fragmentation, within the planned protected areas and in the surrounding landscape. Temporal closures may not benefit wildlife with diurnal activity patterns that differ from the timing of the temporal closures; so, full closures may be required to increase wildlife use in many situations (Whittington 2019). For situations when protected areas and recreational areas are separate but share a boundary, temporal zoning would also apply to the effect zone within the recreational area.

Conclusion.—The most sensible approach for species conservation may be to concentrate research and protection efforts on species whose populations are declining and for which human disturbance is implicated as a possible cause (Gill et al. 2001). The designation of ecological reserves and the conservation of habitat pursuant to NCCPs/HCPs are examples of processes that embody this approach. But, when recreation in such protected areas is not properly planned and adequately managed, their ecological viability and ability to meet their conservation objectives are jeopardized. Implementation of the recommendations provided

herein is necessary to ensure the focal species thrive.

Ultimately, for wildlife that avoids human activity, it is unlikely that dual-role protected areas are entirely sufficient or justifiable for meeting conservation objectives; limiting or prohibiting recreation in strategic circumstances and locations within protected areas is necessary to achieve conservation objectives (Bötsch et al. 2018; Dertien et al. 2018; Reed et al. 2019). Enforced closures of inappropriate trails in all protected areas and restoration of those trails would substantially decrease the trail-related disturbance to wildlife across the landscape; waiting until after wildlife detections or estimates of habitat use decrease is too late to implement these measures (Dertien et al. 2018). These approaches require perpetual management commensurate with expanding levels of authorized and unauthorized non-consumptive recreation in protected areas. Action is urgently needed to secure perpetual fiscal support for management sufficient to ensure the perpetuation of viable populations of sensitive species in protected areas.

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INFORMATION FOR AUTHORS

The California Fish and Wildlife Journal (CFWJ) is a peer-reviewed, scientific journal focused on the biology, ecology, and conservation of the flora and fauna of California and surrounding areas, and the northeastern Pacific Ocean.

Submissions guidelines (PDF) for the Journal have been updated (July 2019).

The California Fish and Wildlife Journal accepts manuscripts in the following categories:

- Original research papers
- Research notes
- Review papers
- Book reviews
- Commentaries and Essays

Manuscripts must be submitted by e-mail following directions provided in the link: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=171113&inline. The journal standard for style is consistent with the Council of Science Editors (CSE) Style Manual. Instructions in the CFWJ guidelines supersede the CSE Style Manual where differences exist between formats. Please follow these formatting guidelines carefully. Manuscripts that do not conform to the guidelines will be returned for revision.

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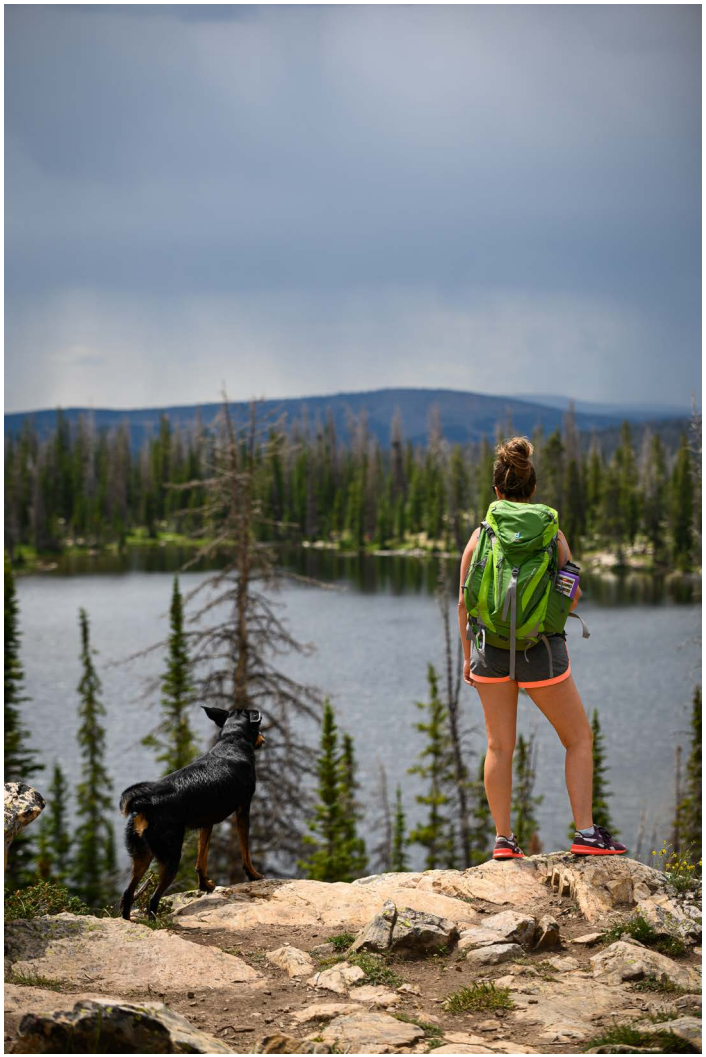

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San Diego County Archaeological Society, Inc.

Environmental Review Committee

5 April 2021

To: Ms. Lorrie Bradley
Department of Parks and Recreation
County of San Diego
5500 Overland Avenue, Suite 410
San Diego, California 92123

Subject: Notice of Preparation of a Draft Environmental Impact Report
Alpine County Park Project

Dear Ms. Bradley:

Thank you for the Notice of Preparation for the subject project, which we downloaded from the County's website.

We are pleased to note the inclusion of cultural resources in the list of subject areas to be addressed in the DEIR and look forward to reviewing it and its cultural resources technical report(s) during the upcoming public comment period.

SDCAS appreciates being included in the County's environmental review process for this project.

Sincerely,

James W. Royle, Jr., Chairperson
Environmental Review Committee

cc: SDCAS President
File

P.O. Box 81106 San Diego, CA 92138-1106 (858) 538-0935

From:	Ray Teran
To:	CEQA, CountyParks
Cc:	Ernest Pingleton
Subject:	Alpine County Park
Date:	Wednesday, March 10, 2021 11:22:36 AM

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site has cultural significance or ties to Viejas. Cultural resources have been located within or adjacent to the APE-DE of the proposed project.

Viejas Band request that a Kumeyaay Cultural Monitor be on site for ground disturbing activities and to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains.

If you wish to utilize Viejas cultural monitors, please call Ernest Pingleton at 619-655-0410 or email, epingleton@viejas-nsn.gov, for contracting and scheduling. Thank you.

Ray Teran

Viejas Tribal Government

Resource Management Director

619-659-2312

rteran@viejas-nsn.gov

Alpine Community Planning Group
PO Box 1419, Alpine, CA 91903

April 7, 2021

County of San Diego, Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, California 92123
Sent via email: CountyParksCEQA@sdcounty.ca.gov

To Whom It May Concern:

The Alpine Community Planning Group held a public meeting on April 6, 2021 to review and comment on the Notice of Preparation of an Environmental Impact Report for the Alpine County Park Concept Plan. The group made the following recommendations.

Motion to recommend support for the Alpine County Park Concept Plan subject to the Alpine Community Planning Group's review of the final design once the Environmental Impact Report for the project is completed.

The Alpine Community Planning Group specifically requests:

1. *the County review the sustainability of watering the grass field playing areas*
2. *the County works directly with Alpine Fire Protection District and the County Fire Authority on a fire safety plan for the park*
3. *the County reviews the feasibility of all-way stop signs at both entrances to the park to provide traffic calming measures on South Grade Road.*

The motion was made by Jim Easterling and seconded by Mike Milligan. The motion passed with a vote of 11 yes, 0 no, 1 abstain, 3 vacant/absent.

Please include this letter summarizing the recommendations of the Alpine Community Planning Group in the public record.

Best regards,



Travis Lyon, Chairman

From:	Neville Connell
To:	CEQA, CountyParks
Cc:	travislyonacpg@gmail.com
Subject:	Alpine County Park
Date:	Thursday, March 11, 2021 1:28:32 PM
Attachments:	Letter to SD County_Alpine Park 2021_FINAL DRAFT_GAFSC.docx

The Board of the Greater Alpine Fire Safe Council submitted the attached letter to the Alpine Sun where it was published two weeks ago. Its chief concern is that the final design of the park should match the available resources on Wrights' Field, so that the park will be sustainable in perpetuity. After attending the webinar about the current design and hearing County's responses to questions about water, we are concerned that this balance may not be achieved with the design proposed. We therefore ask the County to pay particular attention to this issue in its CEQA study so that the park built will be as attractive in 10 years' time as it was when it opened.

We also propose that open flames of any kind should not be permitted to minimize the chance of ignitions and a repeat of the West Fire. In spite of this ban, fires will occur and the water supply must be sufficient and must be easily accessed by fire fighters.

Finally, we ask that the design pays detailed attention to how children in particular with slate boards and bikes will access the park from the town center and from Joan McQueen Middle School . Expecting them to take Tavern or Eltinge then South Grade, though unlikely to happen in our opinion, is also dangerous under current traffic and sidewalk conditions.

Thank you for your attention.

Neville Connell
President GAFSC

PRESERVE ALPINE'S HERITAGE

ONCE GONE GONE FOREVER

Thursday, April 1, 2021

County of San Diego
Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, CA 92123
E-mail : CountyParksCEO@sdcounty.ca.gov; lorrie.bradley@sdcounty.ca.gov

Re: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley:

Thank you for the opportunity to provide information for the Notice of Preparation (NOP) of the Environmental Impact Report (EIR) on the Alpine County Park Project (Project).

Preserve Alpine's Heritage (non-profit status pending) is a group of dedicated community advocates representing all areas and demographics of Alpine. We promote meaningful collaboration and creative partnerships with public representatives and other stakeholders. We embrace a diversity of views as we work toward the common goal of designing innovative, sustainable, and financially-responsible solutions that bring desired facilities and services to Alpine, while preserving the unique natural, cultural, and rural heritage of our community.

We have various issues with the Project including, transportation and traffic, aesthetics, hydrology and water quality, wildfires, biological resources, and public services.

Concern Paragraph 1 - **Transportation and Traffic**. The Project is located on a two-lane road with no sidewalks or crosswalks to neighboring residential areas. The plan contemplates 250-275 parking spaces and potentially 1,000 visitors per week. It is located near two public schools and would be an appealing location for children to walk or ride their bikes, scooters, or skateboards to visit. There already has been pedestrians hit by automobiles on South Grade Road. This concern needs to be analyzed in the Project's EIR. The risk of the safety to all visitors, but especially the children, needs to be eliminated or mitigated below the level of significance.

Concern Paragraph 2 – **Aesthetics.** The Project will have an adverse impact on the existing visual character and quality of the site and its surroundings. Presently, the site has a beautiful view of open space and mountains. At night there is an unobstructed view of the planets and stars since there are no street lights or other light sources on the site. While the County has not been specific on what lights they will utilize on the Project, there has been some discussion of security lights during the evening. This concern needs to be looked into as a part of the Project's EIR and be avoided or greatly mitigated.

Concern Paragraph 3 – **Hydrology and Water Quality**. The County has yet to specify its water source for the Project's extensive landscaping, fields, restroom facilities, etc. Because of that, there has been no investigation of leach field size or location, decrease in ground water supply, or interference with ground water management if wells are the source. The water source must be selected and analyzed as a part of the Project's EIR and assure that a source does not interfere with drainage patterns and ground water supply for neighboring property.

Concern Paragraph 4 – **Noise**. With the contemplated traffic, visitors, and activities, the Project will significantly increase the noise level at the site and the surrounding community. Those that presently use Wright's Field Ecological

Preserve quietly enjoy the trails, wildlife, natural grasslands and trees. With ball fields, basketball courts, biking facilities, and other active sports facilities attracting hundreds of visitors, this quiet enjoyment will be lost. This needs to be addressed and mitigated in the Project's EIR.

Concern Paragraph 5 – **Wildfires**. The Project contemplates fire pits for barbecuing in the park which is a high wildfire zone. This, plus the fire risk associated with the number of visitors to the Project needs to be analyzed as part of the EIR process and the pits need to be eliminated and the other risks avoided or significantly mitigated.

Concern Paragraph 6 – **Biological Resources**. The Project site and neighboring Wright's Field Ecological Preserve are blessed with some of California's Species of Special Concern and natural grasslands. The Project has not addressed the Project's impact on habitat modification of the site or adjacent Wright's Field. This needs to be addressed in the Project's EIR and these resources should be protected.

Concern Paragraph 7 – **Public Services**. The Project will cost taxpayers significant amounts of money both on developing the Project and maintaining it. The source of these funds has not been disclosed. Previously, the County has invested in athletic fields with other government and nonprofit agencies in Alpine to provide recreational space for soccer, softball, baseball, etc. Development of these existing resources should be analyzed in the EIR as the most logical and economic way of achieving what Alpine needs without creating redundant facilities on one new site.

Reasonable Alternative: Small, Nature-Based Park
As outlined in the County's permitting process, the County has to show they have considered reasonable alternatives to the proposed project and they have to demonstrate that their project is the best option. Since County has previously stated they cannot recommend the proposed park site for development "due to significant and not mitigable impacts to biological resources" they need to consider a smaller alternative. The one proposed by Preserve Alpine's Heritage (PAH) is supported by feedback in outreach meetings and independent polling.

The PAH alternative is a much smaller, nature-based park that minimizes the impact on the rare habitat features and significant rural heritage. The most prominently expressed community wishes and needs, as confirmed by the County community outreach efforts and surveys, were nature-based play areas, picnic tables, shade areas, an interpretive area for local history, and protection of the adjacent Wright's Field Ecological Preserve, on-site native grasslands, and Engelmann oak woodland.

As such, please include a project alternative with a smaller, nature-based, minimally developed park that has no impacts to the biological, cultural, and other resources of the project site, Wright's Field Ecological Preserve, and neighboring properties. Focus on making its upkeep and maintenance financially sustainable for the community. Make its construction, maintenance, and rebuilding carbon neutral and environmentally sustainable, to meet federal, state, and County goals.

Reasonable Alternative: Network of Local Parks
Alpine community already has a number of indifferently maintained, underutilized parks and recreational facilities designed to provide many of the amenities this project seeks to build. Why add redundant facilities in one large park? As part of the alternative or in parallel negotiations, the County needs to seek alternate sites (such as Shadow Hills) for the all-terrain bike park, all-wheel park, and the seven acres of sports fields. Multiple distributed sites and options have been identified by the county and by PAH for these larger proposed sports facilities, areas that where there are fewer impacts, and where they are closer to the people who would use them. These local facilities should be connected by a system of safe walkways, bike paths, and trails.

The County needs to revisit joint use and partnering options with Alpine Unified School District for shared investments in sports field facilities at Shadow Hills Elementary School, Joan McQueen Middle School, and other land-holding/management entities to revitalize and upgrade currently neglected, existing, active-recreational facilities with monies already earmarked and/or raised for such projects, rather than building more of the same facilities.

Follow Up
Please analyze all of these potential impacts and avoid the significant ones. Please also provide all updates and meeting notices on this project to info@preservealpinesheritage.org. Additionally, we request a follow up meeting with County of San Diego Parks and Recreation Director, Brian Albright, to discuss the above concerns and how they will be appropriately addressed.

On behalf of the hundreds of the concerned Alpine community members comprising Preserve Alpine's Heritage, we thank you for taking our comments and look forward to your follow up on the above.

Kindest regards,



Julie Simper
Chair, Steering Committee
Co-Chair, Community Outreach Committee
Preserve Alpine's Heritage

Find us on
Tel: (619) 606-8692
info@preservealpinesheritage.org
www.preservealpinesheritage.org
Alpine, California 91901

From: Tom Myers
To: CEQA, CountyParks
Cc: info@alpinehistory.org
Subject: Comments for County Park in Alpine
Date: Friday, April 30, 2021 10:05:38 AM

Good Morning Marcus,
I would like to add one comment to the list for the County Park being planned in Alpine.

In 1998, Alpine was the first ***Certified Community Wildlife Habitat*** in the USA. We have continued to this day as a leader in education related to sharing our home gardens, neighborhoods parks, and open spaces with native wildlife. We urge the planners for this park to include landscape elements that will qualify this park as a certified wildlife habitat. This will be a way to demonstrate how easy it is to share our active community parks with wildlife and it is very simple to do. The landscape design must consider five topics in it's development.

1. FOOD: All living things need to eat to survive, so food sources are a critical component of wildlife habitat. Native plants form the foundation of the food chain in the natural world, and should do the same in wildlife-friendly landscapes. Plants provide food to wildlife in a wide variety of ways, from berries to nuts to pollen, seeds, nectar and even the insects they support that feed other animals.

2. WATER: Wildlife needs clean drinking water to survive. Birds need to bathe in order to keep their feathers in good working order, while other species including some amphibians, insects and other wildlife actually live in water. You can provide this habitat component in a variety of ways, from a simple birdbath or shallow dish of water to a water garden or pond.

3. COVER: Wildlife need places to hide to feel safe from people, predators, and inclement weather. Native vegetation is a perfect cover for terrestrial wildlife. Shrubs, thickets, and brush provide great hiding places within their bushy leaves and thorns.

4. PLACES TO RAISE YOUNG: Wildlife need a sheltered place to raise their offspring. Many places for cover can double as locations where wildlife can raise young, from wildflower meadows and bushes where many butterflies and moths lay their eggs to tall shrubs or trees for nesting species.

5.SUSTAINABLE PRACTICES: Maintaining the landscape in a sustainable, environmentally-friendly way ensures that the soil, air, and water that native wildlife (and people) rely upon stay clean and healthy.Some key sustainable practices that will enhance the park are

- Soil and Water Conservation: Riparian Buffer • Capture Rain Water from Roof • Xeriscape (water-wise landscaping) • Drip or Soaker Hose for Irrigation • Limit Water Use • Reduce Erosion (i.e. ground cover, terraces) • Use Mulch • Rain Garden
- Controlling Exotic Species: Practice Integrated Pest Management • Remove Non-Native Plants and Animals • Use Native Plants • Reduce Lawn Areas
- Organic Practices: Eliminate Chemical Pesticides • Eliminate Chemical Fertilizers • Compost

On behalf of the Certified Wildlife Community Habitat program in Alpine, we request that you include these wildlife friendly concepts in the landscape plans as they continue to develop.

Tom Myers, President
Alpine Historical & Conservation Society
PO Box 382
Alpine, CA
email: info@alpinehistory.org
website: alpinehistory.org
phone: 619-885-8063

From: Alex Carroll
To: CEQA, CountyParks
Subject: Alpine County Park
Date: Wednesday, April 07, 2021 4:55:20 PM

Dear County,

The proposed park has fancy amenities and it's beautifully designed, however, I am opposed to certain elements. Specifically, I'm opposed to the noise elements in the design such as the all-wheels park, bike course, basketball, baseball/softball fields and cemented areas that will carry noise through the field/hills and into the residential areas. I do not live adjacent to the park but I believe the noise level will rise significantly and disturb those who do live nearby and are directly affected by the impacted design. Also, I'm concerned South Grade is a very dangerous road for local children that will attempt to walk/ride to the park. I love the size of the park, the 2 dog parks, the volunteer pad, the playgrounds, trails, grass and gathering areas in the design and I believe a more natural type park, or passive setting, would be best aligned with the community desires and balanced with nature. There are parks such as Damon Lane where children enjoy the open and natural areas just as much, if not more, than over designed or impacted parks such as the proposed park in Alpine. Please scale down the amenities of the park and simplify the design to mimic the surround natural area as much as possible.

Respectfully,
Alex Carroll
2811 Via Asoleado
Alpine
619. 300-6634

From:	Amanda Pavich
To:	CEQA, CountyParks; Bradley, Lorrie
Cc:	Miles Pavich; Dr. Amanda Pavich
Subject:	Comment on NOP Draft EIR- Alpine County Park
Date:	Tuesday, April 06, 2021 8:56:10 PM

Miles & Amanda Pavich

2422 Nido Aguila,

Alpine CA 91901

April 6, 2021

County of San Diego

Department of Parks and Recreation

Attn: Alpine County Park Environmental Review

5500 Overland Avenue, Suite 410

San Diego, CA 92123

By email to CountyParksCEQA@sdcounty.ca.gov and lorrie.bradley@sdcounty.ca.gov.

RE: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley,

Thank you for the opportunity to provide information for the Notice of Preparation ("NOP") of the Environmental Impact Report ("EIR") on the Alpine County Park Project ("Project"). We

moved to Alpine a year ago with our children expressly for the rural, open spaces, access to nature, and dark skies. We are regular users of active and passive recreation areas/parks. We live across South Grade from the proposed park site, the direct line-of-sight view from our property is the Project acreage.

As neighbors who will be directly impacted by this Project, the CEQA issues we are concerned about include: 1- Traffic safety and noise; 2- Use of tax dollars and cost of Project upkeep/ maintenance; 3- Fire Safety; 4- Lighting and Dark Sky Designation; 5- Property value decline due to changed view ; 6- Alternative Park Design

1. Traffic Safety and Traffic Noise

As stated above, we live across South Grade Road from the proposed park site. We travel on this road to and from our home daily. South Grade is a narrow, two-lane country road with dangerous twists and turns where residents travel at high speeds. The current Project details nearly 300 parking spaces and facilities adjacent to and emptying out onto this road, anticipation of large gatherings, tournaments and events, and no safe walkways, sidewalks or horse trails to get to and from the park. The Project's all-wheels park is a tempting destination for local kids, like ours, to ride to without any safe bike paths or trails to get there. County representatives have described this as a "regional destination park," designed to make people travel by vehicle. This, and the amount of people the mega-park is designed to accommodate, will greatly impact the amount of cars on the road and traffic noise we, as neighbors, will experience. In light of the three deaths that have occurred on that road and the very recent hit- and- run of a teenage girl that left her with serious injuries, it seems utterly irresponsible to proceed with ANY PART of this Project until concrete traffic/road plans are proposed and vetted, and analyzed in the EIR. Our own 18-year- old sometimes has to walk that road on his way to work, if he gets called in when we are away from home with the car.

County representatives have merely stated "we're working closely with other departments on this." Putting out a proposal without a traffic plan demonstrates a lack of understanding of the seriousness of adding large amounts of park traffic to an already dangerous road. Putting enticing play areas to attract local kids-- without a safe way to get them there-- is outrageous. Not providing a safe way for horses to get to and from the park in a horse-community, requiring trailering, also adds to the noise, congestion and safety issues. These traffic safety and noise impacts need to be avoided, or, at worst, mitigated below the level of significance.

2. Cost of Project Upkeep and Maintenance

Alpine already has several active recreational fields (that utilized public funds to build) that are in disrepair, decay, or closed to the public. As taxpayers concerned with good stewardship of undeveloped land AND our dollars, it seems financially irresponsible to replace open space near an Ecological Preserve with a high-cost park with redundant facilities. The Alpine Community Plan Update (COS 4.5) calls for the support of joint powers agreements for park and recreational facilities. It would be far less expensive to taxpayers to repair and/or upgrade existing recreational assets using Joint-Use or Joint-Maintenance agreements, in order to fulfill County recreational/ park goals.

Active-use facilities and grass fields such as those detailed in the Project are expensive to maintain, and many of these facilities in existing County Parks are currently in disrepair, closed, and/or neglected from lack of funds. County representatives have publicly stated "there are many ways to generate revenue for a park" and some general ideas for how parks generate revenue are listed on the website. However, there is no plan detail for how the upkeep and maintenance costs for THIS SPECIFIC PARK will be generated. With tax revenues falling because of the Covid -19 Pandemic, how will this park be any different, once it's built? What is the taxpayer impact if there are not enough funds to maintain these facilities, and what are the actual costs to the local users of the Park?

These questions about utilizing Joint Use/ Joint Maintenance agreements to fulfill County goals while managing taxpayer dollars more effectively, as well as a concrete fiscal plan for continued upkeep and maintenance of the Project need to be analyzed in the project EIR.

3. Fire Safety

Alpine is a high-risk fire area. Our neighborhood has one exit route for fire evacuation, utilizing South Grade Road. The proposed Project would significantly increase traffic and congestion on that road. The situation could become dire if a fire evacuation was needed while a large sporting event or gathering was going on at the proposed sports fields or pavilion. Additionally, the Project includes BBQ pits/grills, a high fire hazard for all of the houses that

surround the proposed Project land, like ours, and for Wright's Field Ecological Preserve. Inclusion of and allowing any type of fire or grilling at this location is utterly irresponsible in light of the sensitive habitat of the adjacent Ecological Preserve and known challenge of a being in high fire-risk area. These impacts must be avoided or, at worst, mitigated below the level of significance.

4. Lighting and Dark Sky Designation

We intentionally purchased a home in Alpine because it is a more rural community with an ongoing Dark Sky Designation in process. We have no streetlights. Our home is on a hill and directly overlooks the proposed site, also with a completely dark, natural nighttime view. The Project calls for a 24/7 live-on site volunteer and "safety lighting," and the ball fields to be "lighting-ready should the people of Alpine decide to add it later in the future," according to the County's representatives in the January public meeting. The lighting required by a permanent resident and for parking lot safety alone will eliminate completely the current dark sky; it will also interfere with local wild animal behavior and the natural beauty of the sunsets, dusks, and starry nights. This is in conflict with Alpine's efforts to achieve Dark Sky designation. These impacts should be avoided or, at worst, mitigated below the level of significance.

5. Home Value Decline Due to Loss of Natural View

One of the key features of our property is the natural view over the County-owned land and Wright's Field Ecological Preserve. We purchased this home because of the beauty of the natural landscape viewed from our property, and paid a premium for it. The Project as drawn would make our direct view, not mitigated by trees or berms, a large, asphalt parking lot, cars and/or solar panels, bathrooms, and turf fields with chain link fences. If these facilities are allowed to fall into disrepair as in similar County Parks, we would be looking directly at an eyesore. Furthermore, depending on the way the solar panels are installed, they would be reflecting directly onto our property. This will negatively impact our resale value beyond any suggested benefit a park might bring. These impacts need to be avoided, or mitigated below the level of significance.

6. Alternative Project Design

We would like to suggest, as an alternative to the current Project, a smaller, nature-based park, with a focus on fiscal and environmental sustainability and native plants. We would like the construction to be carbon neutral, and the Native Peoples to be meaningfully included in the process. This minimally-developed park should have little to no impacts to the biological, cultural, and other resources of the project site, Wright's Field Ecological Preserve, and neighboring properties. It should also address traffic and road improvements needed, and able to meet federal, state, and county goals.

We respectfully request that the potential impacts to both our personal property and safety, and those of the larger community, including traffic safety and noise, financial costs and upkeep, fire safety, effect on Dark Sky Designation, and loss of home value, be analyzed and to avoid the significant ones. Please also make sure that we receive all updates and meeting notices on this project, at ampavich@mac.com and mmpavich@me.com and the mailing address above. Thank you, again, for the opportunity to bring light to these important issues.

Sincerely,

Miles and Amanda Pavich, Alpine Residents



Dr. Amanda Pavich, Ph.D.
DIRECTOR

EastLake Leadership College
A Campus of Southeastern University

(925) 580-1772
eastlake.college

Tom & Julie Dyer — 2650 Calle De Compadres, Alpine, CA 91901
Beverly & David Francis — 2695 Calle De Compadres, Alpine, CA 91901
Larry & Tamara Ham — 2643 Calle De Compadres, Alpine, CA 91901
Jeff & Alanna Light — 2634 Calle De Compadres, Alpine, CA 91901
Kyle Ogle & Dominique Norton — 2623 Calle De Compadres, Alpine, CA 91901
Al & Kelly Wilkey — 2662 Calle De Compadres, Alpine, CA 91901

April 3, 2021

County of San Diego
Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, CA 92123

CountyParksCEQA@sdcounty.ca.gov and lorrie.bradley@sdcounty.ca.gov.

RE: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley,

Thank you for the opportunity to provide information for the Notice of Preparation ("NOP") of the Environmental Impact Report ("EIR") on the Alpine County Park Project ("Project"). We are residents of Calle De Compadres which is the cul-de-sac directly across the street from the Project. We are concerned about a number of issues that will directly impact our quality of life.

We are concerned about traffic safety, parking issues in our cul-de-sac, groundwater impact on our wells and the endangered Engelmann Oak trees, noise pollution from the dog park, active sports facilities and high volume of traffic and people, light pollution, septic lines polluting the groundwater and increased fire risk.

One of our biggest concerns is traffic on South Grade Road. It is a dangerous two-lane road with no room for pedestrians or cyclists. This Project will result in more traffic on South Grade Road. Aside from additional traffic accidents, there will be more car pollution and noise. The additional greenhouse gas emissions need to be evaluated in the EIR.

Parking on South Grade Road and Calle De Compadres has increased to a level where our visibility to safely navigate onto South Grade Road is limited. If people are charged for parking, we are concerned that the visibility issues we are already experiencing will be ten-fold. We would like the impact on our visibility avoided and evaluated in the EIR.

Three of the residents in our cul-de-sac have wells. We are concerned that if the Project uses groundwater to keep their extensive grass areas and landscape watered, it will negatively impact our wells, and will impact the health of the Engelmann Oaks at the Project site. We are also concerned that fertilizer leaching into the aquifer, could taint the groundwater. This needs to be evaluated in the EIR. If septic lines are used for the park's restrooms, there is a concern that it could impact the aquifer. This also needs to be evaluated in the "EIR."

Noise pollution is of great concern to us, especially to the residents adjacent to South Grade Road. The increased traffic, dog park and active sports facilities need to be mitigated below the level of significance.

Light pollution will significantly impact our rural community, deter wildlife in the preserved grassland and eliminate the possibility of Alpine being a dark sky community. With the addition of a live-on volunteer, security lights and the possibility of lighting the sports areas in the future, any and all lighting needs to be evaluated in the EIR.

The last concern is fire risk. This Project will attract many additional people to Alpine and we are concerned this will increase risk of wildfire at the adjacent preserve. Whether it's a cigarette, ember from a BBQ pit, or a vehicle backfiring, fire is a big concern. In addition, two-lane South Grade Road is not a feasible road for multiple cars to evacuate in a fire situation. Please evaluate in the EIR what can be done to eliminate this risk and improve South Grade Road to accommodate evacuation in an emergency.

Residents would like to see this park downsized to a community park, which local survey's supported and people voted for in meetings. We would like a nature-based park with little to no impact on the grasslands, as well as no impact on the adjacent Wright's Field Ecological Preserve.

Currently, Alpine has a number of parks that are already in place, underutilized, and poorly maintained. The existing parks in Alpine are centrally located, easy and safe to access, and already have infrastructure in place. Improving our existing parks and continuing to enjoy this peaceful, wonderous open space IS what will BALANCE our beautiful Alpine Community. Instead of spending 28 million to duplicate more parks, consider a more cost effective approach of spending this money to improve what we already have. Just because the County doesn't own the parks, doesn't mean there isn't parkland for residents of Alpine.

In conclusion, please analyze the above potential impacts that this Project will have in our community and avoid the significant ones. Please also make sure that we receive all updates and meeting notices on the project at the addresses included above.

Thank you, in advance, for listening to our comments.

Sincerely,

We, the undersigned.

Tom & Julie Dyer
Beverly & David Francis
Larry & Tamara Ham
Jeff & Alanna Light
Kyle Ogle & Dominique Norton
Al & Kelly Wilkey

From:	Robert Figari
To:	CEQA, CountyParks; Bradley, Lorrie
Subject:	Alpine County Park Environmental Review
Date:	Monday, April 05, 2021 2:10:35 PM

TO: County of San Diego, Department of Parks and Recreation
Attn: Alpine County Park Environmental Review

Hello, I've lived in Alpine almost three years. Our family moved here from a similar rural area in Northern California because we like to see the stars at night, hear the sounds of birds and animals and enjoy the scenic beauty of the area. I walk and mountain bike along the trails of Wright's Field regularly.

I have several concerns about the potential environmental impacts of the proposed park design:

- **Tribal Cultural Resources**: I did not see Tribal Cultural Resources specifically noted in the NOP and expect to see a complete analysis in the EIR.
- **Hazardous Materials**: Given the number of acres devoted to artificial turf and natural grass, I'm concerned about hazardous chemicals and pesticides needed to install and maintain the surfaces in good condition. I request to see an analysis of the chemicals and pesticides that will be used over the life of the park and the impact on, among others, neighboring wells, surrounding watersheds and biological resources.
- **Biological Resources**: In addition to an analysis of the impact of hazardous materials (chemicals and pesticides used on the artificial turf and natural grass) on biological resources, the EIR should include a thorough analysis of the other direct and indirect effects on biological resources, such as the introduction of gophers, moles, skunks and other non-native species.
- **Wildfire**: As a local resident and having just lived through the recent Valley Fire, I have serious concerns with the projected park usage (270-plus parking spaces) during fire season. The EIR must provide substantial and quantitative evidence that operation of the park will not impair the emergency response plans, impact escape routes and will not expose people to significant risk resulting from wildfires.
- **Alternate sites**: There is much public debate and many unanswered questions about the environmental impacts of this proposed park. Because of this, I expect to see a thorough analysis of alternative sites at different locations and of different sizes, including substantial and specific evidence for why other sites for the proposed park are not feasible.

In the EIR I request that:
1) all of the aforementioned concerns be thoroughly analyzed,
and that
2) the impacts of these concerns are avoided or mitigated below the level of significance.

I also respectfully request that you keep me up to date on all project updates, notifications and documents.

Thank you!

Bob Figari

rfigari@well.com
415 259-8153

From:	Frank Landis
To:	Bradley, Lorrie
Cc:	Julie Simper; Preserve Alpine"s Heritage Dominique Norton; Justin Daniel; President Cnpssd; Nick Jensen; George Courser
Subject:	NOP and lack of true scoping meeting on Alpine County Park Project
Date:	Wednesday, March 31, 2021 10:27:43 AM
Attachments:	image001.png

Dear Ms. Bradley,

I am puzzled by the email sent out March 30 (subject: NOTICE OF EIR SCOPING MEETING, at end). I have never heard a YouTube video referred to as a meeting, especially when the purpose of the meeting is (per 15082(c)): "to assist the lead agency in determining the scope and content of the environmental information" that may be required in the EIR.

While it is not clear that a notice of a scoping meeting should be part of the NOP itself, the NOP on the current project did not apparently contain notice of a scoping meeting. This is a problem, because the NOP is publicly available, while the Scoping Meeting notice apparently was only sent out to people who have already expressed an interest in the proposed project. Anyone else who has an interest--perhaps the local tribes?--were not notified.

This is particularly confusing, given that the County has recently issued very different NOPs. This quote below, for example, was part of the December 23, 202) NOP for the County Climate Action Plan: "Consistent with Section 21083.9 of the CEQA Statutes, a public scoping meeting will be held to solicit comments regarding the scope and analysis of the Supplemental EIR. On March 17, 2020, California Governor Gavin Newsom issued Executive Order N-29-20, relating to the convening of public meetings in the State of California in response to the COVID-19 pandemic. The Executive Order outlined requirements for public meetings to take place telephonically or electronically without the need for the public or agencies to attend in person. This meeting will be held virtually on January 28, 2021, 6:00 p.m. to 8:00 p.m. Please follow this link for instructions on how to participate in this virtual scoping meeting: CAP Update….Comments on this Notice of Preparation document will be accepted for 57 days."

This example suggests a solution to the issue that should satisfy all concerns:
--schedule a scoping meeting on Zoom
--Issue a new NOP with a revised date and notice of the Scoping meeting.

Unlike the County Climate Action Plan, Alpine County Park is not urgent, and no one's interests will be harmed by extending the comment period for the NOP. Certainly it will not hamper the County in preparing the draft EIR on this project.

Moreover, this will give the County a chance to double-check their Initial Checklist for the project. We were surprised to note that the County did not think that Tribal Cultural Resources or Energy resources were potentially significant on this project. We know the Kumeyaay are very interested in Wright's Field, and the County has embarked on a plan to go carbon neutral by 2035, a goal requiring energy efficiency. Perhaps whoever prepared the Initial Checklist for this project did not use the most recent checklist available, or filled it out in haste? In any case, issuing a new NOP and holding a virtual scoping meeting to gather information would let these issues be amicably resolved in everyone's favor.

Please feel free to contact me with any comments or questions. Please also keep me on the list to receive all documents and notices related to this project.

Sincerely,

Frank Landis
Conservation Chair, CNPSSD

MARCH 30, 2021 EMAIL:

On Tuesday, March 30, 2021, 8:30:11 PM PDT, CEQA, CountyParks <countyparksceqa@sdcounty.ca.gov> wrote:

NOTICE OF EIR SCOPING MEETING

PROJECT TITLE: ALPINE COUNTY PARK PROJECT

SCH #: 2021030196

APPLICANT: County of San Diego Department of Parks and Recreation

LOCATION: The project is located on South Grade Rd. between Deland Dr. and Boulder Oaks Ln. in the unincorporated community of Alpine in San Diego County.

NOTICE IS HEREBY GIVEN that the County of San Diego, Department of Parks and Recreation (DPR), as lead agency, is holding a Scoping Meeting pursuant to Section 15082(c)(1) of the State CEQA Guidelines.

Due to COVID-19 restrictions on gatherings, an in-person public meeting is not possible. Therefore, the EIR scoping meeting will be in the form of a recorded presentation. DPR is using this format to allow you to view the presentation at your convenience and to allow as many people as possible to provide input.

On March 8, 2021, a Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) was published for the Alpine County Park Project. The purpose of the public comment period is to solicit input and feedback from various agencies, stakeholders, and the public pertaining to the scope and content of the environmental information that will be included in the EIR. The public comment period for the NOP is from March 9, 2021 – April 7, 2021.

Project Description: The proposed project involves the development of an approximately 25-acre active park.

Availability: The recorded presentation along with the EIR Scoping materials can be viewed via the DPR website:

https://www.sdparks.org/content/sdparks/en/AboutUs/Plans/public-review-documents.html

or via direct link:

https://www.youtube.com/watch?v=xyKiPTawDsQ

Comments: Due to the time limits mandated by state law, your written comments on environmental concerns must be sent no later than **5:00 p.m. on Wednesday, April 7, 2021.** Information on how to submit comments can be found on the DPR Website.

For questions regarding the EIR Scoping Meeting or the Notice of Preparation, please contact Lorrie Bradley, Environmental Planner, at (619) 455-7721 or by email at lorrie.bradley@sdcounty.ca.gov.

For local information and daily updates on COVID-19, please visit **www.coronavirus-sd.com.** To receive updates via text, send **COSD COVID19** to **468-311.**

Coronavirus Disease 2019
COVID-19

From: Sandy Castle
To: Bradley, Lorrie
Subject: Hi Lorrie
Date: Wednesday, March 10, 2021 10:50:17 AM

I sincerely hope this goes through. I'd love to have a dog park, and the kids need this. Alpine is growing day by day and we need to grow along with it. Thank you, Sandy

From: MIKE HEIDTBRINK
To: CEQA, CountyParks
Cc: Bradley, Lorrie
Subject: Alpine County Park
Date: Monday, March 29, 2021 5:24:09 PM

This email is in response to the letter we received concerning the 25 acre development of a public park at the current location of Wrights Field in Alpine.

My husband, 4 children and I moved to Alpine 4 years ago after living in the SDSU area for 35 years. We were tired of city living, the noise, congestion, and over development. We have enjoyed the quiet, rural feel of Alpine and have spent many days hiking in Wrights Field since our move. We were delighted and surprised to find such an unadulterated gem. Imagine our dismay when we began hearing rumors of a large county park being planned adjacent to such a very sensitive nature preserve - one which has been kept quite untouched despite the growth around it. We attended the first two "community input" meetings and personally saw the response from the community. What is being proposed is a gross inflation of that idea.

What disturbs me the most is the politics I see behind the scenes in this situation. Those of us voicing concern over the over reach of the board are being put off as "a small group", or being patted on the head and told, "Thank you for your input". I can tell you, we are not a small group, and what you are doing if you go forward with this overblown project is a travesty that cant be undone.

I understand the need for some development at the site according to the needs of those who live here - equestrian staging, an off-leash dog area, a bit more development of the trails, some adequate parking and perhaps a skate park. The rest of it will create litter, noise and light pollution, disturb the wildlife living in Wrights Field, disrupt existing wildlife corridors, create congestion on South grade Rd. and forever change what was once a beautiful and unique area, all in the name of progress.

Please search your consciences and listen to the Alpine Community. Or perhaps take a hike in Wrights Field and sit for a moment to take in what is already there - something which cannot be experienced in any of our other County Parks, and should remain as it is.

Best Regards

Elaine and Mike Heidtbrink

Seth, Sam, Sierra and Shenoah

From: Brad Bach
To: CEQA, CountyParks
Subject: Re: Alpine County Park - Notice of Preparation of a Draft Environmental Impact Report
Date: Tuesday, March 09, 2021 6:15:02 PM

Hey Ron,

I looked at the links but didn't see any environmental reports. All I saw was that they would be having meetings and people could comment on the environmental reports, but they were nowhere to be found. Maybe I'm just not seeing it. Did you see them on this email?

Brad

On Tue, Mar 9, 2021 at 5:52 PM CEQA, CountyParks <CountyParksCEQA@sdcounty.ca.gov> wrote:

> **NOTICE OF PREPARATION**
>
> **of a**
>
> **DRAFT ENVIRONMENTAL IMPACT REPORT**
>
> **PROJECT TITLE:** ALPINE COUNTY PARK PROJECT
>
> **APPLICANT:** County of San Diego Department of Parks and Recreation
>
> **LOCATION:** The project is located on South Grade Rd. between Deland Dr. and Boulder Oaks Ln. in the unincorporated community of Alpine in San Diego County.
>
> NOTICE IS HEREBY GIVEN that the County of San Diego, Department of Parks and Recreation, as lead agency, is preparing an Environmental Impact Report (EIR) for the Alpine County Park Project. The County is soliciting input and feedback from various agencies, stakeholders, and the public pertaining to the scope and content of the environmental information that will be included in the EIR.
>
> **Project Description:** The proposed project would involve the development of an approximately 25-acre active park that would include potential multi-use turf areas,

baseball field, all-wheel area, bike skills area, recreational courts, fitness stations, leash-free dog area, restroom facilities, administrative facility/ranger station, equestrian staging with corral, nature play area, community garden, volunteer pad, picnic areas with shade structures, picnic tables, game table plaza, and trails.

Availability: The project description, location, and possible environmental effects of the proposed project can be viewed and downloaded at:

http://www.sdparks.org/content/sdparks/en/AboutUs/Plans/public-review-documents.html.

Comments: Due to the time limits mandated by state law, your comments on environmental concerns must be sent at the earliest possible date but no later than **5:00 p.m. on Wednesday, April 7, 2021.** Comments should be directed to:

County of San Diego, Department of Parks and Recreation

Attn: Alpine County Park Environmental Review

5500 Overland Avenue, Suite 410

San Diego, California 92123

or emailed to:

CountyParksCEQA@sdcounty.ca.gov. Please include “Alpine County Park” in the subject line of the email.

For questions on this Notice of Preparation, please contact Lorrie Bradley, Environmental Planner, at (619) 455-7721 or by email at lorrie.bradley@sdcounty.ca.gov.

From:	Dominique Norton
To:	CEQA, CountyParks; Bradley, Lorrie; Lubich, Marcus
Cc:	Pisano, Nina
Subject:	Re: Alpine County Park - Notice of Preparation of a Draft Environmental Impact Report
Date:	Thursday, March 18, 2021 6:34:08 PM

Hello,

I would like to provide my name, Dominique Norton, and address 2623 Calle de Compadres, Alpine, CA 91901, and request to receive any future communications of any type relating to the project, as well as information on the following:

1. Who are the "agencies, stakeholders", and the identified members of the public who are included as recipients of your notice, and how widely will those members of the public be solicited for comment on the NOP, and subsequent review and decision processes?

2. When was the park proposal initiated, and what prior public input regarding the proposed park has been received or requested by the Department?

3. Are you subject to Special District assessment to pay for any of those costs that are different from other areas of the County?

4. What is/are the funding sources for the park for acquisition, development, and long-term operations?

5. Who prepared the initial study that led to the determination that the project would have a significant adverse effect on the environment, and is a copy of that study available to me?

6. If any conclusion arising out of the initial study suggested local impacts may be significant, what resources are potentially subject to a significant adverse effect, and which may particularly affect the neighboring property owners and community?

The above questions are merely threshold questions, and that further comments may be provided after I have a chance to consider both the NOP and any of the information listed above.

Thank you,
Dominique

> Begin forwarded message:
>
> **From:** "CEQA, CountyParks" <CountyParksCEQA@sdcounty.ca.gov>
> **Date:** March 9, 2021 at 6:01:34 PM PST
> **Subject: Alpine County Park - Notice of Preparation of a Draft Environmental Impact Report**

NOTICE OF PREPARATION

of a

DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT TITLE: ALPINE COUNTY PARK PROJECT

APPLICANT: County of San Diego Department of Parks and Recreation

LOCATION: The project is located on South Grade Rd. between Deland Dr. and Boulder Oaks Ln. in the unincorporated community of Alpine in San Diego County.

NOTICE IS HEREBY GIVEN that the County of San Diego, Department of Parks and Recreation, as lead agency, is preparing an Environmental Impact Report (EIR) for the Alpine County Park Project. The County is soliciting input and feedback from various agencies, stakeholders, and the public pertaining to the scope and content of the environmental information that will be included in the EIR.

Project Description: The proposed project would involve the development of an approximately 25-acre active park that would include potential multi-use turf areas, baseball field, all-wheel area, bike skills area, recreational courts, fitness stations, leash-free dog area, restroom facilities, administrative facility/ranger station, equestrian staging with corral, nature play area, community garden, volunteer pad, picnic areas with shade structures, picnic tables, game table plaza, and trails.

Availability: The project description, location, and possible environmental effects of the proposed project can be viewed and downloaded at:

http://www.sdparks.org/content/sdparks/en/AboutUs/Plans/public-review-documents.html.

Comments: Due to the time limits mandated by state law, your comments on environmental concerns must be sent at the earliest possible date but no later than **5:00 p.m. on Wednesday, April 7, 2021.** Comments should be directed to:

County of San Diego, Department of Parks and Recreation

Attn: Alpine County Park Environmental Review

5500 Overland Avenue, Suite 410

San Diego, California 92123

or emailed to:

CountyParksCEQA@sdcounty.ca.gov. Please include "Alpine County Park" in the subject line of the email.

For questions on this Notice of Preparation, please contact Lorrie Bradley, Environmental Planner, at (619) 455-7721 or by email at lorrie.bradley@sdcounty.ca.gov.

From: cfigari@well.com
To: CEQA, CountyParks; Bradley, Lorrie
Subject: Alpine County Park Environmental Review
Date: Monday, April 05, 2021 11:28:50 AM

Greetings,
My husband and I moved to Alpine two years ago from Northern California and live in Rancho Palo Verde. I regularly walk on Wright's Field MSCP Preserve and almost daily we must travel on South Grade Road when we leave our home for any destination in Alpine, or beyond.

I have studied the proposed park plan for Alpine and have several concerns about the potential environmental impacts. **In the EIR I request 1) the following items to be thoroughly analyzed and 2) that impacts are avoided or mitigated below the level of significance.**

- Aesthetics: Given the significant changes to the property as it currently exists, I need evidence that the park will not have a substantial negative impact on the scenic vista and quality of public views. I therefore expect the EIR analysis to include visual simulations from a variety of locations.
- Wildfire: Given the fire danger in the area and that South Grade Road is the only road most residents in the area can use to evacuate, I need evidence that in the event of a wildfire when the proposed park is at full capacity, emergency evacuation plans will not be impacted.
- Traffic: Given the expected usage of the proposed park (270-plus parking spaces), I need to see a traffic impact analysis that focuses on level of service/peak hour trips (especially the impact on emergency services and access), in addition to the vehicle miles traveled analysis.
- Noise: Please ensure that the noise assessment in the EIR includes an analysis for ALL sensitive receptors such as hikers, biological species, and tribal cultural resources.
- Alternatives Analysis: Given the significant environmental impacts associated with this park project, including the proposed size, number of amenities, number of parking spots and this particular location, I expect that the alternatives analysis will include several alternatives at different locations and of different sizes, all of which are analyzed fully (not just considered but dismissed) with substantial evidence for why other sites for a proposed park are not feasible.

Please be sure I am notified of all project updates, notifications and documents.

Thank you,
Christine Figari

cfigari@well.com
Landline: 619-722-1993

Patrick L. Williams Ph.D.
Geomorphology, Neotectonics
PO Box 1437
Alpine CA 91903

April 6, 2021

County of San Diego
Department of Parks and Recreation
Attn: Alpine County Park Environmental Review
5500 Overland Avenue, Suite 410
San Diego, CA 92123
By email to CountyParksCEQA@sdcounty.ca.gov and
lorrie.bradley@sdcounty.ca.gov

RE: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley,

Thank you for the opportunity to provide information for the Notice of Preparation of the Environmental Impact Report (EIR) on the Alpine County Park. I am a professional geologist specializing in geohazards and landscape analysis. For six years I served as BCLT Operations Director for almost 4000 acres of high-value-habitat located in Potrero (Long Potrero) and Campo (Clover Flat). My academic training includes project design, zoology, botany and geology. During my time managing BCLT properties I worked closely with staff of multiple state and federal entities and other individuals and organizations too numerous to name. Relationships with this network continue beyond my association with BCLT.

Below please find comments on *geology, biological issues, wildfire, noise and traffic* that need to be addressed in an EIR for the proposed Alpine County Park.
I implore the County to evaluate all current options to distribute park facilities in Alpine. The proposed park measures at least 28 acres, more than twice the size indicated in early press and social media discussions which were widely read by Alpine residents. I urge County Parks to analyze a smaller, less impactful, sustainable park design on the South Grade property as an alternative. A map of large land tracts in Alpine is attached below. Many of these are more central and several are much more suitable for the amenities proposed in the current park plan. However challenging, I believe it is necessary to continue to investigate possible park location(s) to achieve a park(s) without essential destruction of unique, rare, extremely high-value habitat and scenic splendor.

Geology
In my first acquaintance with BCLT, in Fall 2014, I was invited to a field meeting with Jon Green and Yolaine Stout. The outing took place after I inquired regarding

the status of the property at the exact site of the proposed Alpine County Park. The uniqueness of the site had captured my attention. Not only is the park area a striking native grassland, nearly devoid of woody "chaparral" species, but the entirety of the property's grassland is decorated with exotic boulders of a very large and very ancient riverbed, which, per SDSU faculty cannot be associated with a provenance because the mountains of their origin have long since disappeared. The field itself was an active riverbed until about eighty-million years ago, at which time the river's flow was captured into Sweetwater Canyon. Such a site is not only unique in southern California, it is extremely rare in the world. The County property and Wright's Field is a geological heritage site and deserves to be formally recognized as such. Investigation of the geological uniqueness of the site is a necessary component of the EIR process. I am happy to volunteer to assist the County in facilitating a site study by local academic geologists.

Botany/Zoology

Taking of 30 acres of native grassland and Engelmann Oak habitat is communicated as a very serious matter in the County's own documents: "Native grasslands are now quite rare and occur [only] in the hills south of Poway, Wright's Field in Alpine, parts of Camp Pendleton, Ramona, and Rancho Guiejito east of Valley Center." Furthermore the County previously stated that development of the site of the proposed Alpine County Park could not be mitigated in their opinion towards a search for locations for an Alpine high school:
(DPLU/ DPW/ DPR dated 2/20/2009 "Due to the significant and not mitigable impacts to biological resources for Alternative B (Wright's Field) and the direct implications to the County's Multiple Species Conservation Plan, the County cannot recommend that this site be chosen for such an intensive land use. Study Area B is located within the County's Wright's Field Pre-Approved Mitigation Area (PAMA) and adjacent to Wright's Field Preserve, an integral part of the County of San Diego's South County Multiple Species Conservation Program (MSCP) Subarea Plan.").
Development of a park of this size and impact, at a location that the County previously stated development could not be mitigated, is an important contradiction. The projects EIR needs to explain the difference in review that concluded previously that development of the park site could not be mitigated.

Wildfire

It is incredible that wildfire has not burned across the area of the County's Alpine property and Wright's Field Preserve since the *1970 Laguna Fire*. During the *2018 West Fire,* scene command was certain the fire would run west across the grassland and extend indefinitely into neighborhoods in that direction. This terrible outcome was inhibited, but not prevented, by firefighting. The primary reason the fire was able to be brought under control was a drop in wind and temperature. It is certain that a large increase of potential ignition sources will be introduced by smoking materials of youth (and other park users) crossing and assembling in grassland while coming and going from the proposed park attraction. Near certainty of eventual occurrence of a fire ignited auxiliary to the transit of "thousands of daily

park users and hundreds of daily users of adjoining land" (per Rhodes and Associates fire hazard investigation).
A real question arises whether the park should remain open during wind events. I feel strongly that park-caused increases of fire hazard to adjoining habitat areas and extended neighborhoods needs to be more deeply and critically evaluated in the EIR process.

Noise
It is essential that an EIR noise study for the propose park include "nonlinear" impacts due to sound direction and amplification that may be caused by abrupt local topographic features. An steep 220 foot-high granite hill is located across South Grade Road, very close to the park. This feature will almost certainly direct and amplify sound northward. Fifty-foot high granite hills northwest and north of the proposed park will likely redirect sound into the neighborhoods to the east and south. Finally the 250 foot-deep canyon containing Viejas Creek is located close by to the east of the proposed Park. The granite-walled canyon of Viejas Creek is a demonstrated noise echo chamber and the impact of noise from localized large group sports play may be impossible to mitigate. Technical evaluation of these unique local topographic features on noise direction and amplification (individually and collectively) needs to be included in EIR study of noise impacts of the due to the proposed park.

Traffic
Wind driven fire is certain to impact the proposed park site and surrounding neighborhoods in the foreseeable future. A significant fire bearing down from the east during a Santa Ana wind pattern will require evacuation of about 500 homes and up to 1000 vehicles onto South Grade Road. I have attached a "Fuels Map" which I drafted for my interest in fire fuels distribution across Palo Verde Ranch, Ranch Palo Verde and neighborhoods surrounding the proposed park site.
Parking for up to 300 additional vehicles at Alpine County Park is now proposed. Taking the worst case, which is the most conservative evaluation, of a fire occurring during the daytime on a weekend, within a high time-of-use for the park, up to 300 vehicles would exit onto South Grade Road, slowing normal traffic (up to a few vehicles per minute) and eventually backing up at controlled intersections. A line of 300 cars is almost exactly one mile in length (https://www.quora.com/How-many-cars-make-up-a-mile), thus without any cars entering South Grade Road from the adjacent communities, cars could be backed up to Tavern Road or to Alpine Boulevard. With the addition of cars entering from surrounding homes traffic could quickly back up in both directions to such a degree to produce a hazard of enormous proportions. Evaluation of various "worst-case" scenarios should be an integral part of EIR traffic studies for the proposed Alpine County Park.

Project Alternatives
Given all of these concerns a DEIR should include a project alternative with a smaller, nature-focused, minimally-developed park that has no impacts to the biological, cultural, and other resources of the project site, Wright's Field Ecological

Preserve, and neighboring properties. Given voiced community concerns about the lack of maintenance on existing Alpine parks, please focus on making park upkeep and maintenance financially sustainable for the community and County. Also make its construction, maintenance, and rebuilding carbon neutral and environmentally sustainable, to meet federal, state, and county goals. Please also analyze each and every project alternative equally, as unequal analysis has been contentious on past county projects.

Thank you for taking this input. Please keep me informed of all developments with this project and associated documents and meetings, at the address below or by email to geoplw3@gmail.com

Respectfully

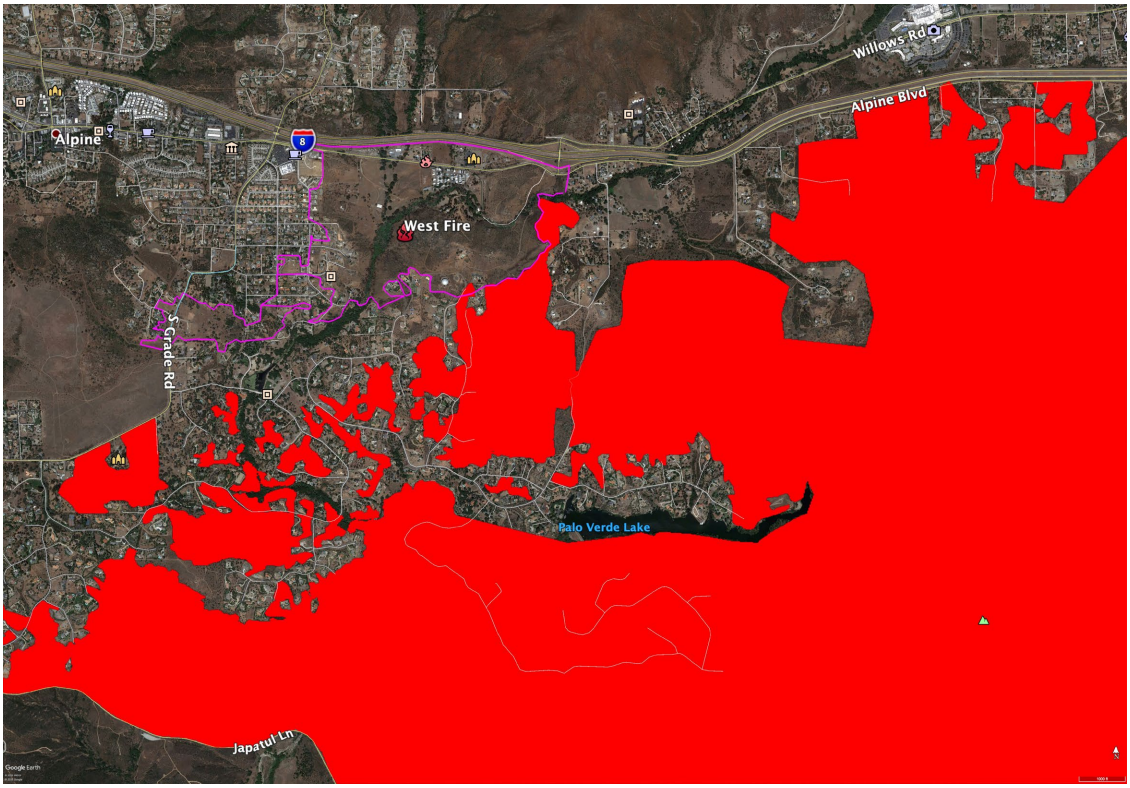
Patrick Williams PhD
PO Box 1437
Alpine, CA 91903

Attachment 1. Selection of "Alpine Recreation Areas and Larger Land Parcels" identified by SDPR and Preserve Alpine's Heritage

Attachment 2. Draft Fuels Map of PVR, RPV and surrounding areas – Dr. Pat Williams

From: Patrick Williams
To: Bradley, Lorrie; CEQA, CountyParks
Subject: Re: Alpine County Park NOP
Date: Tuesday, April 06, 2021 4:45:33 PM

Attachments to PL Williams Letter:
Attachment 2. Draft Fuels Map of PVR, RPV and surrounding areas – Dr. Pat Williams



Attachment 1. Selection of "Alpine Recreation Areas and Larger Land Parcels" identified by SDPR and Preserve Alpine's Heritage:

On Tue, Apr 6, 2021 at 4:38 PM Patrick Williams <geoplw3@gmail.com> wrote:

> Laurie,
>
> Please find comments attached.
>
> Thanks very much,
>
> Pat
>
> --
> Patrick Williams
> Williams Associates
> 508-274-9618
> PO Box 1437

Alpine, CA - 91903


Alpine Parks and Larger Parcels
AID 17 acres
P&R 2.9 acres
Blackwolf Partners 184 ac
Alpine elementery playing fields 2 acres
Alpine Community Center fields 2 acres
Park Meadows Inc 4ac
Alpine Fire District 3.1ac
AUSD rec area 2.5 ac
P&R 1.8 acres
P&R 2.4 acres
OAA 23ac
Jabro 25ac
Thorman 33 ac
P&R 9 ac
P&R 4.4 ac
Shadow Hills AUSD recreation area 11 acres
Yee Group 5ac
Nelson 3.5ac
Albertsons hill 1.5 acres
P&R 4.6 acres
P&R 1.8 acres
Bailey 14 acres
AID46 ac
P&R 19 ac
Walser 12.5ac
Halstead - Tyler 15.5ac
P&R 2.6 acres
Kniffing 21.5 ac
P&R 29 ac
Bailey 12 acres
Augustyn 49 ac
P&R 21 ac
willing seller 9 ac
Flodo Properties LLC 7ac
Fawns Trust 6.8ac
JMMS AUSD Fields 9 acres
Coleman 21 Acres
Lionhead Properties LLC 21ac
Boulder Oaks park
28 acre County Sports Park
Tent City Dev Corp 20 ac
Wise 63 ac

From: Peggy Easterling
To: Bradley, Lorrie
Subject: Alpine park
Date: Wednesday, March 31, 2021 6:08:33 PM

Please consider changing the community garden area to a “Sage, Songbird and butterfly garden”. This is nod to the history of Alpine.

Peggy Easterling

Sent from my iPad

From: PAT
To: CEQA, CountyParks
Subject: "Alpine County Park"
Date: Wednesday, March 10, 2021 6:57:30 AM

Good Morning,
The very idea of a park like what the county is proposing is exactly what the people of the Alpine community do not want.

I have lived in Alpine for over 20 years.

The people of Alpine have fought hard to keep our area known as Wright's Field out of developers hands.

The Alpine Planning Group is made up of people that do not represent Our community. They merely are interested in profiting from this Park from various vendors that will be needed to install things like turf.

We only want to preserve it as a quiet park that the locals could hike in And enjoy in its natural state. The County people do not realize what the Alpine people want.

The County people asked everyone in town for ideas and got plenty. These Ideas are fine for a park on land in the area, but not on this field and area Of natural beauty.

If you have 38 million dollars to work with,
Why not purchase an area where this kind of park would be appropriate?
It is not in Wrights Field.

For the County's information:

The land is composed of clay and does not perk, which means Thousands of dollars will be needed to grade it. Grading this site Will destroy the beauty of this beautiful Open Space. Why do places Like Julian get to have open hiking only areas, and we do not in Alpine?

The land is filled with huge amounts of granite boulders. When Joan McQueen Middle school was built, huge amounts of rock got in the way of the grading.

Why put a sports complex in a beautiful open space such as Wright's Field?

Why not put a park like the one proposed for this site on the Site of the Double A Ranch where the new high school was supposed to go?

What about the site on the North side of I-8 that was owned by Tom Dyke?

What about other appropriate sites east of Albertsons?

What would this proposed plan by the County people do to our community?

It would allow lots of criminal activity for drug dealing at the park.

It would open up the nearby residential areas to burglary activity and the crime Rate Would rise dramatically.

The fire danger would hugely increase exposing the nearby residents to loosing their Homes and possessions.

It will increase their fire insurance costs and make it very costly to insure their homes.

If there were a fire, people In the community would have a difficult evacuation.

Where is the water coming from necessary to support this "plan"?

There are many trees planted on the "plan". The clay will not support this Landscape.

It will increase traffic noise and make the quiet rural area crowded and unpleasant.

Why would the county desire nearly 300 parking spaces in an area where only 10 to 20 cars use daily? A small parking lot on the South side would be the Only part of this plan that makes any sense for just 20 to 30 cars is the only Thing that is needed.

Why would the County encourage bringing people into our quiet Peaceful community so people who do not live in the area will create Noise from all the activities this plan would encourage in our community?

This is part one of my email.
It will be continued later
Sincerely,
Patricia Barton

Sent from my iPad

From: nicole@pacific-ps.com
To: CEQA, CountyParks
Cc: nicole@pacific-ps.com
Subject: Alpine County Park
Date: Wednesday, March 10, 2021 1:55:41 PM

I am writing in response to the proposed plan to build a park in Wright's Field.

As a resident of Palo Verde Ranch and with a direct view to Wright's Field from my home, I am opposed to this "sports complex".

A park, is manageable and feasible for this area. The majority of my neighbors do not oppose a true park as originally proposed. The current plan is presenting a sports complex, something that is not wanted, and will create nothing but problems for those who live nearby. I do not want to imagine the increased traffic on an already unsafe road, let alone the "undesirables" that this project can attract to this peaceful back side of Alpine.

Aesthetically – I would rather look at the natural landscape of Wrights Field than a parking lot, lights, buildings, not to mention the fencing
Land use and planning – planning, involving, and listening to locals, people who actually live here, would be nice. I feel blindsided by the this expansive project
Noise – there is none now, this is how we like it, and this is why we chose to live here
Recreation – wrights field is used by many in the way it is intended to be used. As a natural landscape
Transportation and traffic – nothing positive in regards to traffic will come from this project
Wildfire – this project will open wrights field to more risk for wildfire, especially by bringing people into this area who are not as familiar with the risks as those who live here are aware.

The purpose of my email is to make you aware that I am highly opposed to this project in its current state. If the county cares to take into account those opposed, please be sure to include me in that number.

Thank you,
Nicole Stockmoe
3113 Via Luiseno
Alpine, CA 91901
Direct# 619) 540-0559

From: Michelle Rader
To: CEQA, CountyParks
Subject: Alpine County Park
Date: Wednesday, April 07, 2021 3:43:51 PM

Hello San Diego County Parks and Recreation,

I would like to add the following comment for the Alpine County Park Environmental Review.

Thank you,

Michelle Rader
3155 Via Viejas
Alpine, CA 91901
michelle.rader@sbcglobal.net

I'd like to start by saying I do love parks of all shapes and sizes, and have a great appreciation for community and public places that allow for all community members to enjoy a wide variety of healthy activities.

And I would love to be able to highlight examples of park uses I consider ideal for this location. But unfortunately my time is too short for proper research and inadequate for any real discussion or presentation of substantial evidence regarding the potential environmental and community impacts of similar examples. Thankfully, I know other members of the Alpine Community have completed extensive research and review and no doubt will have presented this to you for consideration.

My family has lived here in the Palo Verde Ranch area for 40 years. The open space of Wright's Field has been a treasure throughout these years. It is this semi- rural environment that drew my family to the Ranch to begin with. Safety, quiet and low traffic were and still are a big part of it. I would like to see it remain a quiet, treasured open space for future generations.

There's a wonderful opportunity to do what's right for Wright's Field and the surrounding community. Spending millions to bulldoze it and cover it in sports facilities and pavement isn't the highest and best use, and it will destroy the opportunity to preserve and celebrate the natural beauty we all love and treasure.

The county should step back and realize 'bigger' is not always better. And sometimes 'progress' is achieved by letting go of big ideas and embracing the beauty that already exists. Preservation is a positive. And nature is necessary. Let's nurture that nature and preserve it for future generations. We will reap far greater benefits in the long run, with far fewer costs.

The location of Wright's Field, the transportation infrastructure, and the surrounding

neighborhoods, are inappropriate for the scope and scale of the county's park plan. A location closer to town center and the freeway would better serve the entire community, and would be safer for everyone. Or the money could be better spent through improving the large number of public facilities already existing in the Alpine area.

Many examples exist of ecologically sensitive passive parklands that highlight the natural and historical resources while preserving them and also providing recreational and physical fitness opportunities. Time spent in physical activity in a natural environment has been proven time and again to benefit us both physically and mentally. THIS is the highest and best use of Wright's Field in its entirety, and THIS is what I ask of all of you to reconsider moving forward.

Again, thank you,

Michelle Rader

To: CountyParksCEQA@sdcounty.ca.gov

From: Yolaine M. Stout _ Ystout11@gmail.com

Re: NOTICE OF PREPARATION of a DRAFT ENVIRONMENTAL IMPACT REPORT :

PROJECT TITLE: ALPINE COUNTY PARK PROJECT

APPLICANT: County of San Diego Department of Parks and Recreation

My concerns for above-referenced project include -but are not limited to- the following.

I request that these are addressed in the draft EIR.

1. Known endangered species near or on the proposed site include the endangered Quino Checkerspot Butterfly and the San Diego Thornmint. Please indicate how this project will impact these species in particular. Additionally, describe impacts to the habitat for the critically imperiled Hermes Copper Butterfly known to be present on Wright's Field.
2. Of the 25 acre proposed Alpine County Park Project Map, it is estimated that 20 of those acres will destroy high quality California Native Valley Needle Grassland will be destroyed in addition to the 20 acre impact from Joan MacQueen Middle School and surrounding homes. The grassland area (Mesa del Arroz) was estimated to have originally been ca. 400 acres. Currently, the grassland area has been reduced to approximately 280 acres. In the Stagecoach EIR SP91-002; TM4974; P91-007; P91-008 that overlay this project area, the grassland was considered an "unmitigable resource." Due to its high biological significance this project area is within the Pre-Approved Mitigation Area (Pama) Multiple Species Conservation Plan (MSCP). Please describe how this project is mitigating a previously determined unmitigable resource that has already been cumulatively and considerably reduced.
3. Please describe how the Alpine County Park project is consistent with CEQA and the County's Biological Mitigation Ordinance in regard to the mitigation of approximately 20 acres of California Native Valley Needle Grassland as well as mitigation measures for Engelmann Oak Woodland, Diegan Coastal Sage Scrub and Riparian habitats.
4. With 2:1 mitigation ratio for California Native Grasslands, please demonstrate how and where approximately 40 acres (or more if required) of equivalent grasslands that will be used as mitigation either onsite or offsite. Please include a map of the habitat areas.
5. As an ancient riverbed containing the remains of a mountain range to the east that no longer exists, with many stones that are not found in the surrounding landscape, the geology underlying the Project area may be unique to San Diego County, if not California. Please evaluate the significance of the riverbed with possible paleontological or fossil presence.
6. As the following will have substantial environmental impacts, please include an economic evaluation and demonstrate the financial (taxpayer) feasibility of the following:
    a. The cost including exact size of leach fields and number of septic tanks that will enable the percolation of x amount of sewage expected to be generated on site. Include percolation rates.

b. If, alternatively, the county is planning on extending the sewer to the site, in addition to the cost, please include a map of the route and describe all cumulative growth impacts that may result.
c. As the site largely occurs on expansive clay soils with stony subsurface, please include a financial evaluation and demonstrate the feasibility of all grading, removal of clay and boulders, rock crushing and disposal of such as needed for the concept plan. Please include less environmentally impactful and less costly alternatives to the concept plan.
d. Please include the costs of replacing clay soils with the expected amount turf that will drain properly as well as enable the growth of grass in those areas proposed for irrigation.

Thank you for considering my concerns,

Yolaine M. Stout

From: VIRGINIA WALKER
To: CEQA, CountyParks
Cc: Alannah Light
Subject: Alpine County Park
Date: Wednesday, March 10, 2021 8:06:17 AM

First of all, I think you need to spend the money on the parks we already have here in Alpine. They are not used because they are not kept up. Why should we want another park that is bigger and will be an eyesore next to our beautiful Wright's Field Preserve when you don't have the money for that to be kept up. It will just become a hangout for homeless and drug dealers. We don't want that here in Alpine. You need to fix up the fields and such that we already have and get people back to using those.

Another reason not to put the park here is because it is still a part of our native grasslands. Native natural grasslands are very hard to find anymore. This piece of property needs to be included into the preserve. This area is a corridor for our wildlife that live around here. Even with the buffer, by only using 25 acres of the 75, this will not prevent the loss of our wildlife. They will go somewhere else as their life will be disturbed. The noise and activity in this area will drive them away. Yes, you have changed the plans to take care of the oaks in this area, but what you plan still won't keep them alive. As you grade around them you will disturb the roots and soil that they have survived in for all these years. They will die.

This piece of land would be great to put, at the entrance area, a parking lot for people to park cars and horse trailers. This doesn't have to be paved, just gravel would do. Put some port a potties there and some picnic tables. That way this could become a destination park for people to walk or ride horses. They would come and explore one of the only large native grassland areas left in our county area. What a pull for birders, animal lovers, and nature hikers. What a stress relief after work. "Come to Wrights Field Preserve to walk and enjoy the native grasslands that used to be everywhere in our county." Wow, you would get a lot of people that way.

Why do you want to destroy something that is so precious in today's world?

You have over the years considered other parcels but have turned them down for different reasons. Most of the reasons are because of some difficulty that you didn't want to deal with. Well the difficulty you are going to deal with here are the people of Alpine. You need to go back to the drawing board on this one. Make it a nature park, connected to Wright's Field. That would solve the problem.

Thanks for reading this if you do.

Virginia Walker

From: VIRGINIA WALKER
To: CEQA, CountyParks
Subject: Alpine Park
Date: Tuesday, April 06, 2021 7:04:20 AM

I really do think that the Board of Supervisors could do a better job for Alpine then to place this park in this area near the Wright's Field Preserve. This active type of park at this location will not only disturb the wildlife of the preserve, this is a wildlife corridor, but disturb the quiet life of the surrounding area. The people of Alpine deserve better from you. We move up here for space, quiet, and nature, not the hustle and bustle of traffic, ball games, parties, all day long. Yes maybe we need pickleball courts and this all wheel course, but let's put those things in a more suitable area. This is not the area for screaming and yelling, but an area for more quiet contemplative activities. Long walks, runs, horseback rides, where one can look for birds and animals. There are not many parks like this around. Not any special grasslands around like this area. Once you start cutting into this land, you will destroy this native grassland and it can never be recovered again. Don't you have a duty as the Board of Supervisors to protect areas like this in our county, not to destroy them!

I really feel that the ball fields we have here in Alpine should be maintained, which they are not, and possibly expanded at the different sites if possible, before any new ones are built. Why not look into if more basketball courts and pickleball courts can be added at any of the school sites. Then start looking elsewhere for places to put these play sites. I know you have been looking for 20 years, but that sounds like a problem of the board. There have been plenty of places, some offers of donated land even, that you have not acted on. So why now all of a sudden do you want to take this pristine grassland and turn it into this enormous park, just so you can pat yourselves on the back and say, "It took us 20 years, but we did it!" That tells me for the past 20 years you have been sitting on your hands and getting nothing done.

I don't feel this is right. I have lived in Alpine for the past 20 years and have never heard anyone complain about not enough ballparks. So let's rethink this idea of destroying this pristine grassland for a park that can be split up and put on pieces of ground that have already been graded, built on, etc. and leave this piece of our heritage alone.

Thank you,

Virginia Walker

From: Louis Russo
To: CEQA, CountyParks
Subject: Alpine County Park
Date: Wednesday, March 10, 2021 12:20:15 PM

This email responds to the request for comments per CEQA for the Alpine County Park to be built in Alpine, CA.

I am a 20-plus year resident of Alpine and a former member of the Alpine Community Planning Group (ACPG). I was also a member of the San Diego Rural Fire District (SDRF) Board and the Grossmont Union High School District (GUHSD) Bond Commission. I wish to state that I was the person who recommended that Jill Blankston investigate the possibility of purchasing this property for a County Park. I wish to also state that I recommend the entire 98 acres be utilized to the maximum extent possible. It is also essential, that Mr. Travis Lyon and Mr. George Barnett, who are members of the Alpine Community Planning Group recuse themselves from any further involvement in this park as they are board members of Back Country Land Trust BCLT) and therefore have a conflict of interest in this matter. In addition, Mr. Lyon is a member of the Alpine Union School District (AUSD) Governing Board, which also causes a conflict of interest with this project. Finally, I must state that I am not an "environmentalist" and supported Mr. Singer's (the original owner) proposed development of this property for estate homes and I also supported his plan to donate a portion of this property to GUHSD for a high school site.

Wright's field, though touted as "environmentally sensitive" is actually no more "environmentally sensitive" than much of Alpine or Cleveland National Forest (CNF), which has nearly 500,000 acres, much abutting Alpine. I view with skepticism any declaration that it is "unique" environmentally. It is a relatively flat piece of land covered with weeds, the same weeds I clear every spring from my property for wildfire abetment. If, indeed, there is a particular plant that needs "protection" then that small area can be protected while the rest is used. Note that Joan McQueen Middle School (JMMS) classes conduct "nature walks" through it and the cross country teams run on it, not to mention the kids who walk to/from school, etc. Having an active park on a portion certainly isn't going to hurt any flora or fauna on it.

At one time a "wall" was declared ancient and needed to be protected. The same professor from San Diego State University who declared it as such has been consistently overruled by State experts on numerous declarations I am aware of.

For my entire time on the ACPG, there was a consistent request for parks by the community. These came from parents in the main, who wanted to take their preschool children to a park during the school day to those who wanted to walk their dogs or ride their horses or have a picnic. Tom Dyke offered the property that currently has the SDGE yard on it for a park. In fact, County Parks came up with a plan for this area. There were two problems with it. First, this parcel was created when Interstate 8 was blasted through the granite and the material was dumped into a depression. There was never any idea to use this land later so proper compaction techniques were not used. (In fact, you can see issues on Interstate 8 today being addressed by CalTrans.) Also, the fuel tanks from the gas station to the east have leaked and contaminated portions of it, which prevent a Sheriff Station from being built there also. When Albertson's was built, County Parks once again created a plan for the portion that Albertson's wasn't going to use and was going to donate. The problem here, besides being small, is that it

looked into people's bedroom windows. I could go on and on, but you get the idea. The parcels being floated as possibilities all had fatal flaws. Throughout this entire time, the individuals listed above kept telling the community that "there's no land in Alpine for a park", knowing full well there was, because THEY were trying to buy it. Finally, through various sources, I learned that this parcel was still available and made the recommendation to the County.

Let me address the issues:

Fire Safety: As a former member of the SDRF Board I must state that County Park's plan will make this parcel MORE safe. Note that on the other side of BCLT's holding is JMMS. It is a wildfire evacuation site and this park can be also, especially for large animals. The design of the park mitigates the BBQ's, etc. fire potential. Also, it enables fire fighting equipment access where only Brush Rigs could currently traverse.

Road Safety: South Grade is no more dangerous than any similar section in Alpine or East County. The fatal accidents there were not atypical. As a side note, the 19 year old girl who was recently hit by a hit and run driver was walking well off the road near Albertsons. As an aside, she is my daughter's best friend and I am furious that those opposed to this project would attempt to use her misfortune to their advantage. Also it seems disingenuous that parents have been begging for sidewalks to JMMS from town to no avail for decades yet somehow those opposed want the lack of sidewalks to be a show-stopper for the park.

Water: The individuals above got the former Supervisor, Jacob, to give AUSD the nearly $1 million (and now $1.2 million) of PLDO funds to refurbish the PE fields at JMMS. These are going to be grass fields and water is plentiful there via a well. There is no doubt that there is plenty for the Park. I am also aware of the County's ability to limit water usage through landscaping modifications, etc.

Light/Noise Pollution: This is especially grating in that the same people raising this issue here had loss of hearing when AUSD planned to place lights/have youth sports leagues on the refurbished fields being paid for with PLDO monies and those living next to those fields raised the issue. There is no doubt that any light/noise pollution at the park will be less especially considering the traffic noise and daylight only hours.

In short, those who are opposed to the park are so inclined for their own personal reasons, primarily that they want it for their environmental organization or want it for their own "greenbelt", and they are throwing everything they can at the wall to see if anything will stick. Build the park as your plan shows, and consider INCREASING the area utilized. 98 acres is awesome and in the future can continue to serve the recreation needs of Alpine...actively!

You may call or email me for any questions/information.

Sincerely,

Louis Russo
1524 Montecito Vista
Alpine, CA 91901

619 300-0866

P.S. I've learned over the years with BCLT that it is always best to ask for the proof, e.g. if they say "this plant is endangered", etc., get proof.

From: susanem
To: Bradley, Lorrie
Subject: please inform where the completed enrollment report can be obtained for review. thank you. susan sweeney
Date: Tuesday, March 09, 2021 10:21:02 PM

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susanem@cox.net

Sent from my Verizon, Samsung Galaxy smartphone

Kyle Ogle and Dominique Norton

2623 Calle de Compadres

Alpine, CA 91901

April 7, 2021

County of San Diego

Department of Parks and Recreation

Attn: Alpine County Park Environmental Review

5500 Overland Avenue, Suite 410

San Diego, CA 92123

By email to CountyParksCEQA@sdcounty.ca.gov and lorrie.bradley@sdcounty.ca.gov

RE: Notice of Preparation of a Draft Environmental Impact Report on the Alpine County Park Project

Dear Ms. Bradley,

Thank you for the opportunity to provide information for the Notice of Preparation ("NOP") of the Environmental Impact Report ("EIR") on the Alpine County Park Project ("Project").

Transportation and traffic

The proposed park currently includes a new four-way stop feeding all traffic into the park at the intersection of Calle de Compadres and South Grade Road, exactly where our home sits. The idling cars at this intersection will increase congestion, noise and air pollution. South Grade Road is an extremely dangerous two-lane unimproved country road. There have been several people who have lost their lives on this stretch of South Grade Road of which one death occurred directly abutting my property.

The County states that there will not be a parking fee to use the proposed park at this time, but there is no guarantee of the future. Parking onsite would help to reduce street parking, congestion, accidents and fatalities. If a parking fee is instituted, like many other County parks, patrons will find other locations to park their vehicles to avoid paying the fee. In this situation, it

will remain the same with patrons parking on South Grade Road and Calle De Compadres exasperating the dire mobility element.

In addition, there is no safe way for young people to get to access the park without either traveling from the town center via South Grade Road, which in most areas does not have a shoulder and has many potentially fatal blind spots, or via Wright's Field Ecological Preserve.

This concern needs to be analyzed in the project EIR. The impacts should be avoided or, at worst, mitigated below the level of significance.

Noise pollution
We chose to live here. We did not choose to live next to heavy machinery needed for construction nor did we choose to live next to constant traffic, idling cars at the proposed four-way stop, increased number of people's voices, endless dogs barking, car alarms going off, amplified music at events held at the pavilion, wheels at the bike and skate park, and all conducted over an abundance of additional concrete needed to complete the park. County Parks' current solution is to build a berm at some unknown height to mitigate noise. The impacts should be avoided or, at worst, mitigated below the level of significance.

Water
Our world is in a climate crisis and water is a finite resource. The proposed park includes water-guzzling manicured turf and landscaping. As new property owners, we are considering when to drill a well for our use and would then share an aquifer with the park. We are concerned that we will lose our well water if the park starts pumping. The impacts should be avoided or, at worst, mitigated below the level of significance.

Septic/Sewer
The NOP states sewer or septic would be used to accommodate public bathrooms. There is currently no municipal sewer tie-in close to this property. Septic tanks and leach fields could affect neighboring properties if it were to pollute our groundwater. This concern needs to be analyzed in the project EIR. The impacts should be avoided or, at worst, mitigated below the level of significance.

Wildfire
Alpine is a in a high fire risk area of the County. As a property owner, it is hard to obtain fire insurance as such. This proposed park would increase the fire risk to all abutting neighbors thus making it even more difficult to obtain/keep insurance and worse than that threaten all of our properties with the increased use of this space. The impacts should be avoided or, at worst, mitigated below the level of significance.

Aesthetics
We moved to Alpine for the quiet rural community, and specifically fell in love with this home due to its amazing views and sunsets. We are deeply concerned about how having a bunch of concrete and berms across from our home will affect our view and hence the resale value of our property. This concern needs to be analyzed in the project EIR. The impacts should be avoided or, at worst, mitigated below the level of significance.

Light pollution
Alpine is a dark sky town. The current proposal includes safety lighting along with light for the volunteer housing. When asked, County Parks stated that ball field lighting is not currently included in this proposal but if that is something Alpine wants it can be incorporated. There will be motion sensor lights that will undoubtedly go off all night long as a result of the active wildlife on the property (owls, coyotes, mountain lions, bobcats, etc). This light will destroy the dark sky. The impacts should be avoided or, at worst, mitigated below the level of significance.

Project Alternative
Please include a project alternative with a smaller, nature-focused, minimally developed park that has no impacts to the biological, cultural, and other resources of the project site, Wright's Field Ecological Preserve, and neighboring properties. Focus on making its upkeep and maintenance financially sustainable for the community. Make its construction, maintenance, and rebuilding carbon neutral and environmentally sustainable, to meet federal, state, and county goals. The Alpine community already has a number of indifferently maintained, lightly-used parks designed to provide many of the amenities this project seeks to build. Why add more?

Please analyze all of these potential impacts to transportation and traffic, noise pollution, water, septic/sewer, wildfire, aesthetics, and light pollution and avoid the significant ones. Please also make sure that I receive all updates and meeting notices on this project, at dqnorton@gmail.com and the mailing address above. Thank you for taking my comments.

Sincerely,

Kyle Ogle and Dominique Norton

From: joyce nygaard
To: CEQA, CountyParks
Subject: Alpine Park CEQA comments
Date: Wednesday, April 07, 2021 3:55:54 PM

Hello,
Thank you for opportunity to express my concerns about the proposed Alpine County Park.

Noise

Many of the amenities planned for the Alpine County Park are noise generating. These will be stationary and will be generated 7 days a week from dawn to dusk. The Alpine Community Plan Update states that 75 CNEL is acceptable for land uses. It further states that the County will "maintain the tranquility of residential neighborhoods by reducing potential noise pollution." Their goal is to "encourage land use and circulation patterns that will minimize noise in residential neighborhoods and sensitive land use areas." This proposed park has homes surrounding it on three sides and sensitive habitat on the other.
Noise levels from skateparks can be 64-96 dB, depending on materials used and tricks done by riders. Basketballs can generate 75-85 dB. Bats hitting balls can range from 50-120 dB. Added to that will be the sound of dogs barking and the loud pop of a pickleball on the paddle and asphalt. Sound travels very well in this area. People speaking at a normal conversational level (60dB) can be heard at homes on the surrounding hills and neighborhoods. Noise analysis needs to take into consideration how the added noise pollution generated by these proposed amenities will be heard by residential neighbors and those trying to enjoy the adjacent sensitive habitat.

Greenhouse Gas Emissions

With all of the amenities currently included in The Alpine County Park it will be a destination park. People will drive there from surrounding areas to visit the bike and skate parks in particular. There is also no safe access to this park by foot, bike, or skateboard and there is no public transportation available. It will mainly be reachable by automobiles. The County estimates the park will attract thousands of visitors per week. The increase in greenhouse gas emissions from increased vehicle traffic to and from the Alpine County Park needs to be studied.

Traffic

The County is anticipating thousands of vehicle trips to the proposed park weekly. These vehicles will have to travel on South Grade Road. In some sections, South Grade already has a very poor level of service. The road cannot easily be straightened, widened or have sidewalks added. Doing so would likely require the use of eminent domain. There is no public transportation to the proposed park property. Many homes have driveways that are directly off of South Grade. At least 3 people have died on this stretch of South Grade in the past few years. More cars will put more people at risk. Serious consideration of traffic issues and how

they can be mitigated and a cost/benefit analysis are needed.

Wildfire

I am concerned about having BBQ pits with open flames and hot ashes in the proposed County Park. This area of Alpine has burned in the past, most recently during the West Fire in 2018. The County's plan is to cover the grills with bags during high wind warnings. Even when there is not a high wind warning, embers can blow to trees or other areas of the park and surrounding homes and cause a wildfire.

Utilities/Service systems

The County seems to be still debating whether to use sewer or septic for this site. All surrounding residential areas are on septic. This property has failed percolation tests many times in the past. This park is not close to sewer lines. What will the cost be to connect to sewer and who will pay for it?

These are just a few of my concerns.

Thank you,
Joyce Magruder Nygaard
1434 Ramsey Rd.
Alpine, CA 91901
619-599-6242

From: Jonah Gula
To: CEQA, CountyParks
Subject: Alpine County Park
Date: Tuesday, April 06, 2021 2:26:21 PM

Hello,
I would like to express the following environmental concerns about DPR's proposed plan for the County Park in Alpine:

- Besides the listed threatened species that occur on the property (which seem to have only been of concern thus far), the following California Species of Special Concern can be found on the property:
  - Crouch's Bumble Bee
  - Western Spadefoot
  - Coastal Whiptail
  - San Diego Legless Lizard
  - Red Diamond Rattlesnake
  - Grasshopper Sparrow

- Additionally, during winter the following species are found on the property, all of which have declined across their distribution in the United States:
  - Vesper Sparrow
  - White-crowned Sparrow
  - Lark Sparrow
  - Savannah Sparrow

- The environmental significance of the proposed park site goes beyond state or federally listed species. This site represents a fragment of the small amount of remaining native grassland in San Diego, and the construction of the park as is will not only impact listed species. Therefore, DPR must purpose to do comprehensive biological surveys of mammals, birds, reptiles, amphibians, insects, and plants. Many of the species that can be found on the site have declined in San Diego County because of projects like this park, which have slowly chipped away at the edges of remaining natural habitat.

- The impacts of the increased use of adjacent Wright's Field have yet to be addressed by any stakeholders. The overflow effects of foot, bicycle, and equine travel from the park into Wright's Field will have meaningful impacts on vegetation and wildlife, not to mention the potential increase in dog walking (on and off leash). Mounting research has demonstrated the negative impact of dogs on wildlife and this consideration is important in DPR's environmental assessment.

- The fragmentation of the grassland that this park will cause will have implications for

wildlife and plants that remain in the undeveloped edges of the county property. Negative edge effects are a well-studied subject in wildlife ecology and must be addressed by DPR given the sensitivity of the habitat community.

- Alpine's historic upland habitat resembled the proposed park site and adjacent Wright's Field, but urban sprawl has left this remaining habitat as the only remnant of what the area used to be. Thus, DPR must consider how this park will diminish the last of Alpine's natural heritage.

- DPR must do no less comprehensive an impact assessment than that found in the previous assessments for the proposed Stagecoach Ranch housing development decades ago. Specifically, details of the assessment can be found in the Planning and Development document archive under Record ID PDS2011-39107714280 and PDS20103100-4974. If development decades ago was considered too detrimental to this sensitive environment, then it will be even more so today given that this habitat is even more threatened now than then.

- The projected timeline set forth by DPR is insufficient for thorough biological assessment given the time required to properly study wildlife and plant occurrence and abundance across each season of the year. By limiting surveys to a short segment of the year, DPR will ignore the reality of the location's seasonal ecology. For example, unless surveys are conducted during the rains, Western Spadefoots will go undetected. The rushed timeline for the project will lead to inappropriate conclusions and sloppy science.

Thank you,
Jonah Gula

Anne Falasco Norton
2457 Avenida Canora
Alpine, CA 91901

April 2, 2021

County of San Diego
Department of Parks and Recreation
5500 Overland Avenue, Suite 410
San Diego, CA 92123
CountyParksCEQA@sdcounty.ca.gov
lorrie.bradley@sdcounty.ca.gov

Attn: Alpine County Park Environmental Review

Dear Ms. Bradley,

I appreciate the opportunity to provide information for the Notice of Preparation (NOP) of the Environmental Impact Report (EIR) on the Alpine County Park Project (Project).

This proposed park as it is presently planned will forever alter and change the character and ambiance of its bordering neighborhoods. Our home of over 30 years is part of Palo Verde Ranch and abuts South Grade Road, separated only by one residence. We have an elevated view of the proposed Project. Instead of the peaceful atmospheric views we now enjoy, the land will be defaced with man-made activities, permanently eliminating the valuable natural resource that it is today. these impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

Direct impacts to our neighbors and ourselves include increased noise for the activities within the park and noise generated from the drastic increase of traffic to reach this destination park. Barking from dogs, constant sounds of skateboards against hard concrete and the tires creating dust from the bike skills area will be a constant annoyance to the neighbors and certain deterrents to the wildlife who make this area a safe animal pathway. Noise from all the activities will resound throughout the neighborhood directly impacting the area…non-stop…til dusk due us part… These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

Dog-transmitted diseases, some of them airborne, and the stench of poo and urine will permeate the dog park grounds adding to the risks of disease and serious dog fights typical at such sites. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

We pride ourselves in being part of a Dark Sky zone. People throughout the county come to Alpine to view stellar phenomena. Having a permanent on-site trailer/home generating light and the additional lighting within the park to deter crime will totally end this treasure. God forbid when the County allows lighted ballparks….total destruction. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

We have a working well which may be directly impacted by the draw of water use needed at the Project. Chemicals used to treat the lawns can cause air-borne allergies and affect ground water contamination. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

The Project will draw the need for more police protection from our Sheriff Substation which spills over with increased crime that directly affects the Project's neighbors who presently see very little crime. This impact should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

Traffic along South Grade will increase substantially with no reasonable mitigation offered. With this comes the increase of air pollution and safety issues. The parking allotment within the park indicates the county's plans for a high volume park. Overflow parking along South Grade and into the county-owned residential streets next to the park will be inundated during the "big events" that will be scheduled at the Project. Parking will remain a high concern because inevitably, parking within the project will have a price tag and Alpiners will not pay the price (nor should they). Therefore, we will continue to see the residents of Alpine park along South Grade and the nearby residential streets. All of this points to a heavily increased use of and heavily increase of danger and safety on South Grade Road which was not built for such volume. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

The change of topography in order to achieve all the activities will drastically be altered when a "berm" will be constructed that will in effect halt all views of the park from the road. One of the beautiful and calming aspects of the existing property is that one can drive past the very open fields and with just glancing, obtain the sense of outdoors. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

Presently, the Project effectively eliminates all access to Wright's Field (WF). One will be forced to travel through the Project in order to enter WF. By doing this, the County just added another layer of hindrance, effectively deterring its own residents from access to this wonderful gem. The other access area to the park is via a private road abutting Joan McQueen Middle School. No one is allowed to park on this private road and no designated spots exist to accommodate WF enthusiasts at Joan McQueen. The other "access" is at the end of Olivewood Lane with no adequate public parking. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

This project will hands-down substantially degrade the quality of the environment for all Alpine residents but more importantly: our dwindling wildlife habitat. It will further destroy a huge chunk of one of the last remaining grasslands in our county and State. These numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance.

In previous statements to the County and to the Alpine Community Planning Group (ACPG) and in published Letters of the Editor of the Alpine Sun I have made it quite clear that ideally the Project's land use should remain passive. Where the land is presently disturbed, only that area should be designed for parking and minimal facilities. The active portions of the Project should be removed and other locations should be identified. This alternative should be analyzed in the EIR.

In addition, at last week's ACPG meeting I offered an alternative location for many of the Project's activities that are not suitable to the Project's location: Alpine Elementary School (AES) in the heart of Alpine. It is an historical site sitting idle and empty. This site could be the perfect fit with regards to providing the activities in the park (the skateboard and bike parks, the playing fields, the community garden and the dog park) that ought to be clustered within the higher populated area of Alpine. This higher populated area is our village center. If designed properly, AES could become a stalwart example of incorporating historical value with the present needs of our community. AES already has the infrastructure. It has playing fields. It has reasonable off-street parking. It has existing electrical, water and sewage hookups. It addresses the traffic flow. Fields could be lighted without causing light pollution. Situated at the school, in the heart of town, the bike, skate and dog parks would not cause noise pollution. This is the location where these types of activities belong and are best served. This alternative should be analyzed in the EIR.

Another alternative park site in the heart of Alpine is the old Alpine School District's offices which also has similar amenities that are suitable for the active portion of the Project. This alternative should be analyzed in the EIR.

It is a great disappointment to have to continue to address to the County that this property is not suitable because of the magnitude of the Project. The County should be the steward of our precious environment. Instead the County leaves the undeniable impression that paving over sensitive and diminishing lands to build more ball fields and whimsical structures to satisfy the short-sighted needs of the public is of utmost importance. This Project continues with the "Slash and Burn" attitude, denuding what is left of our natural resources.

All of my above concerns with the numerous impacts should be analyzed in the EIR. These impacts should be avoided or mitigated below the level of significance. The Project alternatives should be given serious study and review.

Sincerely,

Annie Norton

Appendix C

Air Quality, Greenhouse Gas, and Energy Modeling Files

Appendix B: Air Quality, Greenhouse Gas, and Energy Modeling Files

B-1: Construction AQ & GHG Emissions

Emissions Summary

Regional Emissions (ONSITE + OFFSITE)

				Regional Emissions (Onsite + Offsite)					
				ROG	NO_X	CO	SO_X	PM_{10} Total	$PM_{2.5}$ Total
Source	**Start Date**	**End Date**	**# of Workdays**	**lb/day**					
3.2 Grubbing/Land Clearing - 2022	10/1/2022	10/15/2022	10	1.76	**20.41**	10.74	**0.03**	**2.53**	**0.93**
3.3 Grading/Excavation - 2022	10/1/2022	12/31/2022	65	4.13	**46.19**	29.99	**0.08**	**3.11**	**1.86**
3.3 Grading/Excavation - 2023	1/1/2023	5/31/2023	108	3.84	40.79	**29.17**	0.08	2.84	1.67
3.4 Sewer Line Installation - 2022	10/1/2022	12/31/2022	65	0.60	**5.78**	7.80	**0.01**	**0.42**	**0.29**
3.4 Sewer Line Installation - 2023	1/1/2023	6/1/2023	109	0.55	5.17	**7.75**	0.01	0.38	0.26
3.5 Drainage/Utilities/Subgrade - 2023	5/1/2023	8/31/2023	89	1.27	11.10	**15.69**	0.03	0.77	0.57
3.6 Construction - 2023	6/1/2023	12/31/2023	152	**1.67**	15.35	16.90	0.03	1.09	0.78
3.6 Construction - 2024	1/1/2024	1/31/2024	23	1.57	14.32	16.78	0.03	1.32	0.77
3.7 Paving - 2023	11/30/2023	12/31/2023	22	**0.75**	5.57	7.70	0.01	0.40	0.27
3.7 Paving - 2024	1/1/2024	1/31/2024	23	0.72	5.23	7.70	0.01	0.37	0.25
3.8 Architectural Coating - 2023	12/14/2023	12/31/2023	12	**12.58**	2.20	2.65	0.01	0.17	0.12
3.8 Architectural Coating - 2024	1/1/2024	1/31/2024	23	12.57	2.08	2.64	0.01	0.16	0.10
Maximum Daily Emissions				***15.00***	***72.38***	***52.61***	***0.13***	***6.05***	***3.08***
SDAPCD Significance Thresholds				75	250	550	250	100	55
Exceeds Threshold?				**No**	**No**	**No**	**No**	**No**	**No**

Regional Emissions	Onsite Emissions										Offsite Emissions									
Summer	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total
Source	lb/day										lb/day									
3.2 Grubbing/Land Clearing - 2022	1.68	19.80	10.20	0.03	1.59	0.77	2.36	0.17	0.70	0.88	0.07	0.61	0.54	0.00	0.17	0.00	0.17	0.05	0.00	0.05
3.3 Grading/Excavation - 2022	3.94	44.11	28.58	0.07	0.77	1.76	2.53	0.09	1.61	1.70	0.18	2.06	1.41	0.01	0.57	0.01	0.58	0.15	0.01	0.16
3.3 Grading/Excavation - 2023	3.67	39.29	27.86	0.07	0.77	1.57	2.35	0.09	1.45	1.54	0.15	1.49	1.31	0.01	0.49	0.00	0.49	0.13	0.00	0.13
3.4 Sewer Line Installation - 2022	0.53	5.18	7.35	0.01	0.00	0.28	0.28	0.00	0.25	0.25	0.06	0.60	0.44	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.4 Sewer Line Installation - 2023	0.49	4.69	7.34	0.01	0.00	0.24	0.24	0.00	0.22	0.22	0.05	0.48	0.41	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.5 Drainage/Utilities/Subgrade - 2023	1.17	10.60	15.01	0.02	0.00	0.53	0.53	0.00	0.50	0.50	0.09	0.50	0.68	0.00	0.24	0.00	0.24	0.06	0.00	0.07
3.6 Construction - 2023	1.52	14.22	15.82	0.03	0.00	0.71	0.71	0.00	0.67	0.67	0.13	1.12	1.09	0.01	0.38	0.00	0.38	0.10	0.00	0.10
3.6 Construction - 2024	1.43	13.22	15.74	0.03	0.00	0.62	0.62	0.00	0.59	0.59	0.13	1.09	1.04	0.01	0.70	0.00	0.70	0.18	0.00	0.18
3.7 Paving - 2023	0.69	5.10	7.29	0.01	0.00	0.26	0.26	0.00	0.23	0.23	0.05	0.48	0.41	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.7 Paving - 2024	0.67	4.76	7.31	0.01	0.00	0.23	0.23	0.00	0.22	0.22	0.05	0.47	0.39	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.8 Architectural Coating - 2023	12.56	1.74	2.41	0.00	0.00	0.09	0.09	0.00	0.09	0.09	0.03	0.46	0.23	0.00	0.07	0.00	0.07	0.02	0.00	0.02
3.8 Architectural Coating - 2024	12.54	1.63	2.41	0.00	0.00	0.08	0.08	0.00	0.08	0.08	0.02	0.46	0.22	0.00	0.07	0.00	0.07	0.02	0.00	0.02

Summer	Regional Emissions (Onsite + Offsite)									
	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total
Source	lb/day									
3.2 Grubbing/Land Clearing - 2022	1.75	20.41	10.74	0.03	1.76	0.77	2.53	0.22	0.71	0.92
3.3 Grading/Excavation - 2022	4.12	46.17	29.99	0.08	1.34	1.76	3.11	0.24	1.62	1.86
3.3 Grading/Excavation - 2023	3.82	40.78	29.17	0.08	1.26	1.58	2.84	0.22	1.45	1.67
3.4 Sewer Line Installation - 2022	0.59	5.78	7.80	0.01	0.14	0.28	0.42	0.04	0.26	0.29
3.4 Sewer Line Installation - 2023	0.54	5.17	7.75	0.01	0.14	0.24	0.38	0.04	0.22	0.26
3.5 Drainage/Utilities/Subgrade - 2023	1.25	11.10	15.69	0.03	0.24	0.53	0.77	0.06	0.50	0.57
3.6 Construction - 2023	1.65	15.34	16.90	0.03	0.38	0.72	1.09	0.10	0.68	0.78
3.6 Construction - 2024	1.55	14.32	16.78	0.03	0.70	0.63	1.32	0.18	0.59	0.77
3.7 Paving - 2023	0.74	5.57	7.70	0.01	0.14	0.26	0.40	0.04	0.24	0.27
3.7 Paving - 2024	0.72	5.23	7.70	0.01	0.14	0.24	0.37	0.04	0.22	0.25
3.8 Architectural Coating - 2023	12.58	2.20	2.64	0.01	0.07	0.10	0.17	0.02	0.10	0.12
3.8 Architectural Coating - 2024	12.57	2.08	2.63	0.01	0.07	0.08	0.16	0.02	0.08	0.10

Regional Emissions	Onsite Emissions										Offsite Emissions									
Winter	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total
Source	lb/day										lb/day									
3.2 Grubbing/Land Clearing - 2022	1.68	19.80	10.20	0.03	1.59	0.77	2.36	0.17	0.70	0.88	0.08	0.61	0.53	0.00	0.17	0.00	0.17	0.05	0.00	0.05
3.3 Grading/Excavation - 2022	3.94	44.11	28.58	0.07	0.77	1.76	2.53	0.09	1.61	1.70	0.19	2.07	1.39	0.01	0.57	0.01	0.58	0.15	0.01	0.16
3.3 Grading/Excavation - 2023	3.67	39.29	27.86	0.07	0.77	1.57	2.35	0.09	1.45	1.54	0.17	1.50	1.29	0.01	0.49	0.00	0.49	0.13	0.00	0.13
3.4 Sewer Line Installation - 2022	0.53	5.18	7.35	0.01	0.00	0.28	0.28	0.00	0.25	0.25	0.06	0.60	0.44	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.4 Sewer Line Installation - 2023	0.49	4.69	7.34	0.01	0.00	0.24	0.24	0.00	0.22	0.22	0.06	0.48	0.41	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.5 Drainage/Utilities/Subgrade - 2023	1.17	10.60	15.01	0.02	0.00	0.53	0.53	0.00	0.50	0.50	0.10	0.50	0.66	0.00	0.24	0.00	0.24	0.06	0.00	0.07
3.6 Construction - 2023	1.52	14.22	15.82	0.03	0.00	0.71	0.71	0.00	0.67	0.67	0.15	1.13	1.06	0.01	0.38	0.00	0.38	0.10	0.00	0.10
3.6 Construction - 2024	1.43	13.22	15.74	0.03	0.00	0.62	0.62	0.00	0.59	0.59	0.14	1.10	1.02	0.01	0.70	0.00	0.70	0.18	0.00	0.18
3.7 Paving - 2023	0.69	5.10	7.29	0.01	0.00	0.26	0.26	0.00	0.23	0.23	0.06	0.48	0.41	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.7 Paving - 2024	0.67	4.76	7.31	0.01	0.00	0.23	0.23	0.00	0.22	0.22	0.05	0.47	0.38	0.00	0.14	0.00	0.14	0.04	0.00	0.04
3.8 Architectural Coating - 2023	12.56	1.74	2.41	0.00	0.00	0.09	0.09	0.00	0.09	0.09	0.03	0.46	0.23	0.00	0.07	0.00	0.07	0.02	0.00	0.02
3.8 Architectural Coating - 2024	12.54	1.63	2.41	0.00	0.00	0.08	0.08	0.00	0.08	0.08	0.03	0.45	0.22	0.00	0.07	0.00	0.07	0.02	0.00	0.02

Winter	Regional Emissions (Onsite + Offsite)									
	ROG	NO_X	CO	SO_X	PM_{10} Fugitive	PM_{10} Exhaust	PM_{10} Total	$PM_{2.5}$ Fugitive	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Total
Source	lb/day									
3.2 Grubbing/Land Clearing - 2022	1.76	20.41	10.73	0.03	1.76	0.77	2.53	0.22	0.71	0.93
3.3 Grading/Excavation - 2022	4.13	46.19	29.97	0.08	1.34	1.76	3.11	0.24	1.62	1.86
3.3 Grading/Excavation - 2023	3.84	40.79	29.14	0.08	1.26	1.58	2.84	0.22	1.45	1.67
3.4 Sewer Line Installation - 2022	0.60	5.78	7.80	0.01	0.14	0.28	0.42	0.04	0.26	0.29
3.4 Sewer Line Installation - 2023	0.55	5.17	7.75	0.01	0.14	0.24	0.38	0.04	0.22	0.26
3.5 Drainage/Utilities/Subgrade - 2023	1.27	11.10	15.67	0.03	0.24	0.53	0.77	0.06	0.50	0.57
3.6 Construction - 2023	1.67	15.35	16.88	0.03	0.38	0.72	1.09	0.10	0.68	0.78
3.6 Construction - 2024	1.57	14.32	16.76	0.03	0.70	0.63	1.32	0.18	0.59	0.77
3.7 Paving - 2023	0.75	5.57	7.70	0.01	0.14	0.26	0.40	0.04	0.24	0.27
3.7 Paving - 2024	0.72	5.23	7.70	0.01	0.14	0.24	0.37	0.04	0.22	0.25
3.8 Architectural Coating - 2023	12.58	2.20	2.65	0.01	0.07	0.10	0.17	0.02	0.10	0.12
3.8 Architectural Coating - 2024	12.57	2.08	2.64	0.01	0.07	0.08	0.16	0.02	0.08	0.10

Alpine Park Project-Construction

San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2023
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Health club land used was used to represent park amenities that include buidlings.

Trips and VMT - Water trucks included for dust control.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	7320	2570
tblAreaCoating	Area_Nonresidential_Interior	21960	7710
tblConstructionPhase	NumDays	440.00	174.00
tblConstructionPhase	NumDays	440.00	89.00
tblConstructionPhase	NumDays	440.00	175.00
tblConstructionPhase	NumDays	45.00	173.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	10.00
tblFleetMix	HHD	0.02	0.00
tblFleetMix	LDA	0.60	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.01	0.00
tblFleetMix	LHD2	5.4350e-003	0.00
tblFleetMix	MCY	5.9380e-003	0.00
tblFleetMix	MDV	0.10	0.00
tblFleetMix	MH	1.0560e-003	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9340e-003	0.00
tblFleetMix	SBUS	7.5700e-004	0.00
tblFleetMix	UBUS	1.8880e-003	0.00
tblGrading	AcresOfGrading	605.50	112.50
tblGrading	MaterialExported	0.00	45,900.00
tblGrading	MaterialImported	0.00	54,144.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	1.94	1.95
tblTripsAndVMT	HaulingTripNumber	12,506.00	1,036.00
tblTripsAndVMT	HaulingTripNumber	0.00	656.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	23.00	36.00
tblTripsAndVMT	WorkerTripNumber	471.00	12.00
tblTripsAndVMT	WorkerTripNumber	471.00	24.00
tblTripsAndVMT	WorkerTripNumber	471.00	32.00
tblTripsAndVMT	WorkerTripNumber	8.00	12.00
tblTripsAndVMT	WorkerTripNumber	94.00	4.00
tblWater	OutdoorWaterUseRate	26,867,904.43	27,070,456.26

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	6.4522	72.3611	48.5278	0.1250	3.2454	2.8077	6.0532	0.4940	2.5834	3.0774	0.0000	12,232.6246	12,232.6246	3.5585	0.0000	12,321.5863
2023	14.9766	57.0466	52.6133	0.1194	1.6365	2.3484	3.9848	0.3191	2.1784	2.4975	0.0000	11,669.3469	11,669.3469	3.0951	0.0000	11,746.7250
2024	14.8358	21.6264	27.1107	0.0533	0.9092	0.9445	1.8537	0.2380	0.8909	1.1289	0.0000	5,234.9507	5,234.9507	1.0122	0.0000	5,260.2548
Maximum	**14.9766**	**72.3611**	**52.6133**	**0.1250**	**3.2454**	**2.8077**	**6.0532**	**0.4940**	**2.5834**	**3.0774**	**0.0000**	**12,232.6246**	**12,232.6246**	**3.5585**	**0.0000**	**12,321.5863**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	6.4522	72.3611	48.5278	0.1250	1.8048	2.8077	4.6126	0.3363	2.5834	2.9197	0.0000	12,232.6246	12,232.6246	3.5585	0.0000	12,321.5863
2023	14.9766	57.0466	52.6133	0.1194	1.1663	2.3484	3.5146	0.2662	2.1784	2.4446	0.0000	11,669.3469	11,669.3469	3.0951	0.0000	11,746.7250
2024	14.8358	21.6264	27.1107	0.0533	0.9092	0.9445	1.8537	0.2380	0.8909	1.1289	0.0000	5,234.9507	5,234.9507	1.0122	0.0000	5,260.2548
Maximum	**14.9766**	**72.3611**	**52.6133**	**0.1250**	**1.8048**	**2.8077**	**4.6126**	**0.3363**	**2.5834**	**2.9197**	**0.0000**	**12,232.6246**	**12,232.6246**	**3.5585**	**0.0000**	**12,321.5863**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**33.00**	**0.00**	**16.07**	**20.04**	**0.00**	**3.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grubbing/Land Clearing	Site Preparation	10/1/2022	10/15/2022	5	10	
2	Grading/Excavation	Grading	10/1/2022	5/31/2023	5	173	
3	Sewer Line Installation	Building Construction	10/1/2022	6/1/2023	5	174	
4	Drainage/Utilities/Subgrade	Building Construction	5/1/2023	8/31/2023	5	89	
5	Construction	Building Construction	6/1/2023	1/31/2024	5	175	
6	Paving	Paving	11/30/2023	1/31/2024	5	45	
7	Architectural Coating	Architectural Coating	12/14/2023	1/31/2024	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.01

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 21,960; Non-Residential Outdoor: 7,320; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grubbing/Land Clearing	Crawler Tractors	3	8.00	212	0.43
Grubbing/Land Clearing	Excavators	1	8.00	158	0.38
Grading/Excavation	Crawler Tractors	3	8.00	212	0.43
Grading/Excavation	Excavators	1	8.00	158	0.38
Grading/Excavation	Rollers	1	8.00	80	0.38
Grading/Excavation	Rubber Tired Loaders	1	8.00	203	0.36
Grading/Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading/Excavation	Scrapers	2	8.00	367	0.48
Drainage/Utilities/Subgrade	Air Compressors	1	8.00	78	0.48
Drainage/Utilities/Subgrade	Generator Sets	1	8.00	84	0.74
Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Sewer Line Installation	Excavators	1	8.00	158	0.38
Sewer Line Installation	Rollers	1	8.00	80	0.38
Sewer Line Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Construction	Air Compressors	1	8.00	78	0.48
Construction	Cranes	1	8.00	231	0.29
Construction	Forklifts	3	8.00	89	0.20
Construction	Generator Sets	1	8.00	84	0.74
Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grubbing/Land Clearing	4	16.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading/Excavation	9	36.00	6.00	1,036.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Drainage/Utilities/Sub grade	6	24.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Sewer Line Installation	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction	8	32.00	6.00	656.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grubbing/Land Clearing - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.6782	19.8005	10.1996	0.0287		0.7661	0.7661		0.7048	0.7048		2,777.1123	2,777.1123	0.8982		2,799.5667
Total	**1.6782**	**19.8005**	**10.1996**	**0.0287**	**1.5908**	**0.7661**	**2.3568**	**0.1718**	**0.7048**	**0.8765**		**2,777.1123**	**2,777.1123**	**0.8982**		**2,799.5667**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.0523	0.0328	0.3946	1.2600e-003	0.1314	8.9000e-004	0.1323	0.0349	8.2000e-004	0.0357		125.5296	125.5296	3.4100e-003		125.6148
Total	**0.0692**	**0.6102**	**0.5421**	**2.8700e-003**	**0.1721**	**1.9900e-003**	**0.1740**	**0.0466**	**1.8800e-003**	**0.0484**		**298.6978**	**298.6978**	**0.0155**		**299.0858**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6204	0.0000	0.6204	0.0670	0.0000	0.0670			0.0000			0.0000
Off-Road	1.6782	19.8005	10.1996	0.0287		0.7661	0.7661		0.7048	0.7048	0.0000	2,777.1123	2,777.1123	0.8982		2,799.5667
Total	**1.6782**	**19.8005**	**10.1996**	**0.0287**	**0.6204**	**0.7661**	**1.3864**	**0.0670**	**0.7048**	**0.7718**	**0.0000**	**2,777.1123**	**2,777.1123**	**0.8982**		**2,799.5667**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.0523	0.0328	0.3946	1.2600e-003	0.1314	8.9000e-004	0.1323	0.0349	8.2000e-004	0.0357		125.5296	125.5296	3.4100e-003		125.6148
Total	**0.0692**	**0.6102**	**0.5421**	**2.8700e-003**	**0.1721**	**1.9900e-003**	**0.1740**	**0.0466**	**1.8800e-003**	**0.0484**		**298.6978**	**298.6978**	**0.0155**		**299.0858**

3.3 Grading/Excavation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7709	0.0000	0.7709	0.0868	0.0000	0.0868			0.0000			0.0000
Off-Road	3.9390	44.1140	28.5807	0.0710		1.7554	1.7554		1.6149	1.6149		6,878.7072	6,878.7072	2.2247		6,934.3251
Total	**3.9390**	**44.1140**	**28.5807**	**0.0710**	**0.7709**	**1.7554**	**2.5262**	**0.0868**	**1.6149**	**1.7017**		**6,878.7072**	**6,878.7072**	**2.2247**		**6,934.3251**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0417	1.4047	0.3732	4.5500e-003	0.2362	3.9700e-003	0.2402	0.0610	3.8000e-003	0.0648		499.8240	499.8240	0.0443		500.9313
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.1177	0.0738	0.8879	2.8300e-003	0.2957	2.0000e-003	0.2977	0.0784	1.8400e-003	0.0803		282.4415	282.4415	7.6700e-003		282.6333
Total	**0.1763**	**2.0559**	**1.4086**	**8.9900e-003**	**0.5725**	**7.0700e-003**	**0.5796**	**0.1511**	**6.7000e-003**	**0.1578**		**955.4338**	**955.4338**	**0.0641**		**957.0356**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3007	0.0000	0.3007	0.0338	0.0000	0.0338			0.0000			0.0000
Off-Road	3.9390	44.1140	28.5807	0.0710		1.7554	1.7554		1.6149	1.6149	0.0000	6,878.7072	6,878.7072	2.2247		6,934.3250
Total	**3.9390**	**44.1140**	**28.5807**	**0.0710**	**0.3007**	**1.7554**	**2.0560**	**0.0338**	**1.6149**	**1.6488**	**0.0000**	**6,878.7072**	**6,878.7072**	**2.2247**		**6,934.3250**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0417	1.4047	0.3732	4.5500e-003	0.2362	3.9700e-003	0.2402	0.0610	3.8000e-003	0.0648		499.8240	499.8240	0.0443		500.9313
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.1177	0.0738	0.8879	2.8300e-003	0.2957	2.0000e-003	0.2977	0.0784	1.8400e-003	0.0803		282.4415	282.4415	7.6700e-003		282.6333
Total	**0.1763**	**2.0559**	**1.4086**	**8.9900e-003**	**0.5725**	**7.0700e-003**	**0.5796**	**0.1511**	**6.7000e-003**	**0.1578**		**955.4338**	**955.4338**	**0.0641**		**957.0356**

3.3 Grading/Excavation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7709	0.0000	0.7709	0.0868	0.0000	0.0868			0.0000			0.0000
Off-Road	3.6703	39.2896	27.8561	0.0710		1.5749	1.5749		1.4489	1.4489		6,876.4237	6,876.4237	2.2240		6,932.0231
Total	**3.6703**	**39.2896**	**27.8561**	**0.0710**	**0.7709**	**1.5749**	**2.3458**	**0.0868**	**1.4489**	**1.5357**		**6,876.4237**	**6,876.4237**	**2.2240**		**6,932.0231**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0298	0.9685	0.3516	4.3800e-003	0.1523	1.7900e-003	0.1541	0.0404	1.7100e-003	0.0421		482.8698	482.8698	0.0424		483.9294
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.1115	0.0674	0.8248	2.7200e-003	0.2957	1.9600e-003	0.2977	0.0784	1.8000e-003	0.0803		271.6442	271.6442	7.0200e-003		271.8197
Total	**0.1543**	**1.4905**	**1.3115**	**8.6600e-003**	**0.4886**	**4.2900e-003**	**0.4929**	**0.1305**	**4.0200e-003**	**0.1345**		**923.3042**	**923.3042**	**0.0605**		**924.8164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3007	0.0000	0.3007	0.0338	0.0000	0.0338			0.0000			0.0000
Off-Road	3.6703	39.2896	27.8561	0.0710		1.5749	1.5749		1.4489	1.4489	0.0000	6,876.4237	6,876.4237	2.2240		6,932.0231
Total	**3.6703**	**39.2896**	**27.8561**	**0.0710**	**0.3007**	**1.5749**	**1.8755**	**0.0338**	**1.4489**	**1.4827**	**0.0000**	**6,876.4237**	**6,876.4237**	**2.2240**		**6,932.0231**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0298	0.9685	0.3516	4.3800e-003	0.1523	1.7900e-003	0.1541	0.0404	1.7100e-003	0.0421		482.8698	482.8698	0.0424		483.9294
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.1115	0.0674	0.8248	2.7200e-003	0.2957	1.9600e-003	0.2977	0.0784	1.8000e-003	0.0803		271.6442	271.6442	7.0200e-003		271.8197
Total	**0.1543**	**1.4905**	**1.3115**	**8.6600e-003**	**0.4886**	**4.2900e-003**	**0.4929**	**0.1305**	**4.0200e-003**	**0.1345**		**923.3042**	**923.3042**	**0.0605**		**924.8164**

3.4 Sewer Line Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5334	5.1785	7.3534	0.0109		0.2755	0.2755		0.2535	0.2535		1,055.3580	1,055.3580	0.3413		1,063.8911
Total	**0.5334**	**5.1785**	**7.3534**	**0.0109**		**0.2755**	**0.2755**		**0.2535**	**0.2535**		**1,055.3580**	**1,055.3580**	**0.3413**		**1,063.8911**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.0392	0.0246	0.2960	9.4000e-004	0.0986	6.7000e-004	0.0992	0.0262	6.1000e-004	0.0268		94.1472	94.1472	2.5600e-003		94.2111
Total	**0.0561**	**0.6020**	**0.4434**	**2.5500e-003**	**0.1392**	**1.7700e-003**	**0.1410**	**0.0378**	**1.6700e-003**	**0.0395**		**267.3154**	**267.3154**	**0.0147**		**267.6821**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5334	5.1785	7.3534	0.0109		0.2755	0.2755		0.2535	0.2535	0.0000	1,055.3580	1,055.3580	0.3413		1,063.8911
Total	**0.5334**	**5.1785**	**7.3534**	**0.0109**		**0.2755**	**0.2755**		**0.2535**	**0.2535**	**0.0000**	**1,055.3580**	**1,055.3580**	**0.3413**		**1,063.8911**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0169	0.5774	0.1475	1.6100e-003	0.0406	1.1000e-003	0.0417	0.0117	1.0600e-003	0.0128		173.1683	173.1683	0.0121		173.4710
Worker	0.0392	0.0246	0.2960	9.4000e-004	0.0986	6.7000e-004	0.0992	0.0262	6.1000e-004	0.0268		94.1472	94.1472	2.5600e-003		94.2111
Total	**0.0561**	**0.6020**	**0.4434**	**2.5500e-003**	**0.1392**	**1.7700e-003**	**0.1410**	**0.0378**	**1.6700e-003**	**0.0395**		**267.3154**	**267.3154**	**0.0147**		**267.6821**

3.4 Sewer Line Installation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4938	4.6944	7.3413	0.0109		0.2402	0.2402		0.2210	0.2210		1,055.7898	1,055.7898	0.3415		1,064.3264
Total	**0.4938**	**4.6944**	**7.3413**	**0.0109**		**0.2402**	**0.2402**		**0.2210**	**0.2210**		**1,055.7898**	**1,055.7898**	**0.3415**		**1,064.3264**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0372	0.0225	0.2749	9.1000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		90.5481	90.5481	2.3400e-003		90.6066
Total	**0.0502**	**0.4770**	**0.4100**	**2.4700e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**259.3383**	**259.3383**	**0.0134**		**259.6739**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4938	4.6944	7.3413	0.0109		0.2402	0.2402		0.2210	0.2210	0.0000	1,055.7898	1,055.7898	0.3415		1,064.3264
Total	**0.4938**	**4.6944**	**7.3413**	**0.0109**		**0.2402**	**0.2402**		**0.2210**	**0.2210**	**0.0000**	**1,055.7898**	**1,055.7898**	**0.3415**		**1,064.3264**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0372	0.0225	0.2749	9.1000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		90.5481	90.5481	2.3400e-003		90.6066
Total	**0.0502**	**0.4770**	**0.4100**	**2.4700e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**259.3383**	**259.3383**	**0.0134**		**259.6739**

3.5 Drainage/Utilities/Subgrade - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1669	10.5956	15.0095	0.0230		0.5260	0.5260		0.5017	0.5017		2,204.6046	2,204.6046	0.4400		2,215.6047
Total	**1.1669**	**10.5956**	**15.0095**	**0.0230**		**0.5260**	**0.5260**		**0.5017**	**0.5017**		**2,204.6046**	**2,204.6046**	**0.4400**		**2,215.6047**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0743	0.0449	0.5499	1.8200e-003	0.1972	1.3100e-003	0.1985	0.0523	1.2000e-003	0.0535		181.0961	181.0961	4.6800e-003		181.2131
Total	**0.0873**	**0.4995**	**0.6849**	**3.3800e-003**	**0.2378**	**1.8500e-003**	**0.2396**	**0.0640**	**1.7100e-003**	**0.0657**		**349.8863**	**349.8863**	**0.0158**		**350.2805**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1669	10.5956	15.0095	0.0230		0.5260	0.5260		0.5017	0.5017	0.0000	2,204.6046	2,204.6046	0.4400		2,215.6047
Total	**1.1669**	**10.5956**	**15.0095**	**0.0230**		**0.5260**	**0.5260**		**0.5017**	**0.5017**	**0.0000**	**2,204.6046**	**2,204.6046**	**0.4400**		**2,215.6047**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0743	0.0449	0.5499	1.8200e-003	0.1972	1.3100e-003	0.1985	0.0523	1.2000e-003	0.0535		181.0961	181.0961	4.6800e-003		181.2131
Total	**0.0873**	**0.4995**	**0.6849**	**3.3800e-003**	**0.2378**	**1.8500e-003**	**0.2396**	**0.0640**	**1.7100e-003**	**0.0657**		**349.8863**	**349.8863**	**0.0158**		**350.2805**

3.6 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5232	14.2188	15.8156	0.0271		0.7116	0.7116		0.6725	0.6725		2,604.3634	2,604.3634	0.5693		2,618.5957
Total	**1.5232**	**14.2188**	**15.8156**	**0.0271**		**0.7116**	**0.7116**		**0.6725**	**0.6725**		**2,604.3634**	**2,604.3634**	**0.5693**		**2,618.5957**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0187	0.6063	0.2201	2.7400e-003	0.0730	1.1200e-003	0.0741	0.0198	1.0700e-003	0.0209		302.2610	302.2610	0.0265		302.9243
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0991	0.0599	0.7332	2.4200e-003	0.2629	1.7400e-003	0.2646	0.0697	1.6000e-003	0.0713		241.4615	241.4615	6.2400e-003		241.6175
Total	**0.1308**	**1.1207**	**1.0883**	**6.7200e-003**	**0.3765**	**3.4000e-003**	**0.3799**	**0.1012**	**3.1800e-003**	**0.1044**		**712.5127**	**712.5127**	**0.0439**		**713.6092**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5232	14.2188	15.8156	0.0271		0.7116	0.7116		0.6725	0.6725	0.0000	2,604.3634	2,604.3634	0.5693		2,618.5957
Total	**1.5232**	**14.2188**	**15.8156**	**0.0271**		**0.7116**	**0.7116**		**0.6725**	**0.6725**	**0.0000**	**2,604.3634**	**2,604.3634**	**0.5693**		**2,618.5957**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0187	0.6063	0.2201	2.7400e-003	0.0730	1.1200e-003	0.0741	0.0198	1.0700e-003	0.0209		302.2610	302.2610	0.0265		302.9243
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0991	0.0599	0.7332	2.4200e-003	0.2629	1.7400e-003	0.2646	0.0697	1.6000e-003	0.0713		241.4615	241.4615	6.2400e-003		241.6175
Total	**0.1308**	**1.1207**	**1.0883**	**6.7200e-003**	**0.3765**	**3.4000e-003**	**0.3799**	**0.1012**	**3.1800e-003**	**0.1044**		**712.5127**	**712.5127**	**0.0439**		**713.6092**

3.6 Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4283	13.2210	15.7412	0.0271		0.6238	0.6238		0.5892	0.5892		2,604.7319	2,604.7319	0.5659		2,618.8794
Total	**1.4283**	**13.2210**	**15.7412**	**0.0271**		**0.6238**	**0.6238**		**0.5892**	**0.5892**		**2,604.7319**	**2,604.7319**	**0.5659**		**2,618.8794**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0184	0.5910	0.2223	2.7100e-003	0.3930	1.1000e-003	0.3941	0.0983	1.0500e-003	0.0994		300.1456	300.1456	0.0267		300.8123
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0941	0.0549	0.6855	2.3300e-003	0.2629	1.7100e-003	0.2646	0.0697	1.5700e-003	0.0713		231.9479	231.9479	5.7400e-003		232.0913
Total	**0.1250**	**1.0942**	**1.0386**	**6.5900e-003**	**0.6965**	**3.3300e-003**	**0.6999**	**0.1798**	**3.1200e-003**	**0.1829**		**699.7980**	**699.7980**	**0.0434**		**700.8821**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4283	13.2210	15.7412	0.0271		0.6238	0.6238		0.5892	0.5892	0.0000	2,604.7319	2,604.7319	0.5659		2,618.8794
Total	**1.4283**	**13.2210**	**15.7412**	**0.0271**		**0.6238**	**0.6238**		**0.5892**	**0.5892**	**0.0000**	**2,604.7319**	**2,604.7319**	**0.5659**		**2,618.8794**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0184	0.5910	0.2223	2.7100e-003	0.3930	1.1000e-003	0.3941	0.0983	1.0500e-003	0.0994		300.1456	300.1456	0.0267		300.8123
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0941	0.0549	0.6855	2.3300e-003	0.2629	1.7100e-003	0.2646	0.0697	1.5700e-003	0.0713		231.9479	231.9479	5.7400e-003		232.0913
Total	**0.1250**	**1.0942**	**1.0386**	**6.5900e-003**	**0.6965**	**3.3300e-003**	**0.6999**	**0.1798**	**3.1200e-003**	**0.1829**		**699.7980**	**699.7980**	**0.0434**		**700.8821**

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5164	5.0958	7.2921	0.0114		0.2551	0.2551		0.2347	0.2347		1,103.7921	1,103.7921	0.3570		1,112.7168
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6916**	**5.0958**	**7.2921**	**0.0114**		**0.2551**	**0.2551**		**0.2347**	**0.2347**		**1,103.7921**	**1,103.7921**	**0.3570**		**1,112.7168**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0372	0.0225	0.2749	9.1000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		90.5481	90.5481	2.3400e-003		90.6066
Total	**0.0502**	**0.4770**	**0.4100**	**2.4700e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**259.3383**	**259.3383**	**0.0134**		**259.6739**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5164	5.0958	7.2921	0.0114		0.2551	0.2551		0.2347	0.2347	0.0000	1,103.7921	1,103.7921	0.3570		1,112.7168
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6916**	**5.0958**	**7.2921**	**0.0114**		**0.2551**	**0.2551**		**0.2347**	**0.2347**	**0.0000**	**1,103.7921**	**1,103.7921**	**0.3570**		**1,112.7168**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0372	0.0225	0.2749	9.1000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		90.5481	90.5481	2.3400e-003		90.6066
Total	**0.0502**	**0.4770**	**0.4100**	**2.4700e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**259.3383**	**259.3383**	**0.0134**		**259.6739**

3.7 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4941	4.7623	7.3129	0.0114		0.2343	0.2343		0.2155	0.2155		1,103.7736	1,103.7736	0.3570		1,112.6982
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6693**	**4.7623**	**7.3129**	**0.0114**		**0.2343**	**0.2343**		**0.2155**	**0.2155**		**1,103.7736**	**1,103.7736**	**0.3570**		**1,112.6982**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0353	0.0206	0.2571	8.7000e-004	0.0986	6.4000e-004	0.0992	0.0262	5.9000e-004	0.0267		86.9805	86.9805	2.1500e-003		87.0343
Total	**0.0478**	**0.4688**	**0.3879**	**2.4200e-003**	**0.1392**	**1.1600e-003**	**0.1404**	**0.0378**	**1.0900e-003**	**0.0389**		**254.6850**	**254.6850**	**0.0131**		**255.0128**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4941	4.7623	7.3129	0.0114		0.2343	0.2343		0.2155	0.2155	0.0000	1,103.7736	1,103.7736	0.3570		1,112.6982
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6693**	**4.7623**	**7.3129**	**0.0114**		**0.2343**	**0.2343**		**0.2155**	**0.2155**	**0.0000**	**1,103.7736**	**1,103.7736**	**0.3570**		**1,112.6982**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0353	0.0206	0.2571	8.7000e-004	0.0986	6.4000e-004	0.0992	0.0262	5.9000e-004	0.0267		86.9805	86.9805	2.1500e-003		87.0343
Total	**0.0478**	**0.4688**	**0.3879**	**2.4200e-003**	**0.1392**	**1.1600e-003**	**0.1404**	**0.0378**	**1.0900e-003**	**0.0389**		**254.6850**	**254.6850**	**0.0131**		**255.0128**

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944		375.2641	375.2641	0.0225		375.8253
Total	**12.5555**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**		**375.2641**	**375.2641**	**0.0225**		**375.8253**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0124	7.4900e-003	0.0916	3.0000e-004	0.0329	2.2000e-004	0.0331	8.7200e-003	2.0000e-004	8.9200e-003		30.1827	30.1827	7.8000e-004		30.2022
Total	**0.0254**	**0.4620**	**0.2267**	**1.8600e-003**	**0.0735**	**7.6000e-004**	**0.0742**	**0.0204**	**7.1000e-004**	**0.0211**		**198.9729**	**198.9729**	**0.0119**		**199.2695**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944	0.0000	375.2641	375.2641	0.0225		375.8253
Total	**12.5555**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**	**0.0000**	**375.2641**	**375.2641**	**0.0225**		**375.8253**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4546	0.1351	1.5600e-003	0.0406	5.4000e-004	0.0412	0.0117	5.1000e-004	0.0122		168.7902	168.7902	0.0111		169.0674
Worker	0.0124	7.4900e-003	0.0916	3.0000e-004	0.0329	2.2000e-004	0.0331	8.7200e-003	2.0000e-004	8.9200e-003		30.1827	30.1827	7.8000e-004		30.2022
Total	**0.0254**	**0.4620**	**0.2267**	**1.8600e-003**	**0.0735**	**7.6000e-004**	**0.0742**	**0.0204**	**7.1000e-004**	**0.0211**		**198.9729**	**198.9729**	**0.0119**		**199.2695**

3.8 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2410	1.6251	2.4135	3.9600e-003		0.0812	0.0812		0.0812	0.0812		375.2641	375.2641	0.0211		375.7923
Total	**12.5410**	**1.6251**	**2.4135**	**3.9600e-003**		**0.0812**	**0.0812**		**0.0812**	**0.0812**		**375.2641**	**375.2641**	**0.0211**		**375.7923**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0118	6.8700e-003	0.0857	2.9000e-004	0.0329	2.1000e-004	0.0331	8.7200e-003	2.0000e-004	8.9100e-003		28.9935	28.9935	7.2000e-004		29.0114
Total	**0.0243**	**0.4551**	**0.2166**	**1.8400e-003**	**0.0735**	**7.3000e-004**	**0.0742**	**0.0204**	**7.0000e-004**	**0.0211**		**196.6981**	**196.6981**	**0.0117**		**196.9899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2410	1.6251	2.4135	3.9600e-003		0.0812	0.0812		0.0812	0.0812	0.0000	375.2641	375.2641	0.0211		375.7923
Total	**12.5410**	**1.6251**	**2.4135**	**3.9600e-003**		**0.0812**	**0.0812**		**0.0812**	**0.0812**	**0.0000**	**375.2641**	**375.2641**	**0.0211**		**375.7923**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0126	0.4482	0.1309	1.5500e-003	0.0406	5.2000e-004	0.0411	0.0117	5.0000e-004	0.0122		167.7046	167.7046	0.0110		167.9785
Worker	0.0118	6.8700e-003	0.0857	2.9000e-004	0.0329	2.1000e-004	0.0331	8.7200e-003	2.0000e-004	8.9100e-003		28.9935	28.9935	7.2000e-004		29.0114
Total	**0.0243**	**0.4551**	**0.2166**	**1.8400e-003**	**0.0735**	**7.3000e-004**	**0.0742**	**0.0204**	**7.0000e-004**	**0.0211**		**196.6981**	**196.6981**	**0.0117**		**196.9899**

Alpine Park Project-Construction

San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2023
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Health club land used was used to represent park amenities that include buidlings.

Trips and VMT - Water trucks included for dust control.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	7320	2570
tblAreaCoating	Area_Nonresidential_Interior	21960	7710
tblConstructionPhase	NumDays	440.00	174.00
tblConstructionPhase	NumDays	440.00	89.00
tblConstructionPhase	NumDays	440.00	175.00
tblConstructionPhase	NumDays	45.00	173.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	10.00
tblFleetMix	HHD	0.02	0.00
tblFleetMix	LDA	0.60	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.01	0.00
tblFleetMix	LHD2	5.4350e-003	0.00
tblFleetMix	MCY	5.9380e-003	0.00
tblFleetMix	MDV	0.10	0.00
tblFleetMix	MH	1.0560e-003	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9340e-003	0.00
tblFleetMix	SBUS	7.5700e-004	0.00
tblFleetMix	UBUS	1.8880e-003	0.00
tblGrading	AcresOfGrading	605.50	112.50
tblGrading	MaterialExported	0.00	45,900.00
tblGrading	MaterialImported	0.00	54,144.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	1.94	1.95
tblTripsAndVMT	HaulingTripNumber	12,506.00	1,036.00
tblTripsAndVMT	HaulingTripNumber	0.00	656.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	23.00	36.00
tblTripsAndVMT	WorkerTripNumber	471.00	12.00
tblTripsAndVMT	WorkerTripNumber	471.00	24.00
tblTripsAndVMT	WorkerTripNumber	471.00	32.00
tblTripsAndVMT	WorkerTripNumber	8.00	12.00
tblTripsAndVMT	WorkerTripNumber	94.00	4.00
tblWater	OutdoorWaterUseRate	26,867,904.43	27,070,456.26

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	6.4848	72.3818	48.5025	0.1245	3.2454	2.8080	6.0534	0.4940	2.5836	3.0776	0.0000	12,179.6403	12,179.6403	3.5613	0.0000	12,268.6727
2023	15.0001	57.0606	52.5634	0.1189	1.6365	2.3485	3.9850	0.3191	2.1786	2.4977	0.0000	11,614.6452	11,614.6452	3.0973	0.0000	11,692.0768
2024	14.8586	21.6325	27.0912	0.0530	0.9092	0.9446	1.8538	0.2380	0.8910	1.1290	0.0000	5,195.6110	5,195.6110	1.0141	0.0000	5,220.9629
Maximum	**15.0001**	**72.3818**	**52.5634**	**0.1245**	**3.2454**	**2.8080**	**6.0534**	**0.4940**	**2.5836**	**3.0776**	**0.0000**	**12,179.6403**	**12,179.6403**	**3.5613**	**0.0000**	**12,268.6727**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	6.4848	72.3818	48.5025	0.1245	1.8048	2.8080	4.6128	0.3363	2.5836	2.9199	0.0000	12,179.6403	12,179.6403	3.5613	0.0000	12,268.6727
2023	15.0001	57.0606	52.5634	0.1189	1.1663	2.3485	3.5147	0.2662	2.1786	2.4447	0.0000	11,614.6452	11,614.6452	3.0973	0.0000	11,692.0768
2024	14.8586	21.6325	27.0912	0.0530	0.9092	0.9446	1.8538	0.2380	0.8910	1.1290	0.0000	5,195.6110	5,195.6110	1.0141	0.0000	5,220.9629
Maximum	**15.0001**	**72.3818**	**52.5634**	**0.1245**	**1.8048**	**2.8080**	**4.6128**	**0.3363**	**2.5836**	**2.9199**	**0.0000**	**12,179.6403**	**12,179.6403**	**3.5613**	**0.0000**	**12,268.6727**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**33.00**	**0.00**	**16.07**	**20.04**	**0.00**	**3.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grubbing/Land Clearing	Site Preparation	10/1/2022	10/15/2022	5	10	
2	Grading/Excavation	Grading	10/1/2022	5/31/2023	5	173	
3	Sewer Line Installation	Building Construction	10/1/2022	6/1/2023	5	174	
4	Drainage/Utilities/Subgrade	Building Construction	5/1/2023	8/31/2023	5	89	
5	Construction	Building Construction	6/1/2023	1/31/2024	5	175	
6	Paving	Paving	11/30/2023	1/31/2024	5	45	
7	Architectural Coating	Architectural Coating	12/14/2023	1/31/2024	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.01

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 21,960; Non-Residential Outdoor: 7,320; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grubbing/Land Clearing	Crawler Tractors	3	8.00	212	0.43
Grubbing/Land Clearing	Excavators	1	8.00	158	0.38
Grading/Excavation	Crawler Tractors	3	8.00	212	0.43
Grading/Excavation	Excavators	1	8.00	158	0.38
Grading/Excavation	Rollers	1	8.00	80	0.38
Grading/Excavation	Rubber Tired Loaders	1	8.00	203	0.36
Grading/Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading/Excavation	Scrapers	2	8.00	367	0.48
Drainage/Utilities/Subgrade	Air Compressors	1	8.00	78	0.48
Drainage/Utilities/Subgrade	Generator Sets	1	8.00	84	0.74

Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Sewer Line Installation	Excavators	1	8.00	158	0.38
Sewer Line Installation	Rollers	1	8.00	80	0.38
Sewer Line Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Construction	Air Compressors	1	8.00	78	0.48
Construction	Cranes	1	8.00	231	0.29
Construction	Forklifts	3	8.00	89	0.20
Construction	Generator Sets	1	8.00	84	0.74
Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grubbing/Land Clearing	4	16.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading/Excavation	9	36.00	6.00	1,036.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Drainage/Utilities/Subgrade	6	24.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Sewer Line Installation	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction	8	32.00	6.00	656.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grubbing/Land Clearing - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.6782	19.8005	10.1996	0.0287		0.7661	0.7661		0.7048	0.7048		2,777.1123	2,777.1123	0.8982		2,799.5667
Total	**1.6782**	**19.8005**	**10.1996**	**0.0287**	**1.5908**	**0.7661**	**2.3568**	**0.1718**	**0.7048**	**0.8765**		**2,777.1123**	**2,777.1123**	**0.8982**		**2,799.5667**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.0595	0.0368	0.3702	1.1800e-003	0.1314	8.9000e-004	0.1323	0.0349	8.2000e-004	0.0357		117.8441	117.8441	3.2200e-003		117.9245
Total	**0.0773**	**0.6122**	**0.5343**	**2.7500e-003**	**0.1721**	**2.0400e-003**	**0.1741**	**0.0466**	**1.9200e-003**	**0.0485**		**286.5057**	**286.5057**	**0.0161**		**286.9072**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6204	0.0000	0.6204	0.0670	0.0000	0.0670			0.0000			0.0000
Off-Road	1.6782	19.8005	10.1996	0.0287		0.7661	0.7661		0.7048	0.7048	0.0000	2,777.1123	2,777.1123	0.8982		2,799.5667
Total	**1.6782**	**19.8005**	**10.1996**	**0.0287**	**0.6204**	**0.7661**	**1.3864**	**0.0670**	**0.7048**	**0.7718**	**0.0000**	**2,777.1123**	**2,777.1123**	**0.8982**		**2,799.5667**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.0595	0.0368	0.3702	1.1800e-003	0.1314	8.9000e-004	0.1323	0.0349	8.2000e-004	0.0357		117.8441	117.8441	3.2200e-003		117.9245
Total	**0.0773**	**0.6122**	**0.5343**	**2.7500e-003**	**0.1721**	**2.0400e-003**	**0.1741**	**0.0466**	**1.9200e-003**	**0.0485**		**286.5057**	**286.5057**	**0.0161**		**286.9072**

3.3 Grading/Excavation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7709	0.0000	0.7709	0.0868	0.0000	0.0868			0.0000			0.0000
Off-Road	3.9390	44.1140	28.5807	0.0710		1.7554	1.7554		1.6149	1.6149		6,878.7072	6,878.7072	2.2247		6,934.3251
Total	**3.9390**	**44.1140**	**28.5807**	**0.0710**	**0.7709**	**1.7554**	**2.5262**	**0.0868**	**1.6149**	**1.7017**		**6,878.7072**	**6,878.7072**	**2.2247**		**6,934.3251**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0429	1.4152	0.3957	4.4700e-003	0.2362	4.0600e-003	0.2403	0.0610	3.8800e-003	0.0649		491.1016	491.1016	0.0457		492.2438
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.1338	0.0828	0.8329	2.6600e-003	0.2957	2.0000e-003	0.2977	0.0784	1.8400e-003	0.0803		265.1492	265.1492	7.2400e-003		265.3302
Total	**0.1945**	**2.0735**	**1.3927**	**8.7000e-003**	**0.5725**	**7.2100e-003**	**0.5798**	**0.1511**	**6.8200e-003**	**0.1579**		**924.9124**	**924.9124**	**0.0658**		**926.5566**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3007	0.0000	0.3007	0.0338	0.0000	0.0338			0.0000			0.0000
Off-Road	3.9390	44.1140	28.5807	0.0710		1.7554	1.7554		1.6149	1.6149	0.0000	6,878.7072	6,878.7072	2.2247		6,934.3250
Total	**3.9390**	**44.1140**	**28.5807**	**0.0710**	**0.3007**	**1.7554**	**2.0560**	**0.0338**	**1.6149**	**1.6488**	**0.0000**	**6,878.7072**	**6,878.7072**	**2.2247**		**6,934.3250**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0429	1.4152	0.3957	4.4700e-003	0.2362	4.0600e-003	0.2403	0.0610	3.8800e-003	0.0649		491.1016	491.1016	0.0457		492.2438
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.1338	0.0828	0.8329	2.6600e-003	0.2957	2.0000e-003	0.2977	0.0784	1.8400e-003	0.0803		265.1492	265.1492	7.2400e-003		265.3302
Total	**0.1945**	**2.0735**	**1.3927**	**8.7000e-003**	**0.5725**	**7.2100e-003**	**0.5798**	**0.1511**	**6.8200e-003**	**0.1579**		**924.9124**	**924.9124**	**0.0658**		**926.5566**

3.3 Grading/Excavation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7709	0.0000	0.7709	0.0868	0.0000	0.0868			0.0000			0.0000
Off-Road	3.6703	39.2896	27.8561	0.0710		1.5749	1.5749		1.4489	1.4489		6,876.4237	6,876.4237	2.2240		6,932.0231
Total	**3.6703**	**39.2896**	**27.8561**	**0.0710**	**0.7709**	**1.5749**	**2.3458**	**0.0868**	**1.4489**	**1.5357**		**6,876.4237**	**6,876.4237**	**2.2240**		**6,932.0231**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0307	0.9722	0.3678	4.3000e-003	0.1523	1.8500e-003	0.1541	0.0404	1.7700e-003	0.0421		474.4570	474.4570	0.0435		475.5450
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.1271	0.0756	0.7720	2.5600e-003	0.2957	1.9600e-003	0.2977	0.0784	1.8000e-003	0.0803		255.0226	255.0226	6.6200e-003		255.1881
Total	**0.1715**	**1.5003**	**1.2880**	**8.3800e-003**	**0.4886**	**4.3800e-003**	**0.4930**	**0.1305**	**4.1100e-003**	**0.1346**		**893.9213**	**893.9213**	**0.0618**		**895.4669**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3007	0.0000	0.3007	0.0338	0.0000	0.0338			0.0000			0.0000
Off-Road	3.6703	39.2896	27.8561	0.0710		1.5749	1.5749		1.4489	1.4489	0.0000	6,876.4237	6,876.4237	2.2240		6,932.0231
Total	**3.6703**	**39.2896**	**27.8561**	**0.0710**	**0.3007**	**1.5749**	**1.8755**	**0.0338**	**1.4489**	**1.4827**	**0.0000**	**6,876.4237**	**6,876.4237**	**2.2240**		**6,932.0231**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0307	0.9722	0.3678	4.3000e-003	0.1523	1.8500e-003	0.1541	0.0404	1.7700e-003	0.0421		474.4570	474.4570	0.0435		475.5450
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.1271	0.0756	0.7720	2.5600e-003	0.2957	1.9600e-003	0.2977	0.0784	1.8000e-003	0.0803		255.0226	255.0226	6.6200e-003		255.1881
Total	**0.1715**	**1.5003**	**1.2880**	**8.3800e-003**	**0.4886**	**4.3800e-003**	**0.4930**	**0.1305**	**4.1100e-003**	**0.1346**		**893.9213**	**893.9213**	**0.0618**		**895.4669**

3.4 Sewer Line Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5334	5.1785	7.3534	0.0109		0.2755	0.2755		0.2535	0.2535		1,055.3580	1,055.3580	0.3413		1,063.8911
Total	**0.5334**	**5.1785**	**7.3534**	**0.0109**		**0.2755**	**0.2755**		**0.2535**	**0.2535**		**1,055.3580**	**1,055.3580**	**0.3413**		**1,063.8911**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.0446	0.0276	0.2776	8.9000e-004	0.0986	6.7000e-004	0.0992	0.0262	6.1000e-004	0.0268		88.3831	88.3831	2.4100e-003		88.4434
Total	**0.0624**	**0.6030**	**0.4418**	**2.4600e-003**	**0.1392**	**1.8200e-003**	**0.1410**	**0.0378**	**1.7100e-003**	**0.0396**		**257.0446**	**257.0446**	**0.0153**		**257.4260**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5334	5.1785	7.3534	0.0109		0.2755	0.2755		0.2535	0.2535	0.0000	1,055.3580	1,055.3580	0.3413		1,063.8911
Total	**0.5334**	**5.1785**	**7.3534**	**0.0109**		**0.2755**	**0.2755**		**0.2535**	**0.2535**	**0.0000**	**1,055.3580**	**1,055.3580**	**0.3413**		**1,063.8911**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0178	0.5754	0.1642	1.5700e-003	0.0406	1.1500e-003	0.0418	0.0117	1.1000e-003	0.0128		168.6616	168.6616	0.0128		168.9826
Worker	0.0446	0.0276	0.2776	8.9000e-004	0.0986	6.7000e-004	0.0992	0.0262	6.1000e-004	0.0268		88.3831	88.3831	2.4100e-003		88.4434
Total	**0.0624**	**0.6030**	**0.4418**	**2.4600e-003**	**0.1392**	**1.8200e-003**	**0.1410**	**0.0378**	**1.7100e-003**	**0.0396**		**257.0446**	**257.0446**	**0.0153**		**257.4260**

3.4 Sewer Line Installation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4938	4.6944	7.3413	0.0109		0.2402	0.2402		0.2210	0.2210		1,055.7898	1,055.7898	0.3415		1,064.3264
Total	**0.4938**	**4.6944**	**7.3413**	**0.0109**		**0.2402**	**0.2402**		**0.2210**	**0.2210**		**1,055.7898**	**1,055.7898**	**0.3415**		**1,064.3264**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0424	0.0252	0.2573	8.5000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		85.0075	85.0075	2.2100e-003		85.0627
Total	**0.0561**	**0.4777**	**0.4056**	**2.3700e-003**	**0.1392**	**1.2200e-003**	**0.1404**	**0.0378**	**1.1400e-003**	**0.0390**		**249.4491**	**249.4491**	**0.0139**		**249.7965**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4938	4.6944	7.3413	0.0109		0.2402	0.2402		0.2210	0.2210	0.0000	1,055.7898	1,055.7898	0.3415		1,064.3264
Total	**0.4938**	**4.6944**	**7.3413**	**0.0109**		**0.2402**	**0.2402**		**0.2210**	**0.2210**	**0.0000**	**1,055.7898**	**1,055.7898**	**0.3415**		**1,064.3264**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0424	0.0252	0.2573	8.5000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		85.0075	85.0075	2.2100e-003		85.0627
Total	**0.0561**	**0.4777**	**0.4056**	**2.3700e-003**	**0.1392**	**1.2200e-003**	**0.1404**	**0.0378**	**1.1400e-003**	**0.0390**		**249.4491**	**249.4491**	**0.0139**		**249.7965**

3.5 Drainage/Utilities/Subgrade - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1669	10.5956	15.0095	0.0230		0.5260	0.5260		0.5017	0.5017		2,204.6046	2,204.6046	0.4400		2,215.6047
Total	**1.1669**	**10.5956**	**15.0095**	**0.0230**		**0.5260**	**0.5260**		**0.5017**	**0.5017**		**2,204.6046**	**2,204.6046**	**0.4400**		**2,215.6047**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0847	0.0504	0.5147	1.7100e-003	0.1972	1.3100e-003	0.1985	0.0523	1.2000e-003	0.0535		170.0151	170.0151	4.4100e-003		170.1254
Total	**0.0984**	**0.5029**	**0.6629**	**3.2300e-003**	**0.2378**	**1.8800e-003**	**0.2396**	**0.0640**	**1.7400e-003**	**0.0657**		**334.4567**	**334.4567**	**0.0161**		**334.8592**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1669	10.5956	15.0095	0.0230		0.5260	0.5260		0.5017	0.5017	0.0000	2,204.6046	2,204.6046	0.4400		2,215.6047
Total	**1.1669**	**10.5956**	**15.0095**	**0.0230**		**0.5260**	**0.5260**		**0.5017**	**0.5017**	**0.0000**	**2,204.6046**	**2,204.6046**	**0.4400**		**2,215.6047**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0847	0.0504	0.5147	1.7100e-003	0.1972	1.3100e-003	0.1985	0.0523	1.2000e-003	0.0535		170.0151	170.0151	4.4100e-003		170.1254
Total	**0.0984**	**0.5029**	**0.6629**	**3.2300e-003**	**0.2378**	**1.8800e-003**	**0.2396**	**0.0640**	**1.7400e-003**	**0.0657**		**334.4567**	**334.4567**	**0.0161**		**334.8592**

3.6 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5232	14.2188	15.8156	0.0271		0.7116	0.7116		0.6725	0.6725		2,604.3634	2,604.3634	0.5693		2,618.5957
Total	**1.5232**	**14.2188**	**15.8156**	**0.0271**		**0.7116**	**0.7116**		**0.6725**	**0.6725**		**2,604.3634**	**2,604.3634**	**0.5693**		**2,618.5957**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0192	0.6085	0.2302	2.6900e-003	0.0730	1.1600e-003	0.0742	0.0198	1.1100e-003	0.0209		296.9949	296.9949	0.0272		297.6760
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.1129	0.0672	0.6862	2.2700e-003	0.2629	1.7400e-003	0.2646	0.0697	1.6000e-003	0.0713		226.6868	226.6868	5.8800e-003		226.8338
Total	**0.1459**	**1.1282**	**1.0647**	**6.4800e-003**	**0.3765**	**3.4700e-003**	**0.3800**	**0.1012**	**3.2500e-003**	**0.1045**		**688.1233**	**688.1233**	**0.0448**		**689.2436**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5232	14.2188	15.8156	0.0271		0.7116	0.7116		0.6725	0.6725	0.0000	2,604.3634	2,604.3634	0.5693		2,618.5957
Total	**1.5232**	**14.2188**	**15.8156**	**0.0271**		**0.7116**	**0.7116**		**0.6725**	**0.6725**	**0.0000**	**2,604.3634**	**2,604.3634**	**0.5693**		**2,618.5957**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0192	0.6085	0.2302	2.6900e-003	0.0730	1.1600e-003	0.0742	0.0198	1.1100e-003	0.0209		296.9949	296.9949	0.0272		297.6760
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.1129	0.0672	0.6862	2.2700e-003	0.2629	1.7400e-003	0.2646	0.0697	1.6000e-003	0.0713		226.6868	226.6868	5.8800e-003		226.8338
Total	**0.1459**	**1.1282**	**1.0647**	**6.4800e-003**	**0.3765**	**3.4700e-003**	**0.3800**	**0.1012**	**3.2500e-003**	**0.1045**		**688.1233**	**688.1233**	**0.0448**		**689.2436**

3.6 Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4283	13.2210	15.7412	0.0271		0.6238	0.6238		0.5892	0.5892		2,604.7319	2,604.7319	0.5659		2,618.8794
Total	**1.4283**	**13.2210**	**15.7412**	**0.0271**		**0.6238**	**0.6238**		**0.5892**	**0.5892**		**2,604.7319**	**2,604.7319**	**0.5659**		**2,618.8794**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0189	0.5931	0.2321	2.6700e-003	0.3930	1.1300e-003	0.3942	0.0983	1.0800e-003	0.0994		294.9533	294.9533	0.0274		295.6370
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.1076	0.0616	0.6406	2.1800e-003	0.2629	1.7100e-003	0.2646	0.0697	1.5700e-003	0.0713		217.7638	217.7638	5.4000e-003		217.8988
Total	**0.1397**	**1.1010**	**1.0162**	**6.3600e-003**	**0.6965**	**3.3900e-003**	**0.6999**	**0.1798**	**3.1700e-003**	**0.1830**		**676.1312**	**676.1312**	**0.0443**		**677.2384**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4283	13.2210	15.7412	0.0271		0.6238	0.6238		0.5892	0.5892	0.0000	2,604.7319	2,604.7319	0.5659		2,618.8794
Total	**1.4283**	**13.2210**	**15.7412**	**0.0271**		**0.6238**	**0.6238**		**0.5892**	**0.5892**	**0.0000**	**2,604.7319**	**2,604.7319**	**0.5659**		**2,618.8794**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0189	0.5931	0.2321	2.6700e-003	0.3930	1.1300e-003	0.3942	0.0983	1.0800e-003	0.0994		294.9533	294.9533	0.0274		295.6370
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.1076	0.0616	0.6406	2.1800e-003	0.2629	1.7100e-003	0.2646	0.0697	1.5700e-003	0.0713		217.7638	217.7638	5.4000e-003		217.8988
Total	**0.1397**	**1.1010**	**1.0162**	**6.3600e-003**	**0.6965**	**3.3900e-003**	**0.6999**	**0.1798**	**3.1700e-003**	**0.1830**		**676.1312**	**676.1312**	**0.0443**		**677.2384**

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5164	5.0958	7.2921	0.0114		0.2551	0.2551		0.2347	0.2347		1,103.7921	1,103.7921	0.3570		1,112.7168
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6916**	**5.0958**	**7.2921**	**0.0114**		**0.2551**	**0.2551**		**0.2347**	**0.2347**		**1,103.7921**	**1,103.7921**	**0.3570**		**1,112.7168**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0424	0.0252	0.2573	8.5000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		85.0075	85.0075	2.2100e-003		85.0627
Total	**0.0561**	**0.4777**	**0.4056**	**2.3700e-003**	**0.1392**	**1.2200e-003**	**0.1404**	**0.0378**	**1.1400e-003**	**0.0390**		**249.4491**	**249.4491**	**0.0139**		**249.7965**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5164	5.0958	7.2921	0.0114		0.2551	0.2551		0.2347	0.2347	0.0000	1,103.7921	1,103.7921	0.3570		1,112.7168
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6916**	**5.0958**	**7.2921**	**0.0114**		**0.2551**	**0.2551**		**0.2347**	**0.2347**	**0.0000**	**1,103.7921**	**1,103.7921**	**0.3570**		**1,112.7168**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0424	0.0252	0.2573	8.5000e-004	0.0986	6.5000e-004	0.0992	0.0262	6.0000e-004	0.0268		85.0075	85.0075	2.2100e-003		85.0627
Total	**0.0561**	**0.4777**	**0.4056**	**2.3700e-003**	**0.1392**	**1.2200e-003**	**0.1404**	**0.0378**	**1.1400e-003**	**0.0390**		**249.4491**	**249.4491**	**0.0139**		**249.7965**

3.7 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4941	4.7623	7.3129	0.0114		0.2343	0.2343		0.2155	0.2155		1,103.7736	1,103.7736	0.3570		1,112.6982
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6693**	**4.7623**	**7.3129**	**0.0114**		**0.2343**	**0.2343**		**0.2155**	**0.2155**		**1,103.7736**	**1,103.7736**	**0.3570**		**1,112.6982**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.0404	0.0231	0.2402	8.2000e-004	0.0986	6.4000e-004	0.0992	0.0262	5.9000e-004	0.0267		81.6614	81.6614	2.0300e-003		81.7121
Total	**0.0536**	**0.4693**	**0.3838**	**2.3300e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**245.0756**	**245.0756**	**0.0136**		**245.4146**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4941	4.7623	7.3129	0.0114		0.2343	0.2343		0.2155	0.2155	0.0000	1,103.7736	1,103.7736	0.3570		1,112.6982
Paving	0.1753					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6693**	**4.7623**	**7.3129**	**0.0114**		**0.2343**	**0.2343**		**0.2155**	**0.2155**	**0.0000**	**1,103.7736**	**1,103.7736**	**0.3570**		**1,112.6982**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.0404	0.0231	0.2402	8.2000e-004	0.0986	6.4000e-004	0.0992	0.0262	5.9000e-004	0.0267		81.6614	81.6614	2.0300e-003		81.7121
Total	**0.0536**	**0.4693**	**0.3838**	**2.3300e-003**	**0.1392**	**1.1900e-003**	**0.1404**	**0.0378**	**1.1100e-003**	**0.0390**		**245.0756**	**245.0756**	**0.0136**		**245.4146**

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944		375.2641	375.2641	0.0225		375.8253
Total	**12.5555**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**		**375.2641**	**375.2641**	**0.0225**		**375.8253**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0141	8.4000e-003	0.0858	2.8000e-004	0.0329	2.2000e-004	0.0331	8.7200e-003	2.0000e-004	8.9200e-003		28.3359	28.3359	7.4000e-004		28.3542
Total	**0.0279**	**0.4609**	**0.2341**	**1.8000e-003**	**0.0735**	**7.9000e-004**	**0.0743**	**0.0204**	**7.4000e-004**	**0.0212**		**192.7775**	**192.7775**	**0.0124**		**193.0881**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944	0.0000	375.2641	375.2641	0.0225		375.8253
Total	**12.5555**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**	**0.0000**	**375.2641**	**375.2641**	**0.0225**		**375.8253**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.4525	0.1483	1.5200e-003	0.0406	5.7000e-004	0.0412	0.0117	5.4000e-004	0.0122		164.4416	164.4416	0.0117		164.7338
Worker	0.0141	8.4000e-003	0.0858	2.8000e-004	0.0329	2.2000e-004	0.0331	8.7200e-003	2.0000e-004	8.9200e-003		28.3359	28.3359	7.4000e-004		28.3542
Total	**0.0279**	**0.4609**	**0.2341**	**1.8000e-003**	**0.0735**	**7.9000e-004**	**0.0743**	**0.0204**	**7.4000e-004**	**0.0212**		**192.7775**	**192.7775**	**0.0124**		**193.0881**

3.8 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2410	1.6251	2.4135	3.9600e-003		0.0812	0.0812		0.0812	0.0812		375.2641	375.2641	0.0211		375.7923
Total	**12.5410**	**1.6251**	**2.4135**	**3.9600e-003**		**0.0812**	**0.0812**		**0.0812**	**0.0812**		**375.2641**	**375.2641**	**0.0211**		**375.7923**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.0135	7.7000e-003	0.0801	2.7000e-004	0.0329	2.1000e-004	0.0331	8.7200e-003	2.0000e-004	8.9100e-003		27.2205	27.2205	6.8000e-004		27.2374
Total	**0.0267**	**0.4539**	**0.2236**	**1.7800e-003**	**0.0735**	**7.6000e-004**	**0.0742**	**0.0204**	**7.2000e-004**	**0.0211**		**190.6346**	**190.6346**	**0.0122**		**190.9399**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	12.3000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2410	1.6251	2.4135	3.9600e-003		0.0812	0.0812		0.0812	0.0812	0.0000	375.2641	375.2641	0.0211		375.7923
Total	**12.5410**	**1.6251**	**2.4135**	**3.9600e-003**		**0.0812**	**0.0812**		**0.0812**	**0.0812**	**0.0000**	**375.2641**	**375.2641**	**0.0211**		**375.7923**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0132	0.4462	0.1436	1.5100e-003	0.0406	5.5000e-004	0.0412	0.0117	5.2000e-004	0.0122		163.4141	163.4141	0.0115		163.7026
Worker	0.0135	7.7000e-003	0.0801	2.7000e-004	0.0329	2.1000e-004	0.0331	8.7200e-003	2.0000e-004	8.9100e-003		27.2205	27.2205	6.8000e-004		27.2374
Total	**0.0267**	**0.4539**	**0.2236**	**1.7800e-003**	**0.0735**	**7.6000e-004**	**0.0742**	**0.0204**	**7.2000e-004**	**0.0211**		**190.6346**	**190.6346**	**0.0122**		**190.9399**

Construction Emissions

Construction Year	$MTCO_2e$/year
2022	285
2023	798
2024	55
Total	**1,137**
30-year Amortization	**38**

Alpine Park Project-Construction

San Diego County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2023
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Health club land used was used to represent park amenities that include buidlings.

Trips and VMT - Water trucks included for dust control.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	7320	2570
tblAreaCoating	Area_Nonresidential_Interior	21960	7710
tblConstructionPhase	NumDays	440.00	174.00
tblConstructionPhase	NumDays	440.00	89.00
tblConstructionPhase	NumDays	440.00	175.00
tblConstructionPhase	NumDays	45.00	173.00
tblConstructionPhase	NumDays	35.00	45.00
tblConstructionPhase	NumDays	20.00	10.00
tblFleetMix	HHD	0.02	0.00
tblFleetMix	LDA	0.60	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.18	0.00
tblFleetMix	LHD1	0.01	0.00
tblFleetMix	LHD2	5.4350e-003	0.00
tblFleetMix	MCY	5.9380e-003	0.00
tblFleetMix	MDV	0.10	0.00
tblFleetMix	MH	1.0560e-003	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.9340e-003	0.00
tblFleetMix	SBUS	7.5700e-004	0.00
tblFleetMix	UBUS	1.8880e-003	0.00
tblGrading	AcresOfGrading	605.50	112.50
tblGrading	MaterialExported	0.00	45,900.00
tblGrading	MaterialImported	0.00	54,144.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	1.94	1.95
tblTripsAndVMT	HaulingTripNumber	12,506.00	1,036.00
tblTripsAndVMT	HaulingTripNumber	0.00	656.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	184.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripNumber	10.00	16.00
tblTripsAndVMT	WorkerTripNumber	23.00	36.00
tblTripsAndVMT	WorkerTripNumber	471.00	12.00
tblTripsAndVMT	WorkerTripNumber	471.00	24.00
tblTripsAndVMT	WorkerTripNumber	471.00	32.00
tblTripsAndVMT	WorkerTripNumber	8.00	12.00
tblTripsAndVMT	WorkerTripNumber	94.00	4.00
tblWater	OutdoorWaterUseRate	26,867,904.43	27,070,456.26

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1617	1.7920	1.2802	3.1900e-003	0.0981	0.0701	0.1682	0.0146	0.0645	0.0791	0.0000	283.0933	283.0933	0.0821	0.0000	285.1469
2023	0.5016	4.2213	4.0748	8.9300e-003	0.1401	0.1797	0.3198	0.0273	0.1675	0.1948	0.0000	792.7016	792.7016	0.1941	0.0000	797.5532
2024	0.1706	0.2490	0.3113	6.1000e-004	0.0102	0.0109	0.0211	2.6700e-003	0.0103	0.0129	0.0000	54.3472	54.3472	0.0106	0.0000	54.6113
Maximum	**0.5016**	**4.2213**	**4.0748**	**8.9300e-003**	**0.1401**	**0.1797**	**0.3198**	**0.0273**	**0.1675**	**0.1948**	**0.0000**	**792.7016**	**792.7016**	**0.1941**	**0.0000**	**797.5532**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1617	1.7920	1.2802	3.1900e-003	0.0525	0.0701	0.1227	9.5000e-003	0.0645	0.0740	0.0000	283.0930	283.0930	0.0821	0.0000	285.1466
2023	0.5016	4.2213	4.0748	8.9300e-003	0.0994	0.1797	0.2791	0.0227	0.1675	0.1902	0.0000	792.7008	792.7008	0.1941	0.0000	797.5524
2024	0.1706	0.2490	0.3113	6.1000e-004	0.0102	0.0109	0.0211	2.6700e-003	0.0103	0.0129	0.0000	54.3471	54.3471	0.0106	0.0000	54.6113
Maximum	**0.5016**	**4.2213**	**4.0748**	**8.9300e-003**	**0.0994**	**0.1797**	**0.2791**	**0.0227**	**0.1675**	**0.1902**	**0.0000**	**792.7008**	**792.7008**	**0.1941**	**0.0000**	**797.5524**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**34.71**	**0.00**	**16.94**	**21.73**	**0.00**	**3.38**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
3	**7-3-2022**	**10-2-2022**	0.0563	0.0563
4	**10-3-2022**	**1-2-2023**	1.9613	1.9613
5	**1-3-2023**	**4-2-2023**	1.6185	1.6185
6	**4-3-2023**	**7-2-2023**	1.5344	1.5344
7	**7-3-2023**	**10-2-2023**	0.8230	0.8230
8	**10-3-2023**	**1-2-2024**	0.7403	0.7403
9	**1-3-2024**	**4-2-2024**	0.3779	0.3779
		Highest	1.9613	1.9613

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grubbing/Land Clearing	Site Preparation	10/1/2022	10/15/2022	5	10	
2	Grading/Excavation	Grading	10/1/2022	5/31/2023	5	173	
3	Sewer Line Installation	Building Construction	10/1/2022	6/1/2023	5	174	
4	Drainage/Utilities/Subgrade	Building Construction	5/1/2023	8/31/2023	5	89	
5	Construction	Building Construction	6/1/2023	1/31/2024	5	175	
6	Paving	Paving	11/30/2023	1/31/2024	5	45	
7	Architectural Coating	Architectural Coating	12/14/2023	1/31/2024	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.01

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 21,960; Non-Residential Outdoor: 7,320; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grubbing/Land Clearing	Crawler Tractors	3	8.00	212	0.43
Grubbing/Land Clearing	Excavators	1	8.00	158	0.38
Grading/Excavation	Crawler Tractors	3	8.00	212	0.43
Grading/Excavation	Excavators	1	8.00	158	0.38
Grading/Excavation	Rollers	1	8.00	80	0.38
Grading/Excavation	Rubber Tired Loaders	1	8.00	203	0.36
Grading/Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading/Excavation	Scrapers	2	8.00	367	0.48
Drainage/Utilities/Subgrade	Air Compressors	1	8.00	78	0.48
Drainage/Utilities/Subgrade	Generator Sets	1	8.00	84	0.74
Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	4	8.00	97	0.37

Sewer Line Installation	Excavators	1	8.00	158	0.38
Sewer Line Installation	Rollers	1	8.00	80	0.38
Sewer Line Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Construction	Air Compressors	1	8.00	78	0.48
Construction	Cranes	1	8.00	231	0.29
Construction	Forklifts	3	8.00	89	0.20
Construction	Generator Sets	1	8.00	84	0.74
Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grubbing/Land Clearing	4	16.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading/Excavation	9	36.00	6.00	1,036.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Drainage/Utilities/Sub grade	6	24.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Sewer Line Installation	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction	8	32.00	6.00	656.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	12.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grubbing/Land Clearing - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.9500e-003	0.0000	7.9500e-003	8.6000e-004	0.0000	8.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3900e-003	0.0990	0.0510	1.4000e-004		3.8300e-003	3.8300e-003		3.5200e-003	3.5200e-003	0.0000	12.5968	12.5968	4.0700e-003	0.0000	12.6986
Total	**8.3900e-003**	**0.0990**	**0.0510**	**1.4000e-004**	**7.9500e-003**	**3.8300e-003**	**0.0118**	**8.6000e-004**	**3.5200e-003**	**4.3800e-003**	**0.0000**	**12.5968**	**12.5968**	**4.0700e-003**	**0.0000**	**12.6986**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	2.9100e-003	7.8000e-004	1.0000e-005	2.0000e-004	1.0000e-005	2.0000e-004	6.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7769	0.7769	6.0000e-005	0.0000	0.7783
Worker	2.6000e-004	1.8000e-004	1.8600e-003	1.0000e-005	6.4000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5399	0.5399	1.0000e-005	0.0000	0.5402
Total	**3.5000e-004**	**3.0900e-003**	**2.6400e-003**	**2.0000e-005**	**8.4000e-004**	**1.0000e-005**	**8.5000e-004**	**2.3000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**1.3168**	**1.3168**	**7.0000e-005**	**0.0000**	**1.3185**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.1000e-003	0.0000	3.1000e-003	3.3000e-004	0.0000	3.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3900e-003	0.0990	0.0510	1.4000e-004		3.8300e-003	3.8300e-003		3.5200e-003	3.5200e-003	0.0000	12.5968	12.5968	4.0700e-003	0.0000	12.6986
Total	**8.3900e-003**	**0.0990**	**0.0510**	**1.4000e-004**	**3.1000e-003**	**3.8300e-003**	**6.9300e-003**	**3.3000e-004**	**3.5200e-003**	**3.8500e-003**	**0.0000**	**12.5968**	**12.5968**	**4.0700e-003**	**0.0000**	**12.6986**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	2.9100e-003	7.8000e-004	1.0000e-005	2.0000e-004	1.0000e-005	2.0000e-004	6.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7769	0.7769	6.0000e-005	0.0000	0.7783
Worker	2.6000e-004	1.8000e-004	1.8600e-003	1.0000e-005	6.4000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5399	0.5399	1.0000e-005	0.0000	0.5402
Total	**3.5000e-004**	**3.0900e-003**	**2.6400e-003**	**2.0000e-005**	**8.4000e-004**	**1.0000e-005**	**8.5000e-004**	**2.3000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**1.3168**	**1.3168**	**7.0000e-005**	**0.0000**	**1.3185**

3.3 Grading/Excavation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0667	0.0000	0.0667	7.5100e-003	0.0000	7.5100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1280	1.4337	0.9289	2.3100e-003		0.0571	0.0571		0.0525	0.0525	0.0000	202.8084	202.8084	0.0656	0.0000	204.4482
Total	**0.1280**	**1.4337**	**0.9289**	**2.3100e-003**	**0.0667**	**0.0571**	**0.1237**	**7.5100e-003**	**0.0525**	**0.0600**	**0.0000**	**202.8084**	**202.8084**	**0.0656**	**0.0000**	**204.4482**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3700e-003	0.0465	0.0125	1.5000e-004	7.4900e-003	1.3000e-004	7.6200e-003	1.9400e-003	1.2000e-004	2.0600e-003	0.0000	14.6286	14.6286	1.3200e-003	0.0000	14.6617
Vendor	5.6000e-004	0.0189	5.0600e-003	5.0000e-005	1.2900e-003	4.0000e-005	1.3300e-003	3.7000e-004	3.0000e-005	4.1000e-004	0.0000	5.0498	5.0498	3.7000e-004	0.0000	5.0590
Worker	3.8500e-003	2.6500e-003	0.0271	9.0000e-005	9.3800e-003	6.0000e-005	9.4500e-003	2.4900e-003	6.0000e-005	2.5500e-003	0.0000	7.8957	7.8957	2.2000e-004	0.0000	7.9010
Total	**5.7800e-003**	**0.0680**	**0.0447**	**2.9000e-004**	**0.0182**	**2.3000e-004**	**0.0184**	**4.8000e-003**	**2.1000e-004**	**5.0200e-003**	**0.0000**	**27.5740**	**27.5740**	**1.9100e-003**	**0.0000**	**27.6217**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0260	0.0000	0.0260	2.9300e-003	0.0000	2.9300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1280	1.4337	0.9289	2.3100e-003		0.0571	0.0571		0.0525	0.0525	0.0000	202.8082	202.8082	0.0656	0.0000	204.4480
Total	**0.1280**	**1.4337**	**0.9289**	**2.3100e-003**	**0.0260**	**0.0571**	**0.0831**	**2.9300e-003**	**0.0525**	**0.0554**	**0.0000**	**202.8082**	**202.8082**	**0.0656**	**0.0000**	**204.4480**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3700e-003	0.0465	0.0125	1.5000e-004	7.4900e-003	1.3000e-004	7.6200e-003	1.9400e-003	1.2000e-004	2.0600e-003	0.0000	14.6286	14.6286	1.3200e-003	0.0000	14.6617
Vendor	5.6000e-004	0.0189	5.0600e-003	5.0000e-005	1.2900e-003	4.0000e-005	1.3300e-003	3.7000e-004	3.0000e-005	4.1000e-004	0.0000	5.0498	5.0498	3.7000e-004	0.0000	5.0590
Worker	3.8500e-003	2.6500e-003	0.0271	9.0000e-005	9.3800e-003	6.0000e-005	9.4500e-003	2.4900e-003	6.0000e-005	2.5500e-003	0.0000	7.8957	7.8957	2.2000e-004	0.0000	7.9010
Total	**5.7800e-003**	**0.0680**	**0.0447**	**2.9000e-004**	**0.0182**	**2.3000e-004**	**0.0184**	**4.8000e-003**	**2.1000e-004**	**5.0200e-003**	**0.0000**	**27.5740**	**27.5740**	**1.9100e-003**	**0.0000**	**27.6217**

3.3 Grading/Excavation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0667	0.0000	0.0667	7.5100e-003	0.0000	7.5100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1982	2.1216	1.5042	3.8400e-003		0.0850	0.0850		0.0782	0.0782	0.0000	336.8621	336.8621	0.1090	0.0000	339.5858
Total	**0.1982**	**2.1216**	**1.5042**	**3.8400e-003**	**0.0667**	**0.0850**	**0.1517**	**7.5100e-003**	**0.0782**	**0.0858**	**0.0000**	**336.8621**	**336.8621**	**0.1090**	**0.0000**	**339.5858**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.6300e-003	0.0531	0.0194	2.3000e-004	8.0400e-003	1.0000e-004	8.1300e-003	2.1300e-003	9.0000e-005	2.2300e-003	0.0000	23.4817	23.4817	2.1000e-003	0.0000	23.5342
Vendor	7.2000e-004	0.0247	7.6600e-003	8.0000e-005	2.1500e-003	3.0000e-005	2.1800e-003	6.2000e-004	3.0000e-005	6.5000e-004	0.0000	8.1792	8.1792	5.6000e-004	0.0000	8.1931
Worker	6.0600e-003	4.0100e-003	0.0418	1.4000e-004	0.0156	1.1000e-004	0.0157	4.1400e-003	1.0000e-004	4.2400e-003	0.0000	12.6178	12.6178	3.3000e-004	0.0000	12.6260
Total	**8.4100e-003**	**0.0818**	**0.0689**	**4.5000e-004**	**0.0258**	**2.4000e-004**	**0.0260**	**6.8900e-003**	**2.2000e-004**	**7.1200e-003**	**0.0000**	**44.2788**	**44.2788**	**2.9900e-003**	**0.0000**	**44.3534**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0260	0.0000	0.0260	2.9300e-003	0.0000	2.9300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1982	2.1216	1.5042	3.8400e-003		0.0850	0.0850		0.0782	0.0782	0.0000	336.8617	336.8617	0.1090	0.0000	339.5854
Total	**0.1982**	**2.1216**	**1.5042**	**3.8400e-003**	**0.0260**	**0.0850**	**0.1111**	**2.9300e-003**	**0.0782**	**0.0812**	**0.0000**	**336.8617**	**336.8617**	**0.1090**	**0.0000**	**339.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.6300e-003	0.0531	0.0194	2.3000e-004	8.0400e-003	1.0000e-004	8.1300e-003	2.1300e-003	9.0000e-005	2.2300e-003	0.0000	23.4817	23.4817	2.1000e-003	0.0000	23.5342
Vendor	7.2000e-004	0.0247	7.6600e-003	8.0000e-005	2.1500e-003	3.0000e-005	2.1800e-003	6.2000e-004	3.0000e-005	6.5000e-004	0.0000	8.1792	8.1792	5.6000e-004	0.0000	8.1931
Worker	6.0600e-003	4.0100e-003	0.0418	1.4000e-004	0.0156	1.1000e-004	0.0157	4.1400e-003	1.0000e-004	4.2400e-003	0.0000	12.6178	12.6178	3.3000e-004	0.0000	12.6260
Total	**8.4100e-003**	**0.0818**	**0.0689**	**4.5000e-004**	**0.0258**	**2.4000e-004**	**0.0260**	**6.8900e-003**	**2.2000e-004**	**7.1200e-003**	**0.0000**	**44.2788**	**44.2788**	**2.9900e-003**	**0.0000**	**44.3534**

3.4 Sewer Line Installation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0173	0.1683	0.2390	3.5000e-004		8.9500e-003	8.9500e-003		8.2400e-003	8.2400e-003	0.0000	31.1157	31.1157	0.0101	0.0000	31.3672
Total	**0.0173**	**0.1683**	**0.2390**	**3.5000e-004**		**8.9500e-003**	**8.9500e-003**		**8.2400e-003**	**8.2400e-003**	**0.0000**	**31.1157**	**31.1157**	**0.0101**	**0.0000**	**31.3672**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6000e-004	0.0189	5.0600e-003	5.0000e-005	1.2900e-003	4.0000e-005	1.3300e-003	3.7000e-004	3.0000e-005	4.1000e-004	0.0000	5.0498	5.0498	3.7000e-004	0.0000	5.0590
Worker	1.2800e-003	8.8000e-004	9.0500e-003	3.0000e-005	3.1300e-003	2.0000e-005	3.1500e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.6319	2.6319	7.0000e-005	0.0000	2.6337
Total	**1.8400e-003**	**0.0198**	**0.0141**	**8.0000e-005**	**4.4200e-003**	**6.0000e-005**	**4.4800e-003**	**1.2000e-003**	**5.0000e-005**	**1.2600e-003**	**0.0000**	**7.6817**	**7.6817**	**4.4000e-004**	**0.0000**	**7.6927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0173	0.1683	0.2390	3.5000e-004		8.9500e-003	8.9500e-003		8.2400e-003	8.2400e-003	0.0000	31.1156	31.1156	0.0101	0.0000	31.3672
Total	**0.0173**	**0.1683**	**0.2390**	**3.5000e-004**		**8.9500e-003**	**8.9500e-003**		**8.2400e-003**	**8.2400e-003**	**0.0000**	**31.1156**	**31.1156**	**0.0101**	**0.0000**	**31.3672**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6000e-004	0.0189	5.0600e-003	5.0000e-005	1.2900e-003	4.0000e-005	1.3300e-003	3.7000e-004	3.0000e-005	4.1000e-004	0.0000	5.0498	5.0498	3.7000e-004	0.0000	5.0590
Worker	1.2800e-003	8.8000e-004	9.0500e-003	3.0000e-005	3.1300e-003	2.0000e-005	3.1500e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.6319	2.6319	7.0000e-005	0.0000	2.6337
Total	**1.8400e-003**	**0.0198**	**0.0141**	**8.0000e-005**	**4.4200e-003**	**6.0000e-005**	**4.4800e-003**	**1.2000e-003**	**5.0000e-005**	**1.2600e-003**	**0.0000**	**7.6817**	**7.6817**	**4.4000e-004**	**0.0000**	**7.6927**

3.4 Sewer Line Installation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0269	0.2559	0.4001	5.9000e-004		0.0131	0.0131		0.0120	0.0120	0.0000	52.1999	52.1999	0.0169	0.0000	52.6220
Total	**0.0269**	**0.2559**	**0.4001**	**5.9000e-004**		**0.0131**	**0.0131**		**0.0120**	**0.0120**	**0.0000**	**52.1999**	**52.1999**	**0.0169**	**0.0000**	**52.6220**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.3000e-004	0.0249	7.7300e-003	8.0000e-005	2.1700e-003	3.0000e-005	2.2000e-003	6.3000e-004	3.0000e-005	6.6000e-004	0.0000	8.2550	8.2550	5.6000e-004	0.0000	8.2690
Worker	2.0400e-003	1.3500e-003	0.0141	5.0000e-005	5.2400e-003	4.0000e-005	5.2800e-003	1.3900e-003	3.0000e-005	1.4300e-003	0.0000	4.2449	4.2449	1.1000e-004	0.0000	4.2476
Total	**2.7700e-003**	**0.0263**	**0.0218**	**1.3000e-004**	**7.4100e-003**	**7.0000e-005**	**7.4800e-003**	**2.0200e-003**	**6.0000e-005**	**2.0900e-003**	**0.0000**	**12.4998**	**12.4998**	**6.7000e-004**	**0.0000**	**12.5166**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0269	0.2559	0.4001	5.9000e-004		0.0131	0.0131		0.0120	0.0120	0.0000	52.1998	52.1998	0.0169	0.0000	52.6219
Total	**0.0269**	**0.2559**	**0.4001**	**5.9000e-004**		**0.0131**	**0.0131**		**0.0120**	**0.0120**	**0.0000**	**52.1998**	**52.1998**	**0.0169**	**0.0000**	**52.6219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.3000e-004	0.0249	7.7300e-003	8.0000e-005	2.1700e-003	3.0000e-005	2.2000e-003	6.3000e-004	3.0000e-005	6.6000e-004	0.0000	8.2550	8.2550	5.6000e-004	0.0000	8.2690
Worker	2.0400e-003	1.3500e-003	0.0141	5.0000e-005	5.2400e-003	4.0000e-005	5.2800e-003	1.3900e-003	3.0000e-005	1.4300e-003	0.0000	4.2449	4.2449	1.1000e-004	0.0000	4.2476
Total	**2.7700e-003**	**0.0263**	**0.0218**	**1.3000e-004**	**7.4100e-003**	**7.0000e-005**	**7.4800e-003**	**2.0200e-003**	**6.0000e-005**	**2.0900e-003**	**0.0000**	**12.4998**	**12.4998**	**6.7000e-004**	**0.0000**	**12.5166**

3.5 Drainage/Utilities/Subgrade - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0519	0.4715	0.6679	1.0200e-003		0.0234	0.0234		0.0223	0.0223	0.0000	88.9993	88.9993	0.0178	0.0000	89.4433
Total	**0.0519**	**0.4715**	**0.6679**	**1.0200e-003**		**0.0234**	**0.0234**		**0.0223**	**0.0223**	**0.0000**	**88.9993**	**88.9993**	**0.0178**	**0.0000**	**89.4433**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9000e-004	0.0204	6.3100e-003	7.0000e-005	1.7700e-003	2.0000e-005	1.8000e-003	5.1000e-004	2.0000e-005	5.3000e-004	0.0000	6.7403	6.7403	4.6000e-004	0.0000	6.7517
Worker	3.3300e-003	2.2000e-003	0.0230	8.0000e-005	8.5600e-003	6.0000e-005	8.6200e-003	2.2800e-003	5.0000e-005	2.3300e-003	0.0000	6.9320	6.9320	1.8000e-004	0.0000	6.9365
Total	**3.9200e-003**	**0.0226**	**0.0293**	**1.5000e-004**	**0.0103**	**8.0000e-005**	**0.0104**	**2.7900e-003**	**7.0000e-005**	**2.8600e-003**	**0.0000**	**13.6723**	**13.6723**	**6.4000e-004**	**0.0000**	**13.6883**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0519	0.4715	0.6679	1.0200e-003		0.0234	0.0234		0.0223	0.0223	0.0000	88.9992	88.9992	0.0178	0.0000	89.4432
Total	**0.0519**	**0.4715**	**0.6679**	**1.0200e-003**		**0.0234**	**0.0234**		**0.0223**	**0.0223**	**0.0000**	**88.9992**	**88.9992**	**0.0178**	**0.0000**	**89.4432**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9000e-004	0.0204	6.3100e-003	7.0000e-005	1.7700e-003	2.0000e-005	1.8000e-003	5.1000e-004	2.0000e-005	5.3000e-004	0.0000	6.7403	6.7403	4.6000e-004	0.0000	6.7517
Worker	3.3300e-003	2.2000e-003	0.0230	8.0000e-005	8.5600e-003	6.0000e-005	8.6200e-003	2.2800e-003	5.0000e-005	2.3300e-003	0.0000	6.9320	6.9320	1.8000e-004	0.0000	6.9365
Total	**3.9200e-003**	**0.0226**	**0.0293**	**1.5000e-004**	**0.0103**	**8.0000e-005**	**0.0104**	**2.7900e-003**	**7.0000e-005**	**2.8600e-003**	**0.0000**	**13.6723**	**13.6723**	**6.4000e-004**	**0.0000**	**13.6883**

3.6 Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1158	1.0806	1.2020	2.0600e-003		0.0541	0.0541		0.0511	0.0511	0.0000	179.5605	179.5605	0.0393	0.0000	180.5418
Total	**0.1158**	**1.0806**	**1.2020**	**2.0600e-003**		**0.0541**	**0.0541**		**0.0511**	**0.0511**	**0.0000**	**179.5605**	**179.5605**	**0.0393**	**0.0000**	**180.5418**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0467	0.0171	2.1000e-004	5.4300e-003	9.0000e-005	5.5200e-003	1.4700e-003	8.0000e-005	1.5600e-003	0.0000	20.6872	20.6872	1.8500e-003	0.0000	20.7335
Vendor	1.0100e-003	0.0348	0.0108	1.2000e-004	3.0300e-003	4.0000e-005	3.0700e-003	8.7000e-004	4.0000e-005	9.1000e-004	0.0000	11.5115	11.5115	7.8000e-004	0.0000	11.5311
Worker	7.5800e-003	5.0200e-003	0.0523	1.7000e-004	0.0195	1.3000e-004	0.0196	5.1800e-003	1.2000e-004	5.3000e-003	0.0000	15.7853	15.7853	4.1000e-004	0.0000	15.7955
Total	**0.0100**	**0.0865**	**0.0802**	**5.0000e-004**	**0.0280**	**2.6000e-004**	**0.0282**	**7.5200e-003**	**2.4000e-004**	**7.7700e-003**	**0.0000**	**47.9840**	**47.9840**	**3.0400e-003**	**0.0000**	**48.0600**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1158	1.0806	1.2020	2.0600e-003		0.0541	0.0541		0.0511	0.0511	0.0000	179.5603	179.5603	0.0393	0.0000	180.5416
Total	**0.1158**	**1.0806**	**1.2020**	**2.0600e-003**		**0.0541**	**0.0541**		**0.0511**	**0.0511**	**0.0000**	**179.5603**	**179.5603**	**0.0393**	**0.0000**	**180.5416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4400e-003	0.0467	0.0171	2.1000e-004	5.4300e-003	9.0000e-005	5.5200e-003	1.4700e-003	8.0000e-005	1.5600e-003	0.0000	20.6872	20.6872	1.8500e-003	0.0000	20.7335
Vendor	1.0100e-003	0.0348	0.0108	1.2000e-004	3.0300e-003	4.0000e-005	3.0700e-003	8.7000e-004	4.0000e-005	9.1000e-004	0.0000	11.5115	11.5115	7.8000e-004	0.0000	11.5311
Worker	7.5800e-003	5.0200e-003	0.0523	1.7000e-004	0.0195	1.3000e-004	0.0196	5.1800e-003	1.2000e-004	5.3000e-003	0.0000	15.7853	15.7853	4.1000e-004	0.0000	15.7955
Total	**0.0100**	**0.0865**	**0.0802**	**5.0000e-004**	**0.0280**	**2.6000e-004**	**0.0282**	**7.5200e-003**	**2.4000e-004**	**7.7700e-003**	**0.0000**	**47.9840**	**47.9840**	**3.0400e-003**	**0.0000**	**48.0600**

3.6 Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0164	0.1520	0.1810	3.1000e-004		7.1700e-003	7.1700e-003		6.7800e-003	6.7800e-003	0.0000	27.1742	27.1742	5.9000e-003	0.0000	27.3218
Total	**0.0164**	**0.1520**	**0.1810**	**3.1000e-004**		**7.1700e-003**	**7.1700e-003**		**6.7800e-003**	**6.7800e-003**	**0.0000**	**27.1742**	**27.1742**	**5.9000e-003**	**0.0000**	**27.3218**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.1000e-004	6.8900e-003	2.6100e-003	3.0000e-005	4.4000e-003	1.0000e-005	4.4100e-003	1.1000e-003	1.0000e-005	1.1100e-003	0.0000	3.1086	3.1086	2.8000e-004	0.0000	3.1156
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	1.0900e-003	7.0000e-004	7.3900e-003	3.0000e-005	2.9500e-003	2.0000e-005	2.9700e-003	7.8000e-004	2.0000e-005	8.0000e-004	0.0000	2.2945	2.2945	6.0000e-005	0.0000	2.2960
Total	**1.4500e-003**	**0.0128**	**0.0116**	**8.0000e-005**	**7.8100e-003**	**4.0000e-005**	**7.8400e-003**	**2.0100e-003**	**4.0000e-005**	**2.0500e-003**	**0.0000**	**7.1339**	**7.1339**	**4.6000e-004**	**0.0000**	**7.1453**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0164	0.1520	0.1810	3.1000e-004		7.1700e-003	7.1700e-003		6.7800e-003	6.7800e-003	0.0000	27.1742	27.1742	5.9000e-003	0.0000	27.3218
Total	**0.0164**	**0.1520**	**0.1810**	**3.1000e-004**		**7.1700e-003**	**7.1700e-003**		**6.7800e-003**	**6.7800e-003**	**0.0000**	**27.1742**	**27.1742**	**5.9000e-003**	**0.0000**	**27.3218**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.1000e-004	6.8900e-003	2.6100e-003	3.0000e-005	4.4000e-003	1.0000e-005	4.4100e-003	1.1000e-003	1.0000e-005	1.1100e-003	0.0000	3.1086	3.1086	2.8000e-004	0.0000	3.1156
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	1.0900e-003	7.0000e-004	7.3900e-003	3.0000e-005	2.9500e-003	2.0000e-005	2.9700e-003	7.8000e-004	2.0000e-005	8.0000e-004	0.0000	2.2945	2.2945	6.0000e-005	0.0000	2.2960
Total	**1.4500e-003**	**0.0128**	**0.0116**	**8.0000e-005**	**7.8100e-003**	**4.0000e-005**	**7.8400e-003**	**2.0100e-003**	**4.0000e-005**	**2.0500e-003**	**0.0000**	**7.1339**	**7.1339**	**4.6000e-004**	**0.0000**	**7.1453**

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6800e-003	0.0561	0.0802	1.3000e-004		2.8100e-003	2.8100e-003		2.5800e-003	2.5800e-003	0.0000	11.0148	11.0148	3.5600e-003	0.0000	11.1038
Paving	1.9300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6100e-003**	**0.0561**	**0.0802**	**1.3000e-004**		**2.8100e-003**	**2.8100e-003**		**2.5800e-003**	**2.5800e-003**	**0.0000**	**11.0148**	**11.0148**	**3.5600e-003**	**0.0000**	**11.1038**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.0300e-003	1.5600e-003	2.0000e-005	4.4000e-004	1.0000e-005	4.4000e-004	1.3000e-004	1.0000e-005	1.3000e-004	0.0000	1.6661	1.6661	1.1000e-004	0.0000	1.6690
Worker	4.1000e-004	2.7000e-004	2.8400e-003	1.0000e-005	1.0600e-003	1.0000e-005	1.0700e-003	2.8000e-004	1.0000e-005	2.9000e-004	0.0000	0.8568	0.8568	2.0000e-005	0.0000	0.8573
Total	**5.6000e-004**	**5.3000e-003**	**4.4000e-003**	**3.0000e-005**	**1.5000e-003**	**2.0000e-005**	**1.5100e-003**	**4.1000e-004**	**2.0000e-005**	**4.2000e-004**	**0.0000**	**2.5229**	**2.5229**	**1.3000e-004**	**0.0000**	**2.5263**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6800e-003	0.0561	0.0802	1.3000e-004		2.8100e-003	2.8100e-003		2.5800e-003	2.5800e-003	0.0000	11.0148	11.0148	3.5600e-003	0.0000	11.1038
Paving	1.9300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.6100e-003**	**0.0561**	**0.0802**	**1.3000e-004**		**2.8100e-003**	**2.8100e-003**		**2.5800e-003**	**2.5800e-003**	**0.0000**	**11.0148**	**11.0148**	**3.5600e-003**	**0.0000**	**11.1038**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.0300e-003	1.5600e-003	2.0000e-005	4.4000e-004	1.0000e-005	4.4000e-004	1.3000e-004	1.0000e-005	1.3000e-004	0.0000	1.6661	1.6661	1.1000e-004	0.0000	1.6690
Worker	4.1000e-004	2.7000e-004	2.8400e-003	1.0000e-005	1.0600e-003	1.0000e-005	1.0700e-003	2.8000e-004	1.0000e-005	2.9000e-004	0.0000	0.8568	0.8568	2.0000e-005	0.0000	0.8573
Total	**5.6000e-004**	**5.3000e-003**	**4.4000e-003**	**3.0000e-005**	**1.5000e-003**	**2.0000e-005**	**1.5100e-003**	**4.1000e-004**	**2.0000e-005**	**4.2000e-004**	**0.0000**	**2.5229**	**2.5229**	**1.3000e-004**	**0.0000**	**2.5263**

3.7 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6800e-003	0.0548	0.0841	1.3000e-004		2.6900e-003	2.6900e-003		2.4800e-003	2.4800e-003	0.0000	11.5153	11.5153	3.7200e-003	0.0000	11.6084
Paving	2.0200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.7000e-003**	**0.0548**	**0.0841**	**1.3000e-004**		**2.6900e-003**	**2.6900e-003**		**2.4800e-003**	**2.4800e-003**	**0.0000**	**11.5153**	**11.5153**	**3.7200e-003**	**0.0000**	**11.6084**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	4.1000e-004	2.6000e-004	2.7700e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.8605	0.8605	2.0000e-005	0.0000	0.8610
Total	**5.6000e-004**	**5.4500e-003**	**4.3500e-003**	**3.0000e-005**	**1.5700e-003**	**2.0000e-005**	**1.5700e-003**	**4.2000e-004**	**2.0000e-005**	**4.4000e-004**	**0.0000**	**2.5913**	**2.5913**	**1.4000e-004**	**0.0000**	**2.5947**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.6800e-003	0.0548	0.0841	1.3000e-004		2.6900e-003	2.6900e-003		2.4800e-003	2.4800e-003	0.0000	11.5152	11.5152	3.7200e-003	0.0000	11.6084
Paving	2.0200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.7000e-003**	**0.0548**	**0.0841**	**1.3000e-004**		**2.6900e-003**	**2.6900e-003**		**2.4800e-003**	**2.4800e-003**	**0.0000**	**11.5152**	**11.5152**	**3.7200e-003**	**0.0000**	**11.6084**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	4.1000e-004	2.6000e-004	2.7700e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.8605	0.8605	2.0000e-005	0.0000	0.8610
Total	**5.6000e-004**	**5.4500e-003**	**4.3500e-003**	**3.0000e-005**	**1.5700e-003**	**2.0000e-005**	**1.5700e-003**	**4.2000e-004**	**2.0000e-005**	**4.4000e-004**	**0.0000**	**2.5913**	**2.5913**	**1.4000e-004**	**0.0000**	**2.5947**

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0738					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5300e-003	0.0104	0.0145	2.0000e-005		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	2.0426	2.0426	1.2000e-004	0.0000	2.0457
Total	**0.0753**	**0.0104**	**0.0145**	**2.0000e-005**		**5.7000e-004**	**5.7000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**2.0426**	**2.0426**	**1.2000e-004**	**0.0000**	**2.0457**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	2.7400e-003	8.5000e-004	1.0000e-005	2.4000e-004	0.0000	2.4000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9088	0.9088	6.0000e-005	0.0000	0.9104
Worker	7.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.9000e-004	0.0000	1.9000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1558	0.1558	0.0000	0.0000	0.1559
Total	**1.5000e-004**	**2.7900e-003**	**1.3700e-003**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**4.3000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.0646**	**1.0646**	**6.0000e-005**	**0.0000**	**1.0662**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0738					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5300e-003	0.0104	0.0145	2.0000e-005		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	2.0426	2.0426	1.2000e-004	0.0000	2.0457
Total	**0.0753**	**0.0104**	**0.0145**	**2.0000e-005**		**5.7000e-004**	**5.7000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**2.0426**	**2.0426**	**1.2000e-004**	**0.0000**	**2.0457**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	2.7400e-003	8.5000e-004	1.0000e-005	2.4000e-004	0.0000	2.4000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.9088	0.9088	6.0000e-005	0.0000	0.9104
Worker	7.0000e-005	5.0000e-005	5.2000e-004	0.0000	1.9000e-004	0.0000	1.9000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1558	0.1558	0.0000	0.0000	0.1559
Total	**1.5000e-004**	**2.7900e-003**	**1.3700e-003**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**4.3000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.0646**	**1.0646**	**6.0000e-005**	**0.0000**	**1.0662**

3.8 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1415					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7700e-003	0.0187	0.0278	5.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	3.9150	3.9150	2.2000e-004	0.0000	3.9205
Total	**0.1442**	**0.0187**	**0.0278**	**5.0000e-005**		**9.3000e-004**	**9.3000e-004**		**9.3000e-004**	**9.3000e-004**	**0.0000**	**3.9150**	**3.9150**	**2.2000e-004**	**0.0000**	**3.9205**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	1.4000e-004	9.0000e-005	9.2000e-004	0.0000	3.7000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2868	0.2868	1.0000e-005	0.0000	0.2870
Total	**2.9000e-004**	**5.2800e-003**	**2.5000e-003**	**2.0000e-005**	**8.3000e-004**	**1.0000e-005**	**8.3000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.0176**	**2.0176**	**1.3000e-004**	**0.0000**	**2.0207**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1415					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7700e-003	0.0187	0.0278	5.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	3.9150	3.9150	2.2000e-004	0.0000	3.9205
Total	**0.1442**	**0.0187**	**0.0278**	**5.0000e-005**		**9.3000e-004**	**9.3000e-004**		**9.3000e-004**	**9.3000e-004**	**0.0000**	**3.9150**	**3.9150**	**2.2000e-004**	**0.0000**	**3.9205**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	5.1900e-003	1.5800e-003	2.0000e-005	4.6000e-004	1.0000e-005	4.6000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.7308	1.7308	1.2000e-004	0.0000	1.7337
Worker	1.4000e-004	9.0000e-005	9.2000e-004	0.0000	3.7000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2868	0.2868	1.0000e-005	0.0000	0.2870
Total	**2.9000e-004**	**5.2800e-003**	**2.5000e-003**	**2.0000e-005**	**8.3000e-004**	**1.0000e-005**	**8.3000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.0176**	**2.0176**	**1.3000e-004**	**0.0000**	**2.0207**

B-2: Operations AQ & GHG Emissions

Regional Operational Emissions-2024

SUMMER	ROG	NO_X	CO	SO_X	PM_{10} Total	$PM_{2.5}$ Total
Category	**Emissions (lb/day)**					
Area	0.530	0.000	0.016	0.000	0.000	0.000
Mobile	0.623	2.259	6.560	0.024	2.191	0.597
Total	**1.152**	**2.259**	**6.576**	**0.024**	**2.191**	**0.597**

WINTER	ROG	NO_X	CO	SO_X	PM_{10} Total	$PM_{2.5}$ Total
Category	**Emissions (lb/day)**					
Area	0.530	0.000	0.016	0.000	0.000	0.000
Mobile	0.601	2.310	6.517	0.023	2.191	0.598
Total	**1.131**	**2.310**	**6.534**	**0.023**	**2.191**	**0.598**

MAXIMUM	ROG	NO_X	CO	SO_X	PM_{10} Total	$PM_{2.5}$ Total
Category	**Emissions (lb/day)**					
Area	0.530	0.000	0.016	0.000	0.000	0.000
Mobile	0.623	2.310	6.560	0.024	2.191	0.598
Project Emissions	**1.152**	**2.310**	**6.576**	**0.024**	**2.191**	**0.598**
SDAPCD Significance Thresholds	75	250	550	250	100	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Alpine Park Project-Operations

San Diego County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	478.64	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor based on SDG&E RPS projections for 2024.

Land Use - Health club land use was used to represent park amenities that include buildings.

Vehicle Trips - Trip rate adjusted to be consistent with daily trips in Traffic Impact Study.

Energy Use - Project would not consume natural gas.

Water And Wastewater - City Park water consumption based on landscape report. No outdoor water consumption for health club, only indoor to represent building water consumption.

Solid Waste - Only city park land use would generate solid waste.

Table Name	Column Name	Default Value	New Value
tblEnergyUse	NT24NG	7.25	0.00
tblEnergyUse	T24NG	4.31	0.00
tblProjectCharacteristics	CO2IntensityFactor	720.49	478.64
tblVehicleTrips	ST_TR	22.75	21.29
tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	SU_TR	16.74	21.29
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	WD_TR	1.89	21.29
tblVehicleTrips	WD_TR	32.93	0.00
tblWater	OutdoorWaterUseRate	26,867,904.43	13,846,272.80
tblWater	OutdoorWaterUseRate	265,342.85	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6226	2.2591	6.5597	0.0238	2.1729	0.0180	2.1909	0.5807	0.0167	0.5974		2,420.0453	2,420.0453	0.1196		2,423.0341
Total	**1.1520**	**2.2592**	**6.5762**	**0.0238**	**2.1729**	**0.0180**	**2.1909**	**0.5807**	**0.0168**	**0.5974**		**2,420.0806**	**2,420.0806**	**0.1196**	**0.0000**	**2,423.0717**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6226	2.2591	6.5597	0.0238	2.1729	0.0180	2.1909	0.5807	0.0167	0.5974		2,420.0453	2,420.0453	0.1196		2,423.0341
Total	**1.1520**	**2.2592**	**6.5762**	**0.0238**	**2.1729**	**0.0180**	**2.1909**	**0.5807**	**0.0168**	**0.5974**		**2,420.0806**	**2,420.0806**	**0.1196**	**0.0000**	**2,423.0717**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6226	2.2591	6.5597	0.0238	2.1729	0.0180	2.1909	0.5807	0.0167	0.5974		2,420.0453	2,420.0453	0.1196		2,423.0341
Unmitigated	0.6226	2.2591	6.5597	0.0238	2.1729	0.0180	2.1909	0.5807	0.0167	0.5974		2,420.0453	2,420.0453	0.1196		2,423.0341

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	480.09	480.09	480.09	1,024,920	1,024,920
Health Club	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	480.09	480.09	480.09	1,024,920	1,024,920

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Health Club	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Parking Lot	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Unmitigated	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1179					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5200e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Total	**0.5295**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0353**	**0.0353**	**9.0000e-005**		**0.0376**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1179					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5200e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Total	**0.5295**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0353**	**0.0353**	**9.0000e-005**		**0.0376**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Alpine Park Project-Operations - San Diego County APCD Air District, Winter

Alpine Park Project-Operations

San Diego County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	478.64	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor based on SDG&E RPS projections for 2024.

Land Use - Health club land use was used to represent park amenities that include buildings.

Vehicle Trips - Trip rate adjusted to be consistent with daily trips in Traffic Impact Study.

Energy Use - Project would not consume natural gas.

Water And Wastewater - City Park water consumption based on landscape report. No outdoor water consumption for health club, only indoor to represent building water consumption.

Solid Waste - Only city park land use would generate solid waste.

Table Name	Column Name	Default Value	New Value
tblEnergyUse	NT24NG	7.25	0.00
tblEnergyUse	T24NG	4.31	0.00
tblProjectCharacteristics	CO2IntensityFactor	720.49	478.64
tblVehicleTrips	ST_TR	22.75	21.29
tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	SU_TR	16.74	21.29
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	WD_TR	1.89	21.29
tblVehicleTrips	WD_TR	32.93	0.00
tblWater	OutdoorWaterUseRate	26,867,904.43	13,846,272.80
tblWater	OutdoorWaterUseRate	265,342.85	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6012	2.3096	6.5174	0.0225	2.1729	0.0181	2.1910	0.5807	0.0168	0.5975		2,295.3423	2,295.3423	0.1208		2,298.3616
Total	**1.1307**	**2.3098**	**6.5338**	**0.0225**	**2.1729**	**0.0182**	**2.1910**	**0.5807**	**0.0169**	**0.5975**		**2,295.3776**	**2,295.3776**	**0.1209**	**0.0000**	**2,298.3991**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6012	2.3096	6.5174	0.0225	2.1729	0.0181	2.1910	0.5807	0.0168	0.5975		2,295.3423	2,295.3423	0.1208		2,298.3616
Total	**1.1307**	**2.3098**	**6.5338**	**0.0225**	**2.1729**	**0.0182**	**2.1910**	**0.5807**	**0.0169**	**0.5975**		**2,295.3776**	**2,295.3776**	**0.1209**	**0.0000**	**2,298.3991**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6012	2.3096	6.5174	0.0225	2.1729	0.0181	2.1910	0.5807	0.0168	0.5975		2,295.3423	2,295.3423	0.1208		2,298.3616
Unmitigated	0.6012	2.3096	6.5174	0.0225	2.1729	0.0181	2.1910	0.5807	0.0168	0.5975		2,295.3423	2,295.3423	0.1208		2,298.3616

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	480.09	480.09	480.09	1,024,920	1,024,920
Health Club	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	480.09	480.09	480.09	1,024,920	1,024,920

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Health Club	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Parking Lot	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Unmitigated	0.5295	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1179					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5200e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Total	**0.5295**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0353**	**0.0353**	**9.0000e-005**		**0.0376**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1179					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4100					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.5200e-003	1.5000e-004	0.0164	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0353	0.0353	9.0000e-005		0.0376
Total	**0.5295**	**1.5000e-004**	**0.0164**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**		**0.0353**	**0.0353**	**9.0000e-005**		**0.0376**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Project Operations GHG Summary-Buildout Year 2024 Emissions

Source Category	$MTCO_2e$/year
Area	0.003
Electricity	23.298
Mobile	383.354
Waste	21.957
Water	35.393
Construction	37.910
Total Project Emissions	**501.91**

Alpine Park Project-Operations

San Diego County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	131.20	1000sqft	3.01	131,200.00	0
City Park	22.55	Acre	22.55	982,278.00	0
Health Club	7.32	1000sqft	0.17	7,320.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2024
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	478.64	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor based on SDG&E RPS projections for 2024.

Land Use - Health club land use was used to represent park amenities that include buildings.

Vehicle Trips - Trip rate adjusted to be consistent with daily trips in Traffic Impact Study.

Energy Use - Project would not consume natural gas.

Water And Wastewater - City Park water consumption based on landscape report. No outdoor water consumption for health club, only indoor to represent building water consumption.

Solid Waste - Only city park land use would generate solid waste.

Table Name	Column Name	Default Value	New Value
tblEnergyUse	NT24NG	7.25	0.00
tblEnergyUse	T24NG	4.31	0.00
tblProjectCharacteristics	CO2IntensityFactor	720.49	478.64
tblVehicleTrips	ST_TR	22.75	21.29
tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	SU_TR	16.74	21.29
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	WD_TR	1.89	21.29
tblVehicleTrips	WD_TR	32.93	0.00
tblWater	OutdoorWaterUseRate	26,867,904.43	13,846,272.80
tblWater	OutdoorWaterUseRate	265,342.85	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0965	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	23.1761	23.1761	1.4000e-003	2.9000e-004	23.2977
Mobile	0.1066	0.4217	1.1701	4.1400e-003	0.3862	3.2800e-003	0.3895	0.1034	3.0500e-003	0.1065	0.0000	382.8613	382.8613	0.0197	0.0000	383.3536
Waste						0.0000	0.0000		0.0000	0.0000	8.8626	0.0000	8.8626	0.5238	0.0000	21.9567
Water						0.0000	0.0000		0.0000	0.0000	0.1374	34.6220	34.7593	0.0162	7.7000e-004	35.3930
Total	**0.2031**	**0.4217**	**1.1716**	**4.1400e-003**	**0.3862**	**3.2900e-003**	**0.3895**	**0.1034**	**3.0600e-003**	**0.1065**	**8.9999**	**440.6622**	**449.6622**	**0.5611**	**1.0600e-003**	**464.0041**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0965	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	23.1761	23.1761	1.4000e-003	2.9000e-004	23.2977
Mobile	0.1066	0.4217	1.1701	4.1400e-003	0.3862	3.2800e-003	0.3895	0.1034	3.0500e-003	0.1065	0.0000	382.8613	382.8613	0.0197	0.0000	383.3536
Waste						0.0000	0.0000		0.0000	0.0000	8.8626	0.0000	8.8626	0.5238	0.0000	21.9567
Water						0.0000	0.0000		0.0000	0.0000	0.1374	34.6220	34.7593	0.0162	7.7000e-004	35.3930
Total	**0.2031**	**0.4217**	**1.1716**	**4.1400e-003**	**0.3862**	**3.2900e-003**	**0.3895**	**0.1034**	**3.0600e-003**	**0.1065**	**8.9999**	**440.6622**	**449.6622**	**0.5611**	**1.0600e-003**	**464.0041**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1066	0.4217	1.1701	4.1400e-003	0.3862	3.2800e-003	0.3895	0.1034	3.0500e-003	0.1065	0.0000	382.8613	382.8613	0.0197	0.0000	383.3536
Unmitigated	0.1066	0.4217	1.1701	4.1400e-003	0.3862	3.2800e-003	0.3895	0.1034	3.0500e-003	0.1065	0.0000	382.8613	382.8613	0.0197	0.0000	383.3536

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	480.09	480.09	480.09	1,024,920	1,024,920
Health Club	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	480.09	480.09	480.09	1,024,920	1,024,920

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Health Club	9.50	7.30	7.30	16.90	64.10	19.00	52	39	9
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Health Club	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998
Parking Lot	0.606234	0.039465	0.179154	0.102641	0.014368	0.005395	0.016820	0.024508	0.001929	0.001857	0.005869	0.000761	0.000998

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.1761	23.1761	1.4000e-003	2.9000e-004	23.2977
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	23.1761	23.1761	1.4000e-003	2.9000e-004	23.2977
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Health Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Health Club	60829.2	13.2065	8.0000e-004	1.7000e-004	13.2758
Parking Lot	45920	9.9696	6.0000e-004	1.2000e-004	10.0219
Total		**23.1760**	**1.4000e-003**	**2.9000e-004**	**23.2977**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Health Club	60829.2	13.2065	8.0000e-004	1.7000e-004	13.2758
Parking Lot	45920	9.9696	6.0000e-004	1.2000e-004	10.0219
Total		**23.1760**	**1.4000e-003**	**2.9000e-004**	**23.2977**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0965	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003
Unmitigated	0.0965	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0215					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0748					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4000e-004	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003
Total	**0.0965**	**1.0000e-005**	**1.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.8800e-003**	**2.8800e-003**	**1.0000e-005**	**0.0000**	**3.0700e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0215					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0748					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4000e-004	1.0000e-005	1.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.8800e-003	2.8800e-003	1.0000e-005	0.0000	3.0700e-003
Total	**0.0965**	**1.0000e-005**	**1.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.8800e-003**	**2.8800e-003**	**1.0000e-005**	**0.0000**	**3.0700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	34.7593	0.0162	7.7000e-004	35.3930
Unmitigated	34.7593	0.0162	7.7000e-004	35.3930

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 13.8463	33.3981	2.0200e-003	4.2000e-004	33.5734
Health Club	0.432928 / 0	1.3612	0.0142	3.5000e-004	1.8196
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**34.7593**	**0.0162**	**7.7000e-004**	**35.3930**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 13.8463	33.3981	2.0200e-003	4.2000e-004	33.5734
Health Club	0.432928 / 0	1.3612	0.0142	3.5000e-004	1.8196
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**34.7593**	**0.0162**	**7.7000e-004**	**35.3930**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.8626	0.5238	0.0000	21.9567
Unmitigated	8.8626	0.5238	0.0000	21.9567

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	1.94	0.3938	0.0233	0.0000	0.9756
Health Club	41.72	8.4688	0.5005	0.0000	20.9811
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**8.8626**	**0.5238**	**0.0000**	**21.9567**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	1.94	0.3938	0.0233	0.0000	0.9756
Health Club	41.72	8.4688	0.5005	0.0000	20.9811
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**8.8626**	**0.5238**	**0.0000**	**21.9567**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B-3: Construction Energy Analysis

PROJECT Fuel Consumption Summary

Source Category	Fuel Consumption (gal)	
	Diesel	Gasoline
Offroad Equipment	106,444	
Haul Trucks	5,969	
Vendor Trucks	4,943	
Workers		7,350
Total Fuel Consumption	**117,355**	**7,350**

Construction Duration (years)	1.33
Average Annual Diesel	**87,956.35**
Average Annual Gasoline	**5,508.57**

County Fuel Consumption (2019) [1]

County: San Diego

Source	Fuel Type	Gallons (Retail + Non-Retail	Percent of Project Compared to County
Workers	Gas	1,325,000,000	0.0004%
Off-Road/Haul & Vendor Trucks	Diesel	229,166,667	0.038%

Notes:

1. California Energy Commission, California Annual Retail Fuel Outlet Report Results (CEC-A15), 2010-2019
   https://www.energy.ca.gov/sites/default/files/2020-10/2010-2019%20CEC-A15%20Results%20and%20Analysis.xlsx
   Accessed November 2020. Diesel is adjusted to account for retail (48%) and non-retail (52%) diesel sales

Off-Road Equipment

Fuel Consumption: Equipment ≤ 100HP	Value
Brake Specific Fuel Consumption Factor (lb/hp-hr)[1]	0.408
Fuel Density (lb/gal)[1]	7.11
Consumption Factor (gal/hp-hr)	0.0574
Total HP-HR <100	693,270
Total Diesel Fuel (gal)	**39,788**

Fuel Consumption: Equipment > 100HP	Value
Brake Specific Fuel Consumption Factor (lb/hp-hr)[1]	0.367
Fuel Density (lb/gal)[1]	7.11
Consumption Factor (gal/hp-hr)	0.0516
Total HP-HR ≥100	1,291,152
Total Diesel Fuel (gal)	**66,655**

Total diesel gallons (off-road equipment): 106,444

Phase Name	Equipment	# of Equipment	Hours/Day	HP	Load Factor	Days	Total HP-HR
Grubbing/Land Clearing	Crawler Tractors	3	8	212	0.43	10	21,878.40
Grubbing/Land Clearing	Excavators	1	8	158	0.38	10	4,803.20
Grading/Excavation	Crawler Tractors	3	8	212	0.43	173	378,496.32
Grading/Excavation	Excavators	1	8	158	0.38	173	83,095.36
Grading/Excavation	Rollers	1	8	80	0.38	173	42,073.60
Grading/Excavation	Rubber Tired Loaders	1	8	203	0.36	173	101,142.72
Grading/Excavation	Tractors/Loaders/Backhoes	1	8	97	0.37	173	49,671.76
Grading/Excavation	Scrapers	2	8	367	0.48	173	487,610.88
Drainage/Utilities/Subgrade	Air Compressors	1	8	78	0.48	89	26,657.28
Drainage/Utilities/Subgrade	Generator Sets	1	8	84	0.74	89	44,257.92
Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	4	8	97	0.37	89	102,214.72
Sewer Line Installation	Excavators	1	8	158	0.38	174	83,575.68
Sewer Line Installation	Rollers	1	8	80	0.38	174	42,316.80
Sewer Line Installation	Tractors/Loaders/Backhoes	1	8	97	0.37	174	49,958.88
Construction	Air Compressors	1	8	78	0.48	175	52,416.00
Construction	Cranes	1	8	231	0.29	175	93,786.00
Construction	Forklifts	3	8	89	0.2	175	74,760.00
Construction	Generator Sets	1	8	84	0.74	175	87,024.00
Construction	Tractors/Loaders/Backhoes	2	8	97	0.37	175	100,492.00
Paving	Pavers	1	8	130	0.42	45	19,656.00
Paving	Paving Equipment	1	8	132	0.36	45	17,107.20
Paving	Rollers	1	8	80	0.38	45	10,944.00
Architectural Coating	Air Compressors	1	8	78	0.48	35	10,483.20
						Total ≥100HP	1,291,151.76
						Total <100HP	693,270.16

Notes:
1. CARB, 2017 Off-road Diesel Emission Factors
https://ww3.arb.ca.gov/msei/ordiesel/ordas_ef_fcf_2017_v7.xlsx

Haul Trucks

Onroad Travel Consumption	Value
EMFAC2021 Diesel Fuel Consumption Factor (gal/mi):[1]	0.176
Total VMT (mi):	33,840
Total diesel gallons	**5,953**
Idling Consumption	**Value**
Idling Fuel Consumption Factor (gal/hr):[2]	0.6400
Total Idle-Hours per Year:	71
Total diesel gallons	**16**

Total diesel gallons: 5,969

Phase	Total Truck Trips	Trip Length (miles)	Vehicle Category	VMT	Idle Hours
Grubbing/Land Clearing	0	20	HHDT	0	0
Grading/Excavation	1036	20	HHDT	20,720	86
Drainage/Utilities/Subgrade	0	20	HHDT	0	0
Sewer Line Installation	0	20	HHDT	0	0
Construction	656	20	HHDT	13,120	55
Paving	0	20	HHDT	0	0
Architectural Coating	0	20	HHDT	0	0
			Total VMT:	**33,840**	
			Total Idle-Hours:		**71**

1. CARB, EMFAC2021 (SDAPCD; HHDT; Annual; CY 2022; Aggregate MY; Aggregate Speed,DSL)
2. Department of Energy, Fact #861, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles, February 23, 2015. https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles

Vendor Trucks

Onroad Travel Consumption	Value
EMFAC2021 Diesel Fuel Consumption Factor (gal/mi):[1]	0.160
Total VMT (mi):	30,704
Total diesel gallons	**4,902**
Idling Consumption	**Value**
Idling Fuel Consumption Factor (gal/hr):[2]	0.6400
Total Idle-Hours per Year:	175
Total diesel gallons	**40**

Total diesel gallons: 4,943

Phase	Days/year	Truck Trips per Day (In/Out)	Trip Length (miles)	Vehicle Category	VMT	Idle Hours
Grubbing/Land Clearing	10	6	7.3	HHDT/MHDT	438	5
Grading/Excavation	173	6	7.3	HHDT/MHDT	7,577	87
Drainage/Utilities/Subgrade	89	6	7.3	HHDT/MHDT	3,898	45
Sewer Line Installation	174	6	7.3	HHDT/MHDT	7,621	87
Construction	175	6	7.3	HHDT/MHDT	7,665	88
Paving	45	6	7.3	HHDT/MHDT	1,971	23
Architectural Coating	35	6	7.3	HHDT/MHDT	1,533	18
				Total VMT:	**30,704**	
				Total Idle-Hours:		**175**

1. CARB, EMFAC2021 (SDAPCD; MHDT/HHDT; Annual; CY 2022; Aggregate MY; Aggregate Speed,DSL)
2. Department of Energy, Fact #861, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles, February 23, 2015. https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles

Workers

Onroad Travel Consumption	Value
EMFAC2021 Gasoline Fuel Consumption Factor (gal/mi):[1]	0.0403
Total VMT (mi):	182,434
Total gasoline gallons	**7,350**

Phase	Days/year	Vehicle Trips per day (In/Out)	Trip Length (miles)	Vehicle Category	VMT
Grubbing/Land Clearing	10	16	10.8	LD Fleet Mix	1,728
Grading/Excavation	173	36	10.8	LD Fleet Mix	67,262
Drainage/Utilities/Subgrade	89	24	10.8	LD Fleet Mix	23,069
Sewer Line Installation	174	12	10.8	LD Fleet Mix	22,550
Construction	175	32	10.8	LD Fleet Mix	60,480
Paving	45	12	10.8	LD Fleet Mix	5,832
Architectural Coating	35	4	10.8	LD Fleet Mix	1,512
				Total VMT:	**182,434**

1. CARB, EMFAC2021 (SDAPCD; LDA/LDT1/LDT2; Annual; CY 2022; Aggregate MY; Aggregate Speed,GAS)

Idling Fuel Consumption Factors

Column1	Column2	Column3	Column4	Column5
VEHICLE TYPE	FUEL TYPE	ENGINE SIZE	GROSS VEHICLE WEIGHT	IDLING FUEL USE
		(LITER)	(GVW) (LBS)	(GAL/HR WITH NO LOAD)
Compact Sedan	Gas	2	-	0.16
Large Sedan	Gas	4.6	-	0.39
Compact Sedan	Diesel	2	-	0.17
Medium Heavy Truck	Gas	7-May	19,700-26,000	0.84
Delivery Truck	Diesel	-	19,500	0.84
Tow Truck	Diesel	-	26,000	0.59
Medium Heavy Truck	Diesel	10-Jun	23,000-33,000	0.44
Transit Bus	Diesel	-	30,000	0.97
Combination Truck	Diesel	-	32,000	0.49
Bucket Truck	Diesel	-	37,000	0.9
Tractor-Semitrailer	Diesel	-	80,000	0.64

Department of Energy, Fact #861, 2015 Idle Fuel Consumption for Selected Gasoline and Diesel Vehicles, February 23, 2015.
https://www.energy.gov/eere/vehicles/fact-861-february-23-2015-idle-fuel-consumption-selected-gasoline-and-diesel-vehicles

Region	San Diego County APCD
Calendar Year	2022
Model Year	Aggregate
Speed	Aggregate
Fuel	Gasoline

Row Labels	Sum of Total VMT	Sum of Fuel Consumption
LDA	46651921.79	1723.6896
LDT1	4651323.272	207.139018
LDT2	21817861.26	1015.035547
Grand Total	**73121106.32**	**2945.864165**

Worker Fuel Consumption Factors

Vehicle Category	VMT (mi/day)	Fuel Consumption (1000gal/day)	Fuel Consumption Factor (gal/mi)	Fuel Economy (mi/gal)	Distribution of Trips	gal/mi
LDA	46651921.79	1723.6896	0.037	27.1	64%	0.040
LDT1	4651323.272	207.139018	0.045	22.5	6%	
LDT2	21817861.26	1015.035547	0.047	21.5	30%	

Region	San Diego County APCD
Calendar Year	2022
Model Year	Aggregate
Speed	Aggregate
Fuel	Diesel

Row Labels	Sum of Total VMT	Sum of Fuel Consumption
HHDT	1811813.427	318.7189632
MHDT	736028.0774	88.09465902
Grand Total	**2547841.504**	**406.8136222**

Truck Fuel Consumption Factors

Vehicle Category	VMT (miles/day)	Fuel Consumption (1000 gal/day)	Fuel Consumption Factor (gal/mi)	Fuel Economy (mi/gal)	Distribution of Trips	Vendor Fuel Factor (gal/mi)
HHDT	1811813.427	318.7189632	0.176	5.68	71%	0.160
MHDT	736028.0774	88.09465902	0.120	8.35	29%	

B-4: Operations Energy Analysis

Operations Energy Consumption Summary

Transportation Fuel

Fuel Type	Gallons/Year
GAS	42,038
DSL	5,982

County: San Diego

Fuel Type	Gallons (Retail + Non-Retail	Percent of Project Compared to County
Gas	1,325,000,000	0.003%
Diesel	229,166,667	0.003%

Electricity

Comparison	GWh/year
SDG&E 2019 Electricity Sales	17,880
Project Electricity	0.29
Project % of Sales	0.002%

Utility Consumption

Electricity[3]

Land Use	kWh/year	GWh/year
City Park	0	0.000
Health Club	60829.2	0.061
Parking Lot	45920	0.046
Total	**0**	**0.107**

Comparison	GWh/year
SDG&E 2019 Electricity Sales[1]	17,880
Project Electricity	0.29
Project % of Sales	0.0016%

Water Consumption[2]

Land Use	Mgal/yr
City Park	14
Health Club	0
Parking Lot	0
Total	**14**

Electricity Intensity Factors	kWh/Mgal
Electricity Factor - Supply	9,727.00
Electricity Factor - Treat	111.00
Electricity Factor - Distribute	1,272.00
Electricity Factor - Wastewater Treatment	1,911.00
Total	**13021.0**

Electricity from Water Demand	kWh/yr	GWh/yr
Total	**185,929.83**	**0.19**

Notes:

1 2020 Sempra Energy Sustainability Report
https://www.sempra.com/sites/default/files/content/files/node-report/2020/SempraEnergy_2020_Corporate-Sustainability-Report.pdf

2 Electricity and water values from CalEEMod Annual Output file

3 Health Club used to account for electricity and indoor water consumption from buildings.

Region	San Diego County APCD
Model Year	Aggregate
Speed	Aggregate
Calendar Year	2024

Row Labels	Vehicle Category	Sum of Total VMT	Sum of Fuel Consumption
Diesel	HHDT	1859684.668	317.7018708
Diesel	LDA	172212.5896	4.324711617
Diesel	LDT1	887.9331638	0.039484997
Diesel	LDT2	87677.92127	2.966871759
Diesel	LHDT1	1194852.754	74.30238324
Diesel	LHDT2	483249.1016	36.24370561
Diesel	MDV	235562.3085	10.53542862
Diesel	MH	39601.90723	4.218298391
Diesel	MHDT	748443.1077	88.58979522
Diesel	OBUS	47363.04896	7.009053046
Diesel	SBUS	45339.0525	5.595751568
Gasoline	HHDT	492.454592	0.135558299
Gasoline	LDA	46842847.47	1675.082383
Gasoline	LDT1	4429822.548	192.2938286
Gasoline	LDT2	22430753.47	1003.629579
Gasoline	LHDT1	1671762.223	172.8674945
Gasoline	LHDT2	231444.1973	26.98225132
Gasoline	MCY	430235.858	11.02982364
Gasoline	MDV	13160207.11	715.8291652
Gasoline	MH	93222.28885	21.13678274
Gasoline	MHDT	196459.3898	41.45910634
Gasoline	OBUS	56792.68216	11.88069266
Gasoline	SBUS	15743.27221	1.588112369
Gasoline	UBUS	13564.69797	1.570833898
Grand Total		**94488222.06**	**4427.012966**

Fuel Type	Vehicle Category	VMT (mi/day)	Fuel Consumption (1000gal/day)
Diesel	HHDT	1859684.67	317.70
Diesel	LDA	172212.59	4.32
Diesel	LDT1	887.93	0.04
Diesel	LDT2	87677.92	2.97
Diesel	LHDT1	1194852.75	74.30
Diesel	LHDT2	483249.10	36.24
Diesel	MDV	235562.31	10.54
Diesel	MH	39601.91	4.22
Diesel	MHDT	748443.11	88.59
Diesel	OBUS	47363.05	7.01
Diesel	SBUS	45339.05	5.60
Gasoline	HHDT	492.45	0.14
Gasoline	LDA	46842847.47	1675.08
Gasoline	LDT1	4429822.55	192.29
Gasoline	LDT2	22430753.47	1003.63
Gasoline	LHDT1	1671762.22	172.87
Gasoline	LHDT2	231444.20	26.98
Gasoline	MCY	430235.86	11.03
Gasoline	MDV	13160207.11	715.83
Gasoline	MH	93222.29	21.14
Gasoline	MHDT	196459.39	41.46
Gasoline	OBUS	56792.68	11.88
Gasoline	SBUS	15743.27	1.59
Gasoline	UBUS	13564.70	1.57

Project Fuel Consumption

						Annual Miles		
						1,024,920.37		
	Fuel Consumption Factor (gal/mi)		Fuel Distribution		Fleet Mix	Miles/Vehicle Category	Gallons of Fuel	
Vehicle Category	DSL	GAS	DSL	GAS			DSL	GAS
HHDT	0.17	0.28	99.97%	0.03%	2.0%	20,177.47	3,446.13	1.47
LDA	0.03	0.04	0.37%	99.63%	49.8%	509,975.66	46.91	18,169.74
LDT1	0.04	0.04	0.02%	99.98%	4.7%	48,060.23	0.43	2,085.82
LDT2	0.03	0.04	0.39%	99.61%	23.8%	244,259.01	32.18	10,886.44
LHDT1	0.06	0.10	41.68%	58.32%	3.0%	31,094.37	805.96	1,875.11
LHDT2	0.08	0.12	67.62%	32.38%	0.8%	7,752.33	393.14	292.68
MCY	0.00	0.03	0.00%	100.00%	0.5%	4,666.80	0.00	119.64
MDV	0.04	0.05	1.76%	98.24%	14.2%	145,304.85	114.28	7,764.65
MH	0.11	0.23	29.82%	70.18%	0.1%	1,440.75	45.76	229.27
MHDT	0.12	0.21	79.21%	20.79%	1.0%	10,249.42	960.94	449.71
OBUS	0.15	0.21	45.47%	54.53%	0.1%	1,129.78	76.03	128.87
SBUS	0.12	0.10	74.23%	25.77%	0.1%	662.56	60.70	17.23
UBUS	0.00	0.12	0.00%	100.00%	0.0%	147.14	0.00	17.04
Project						**1,024,920.37**	**5,982.46**	**42,037.66**

*Annual miles from CalEEMod Annual Operations output
EMFAC2021, SDAPCD, Aggregate Speed, Aggregate Model Year, Calendar Year 2024

Appendix D

Biological Resources Report for the Alpine County Park Project

BIOLOGICAL RESOURCES REPORT FOR THE ALPINE COUNTY PARK PROJECT

PREPARED FOR:

County of San Diego, Department of Parks and Recreation
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PREPARED BY:

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December 2022





ICF. 2022. Biological Resources Report for the Alpine County Park Project. Prepared for the County of San Diego, Department of Parks and Recreation. San Diego, CA. December.

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Acronyms and Abbreviations

°F	degrees Fahrenheit
APM	applicant-proposed measure
BMO	Biological Mitigation Ordinance
BRCA	Biological Resource Core Area
BSA	Biological Study Area
CAGN	California gnatcatcher
CAL FIRE	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFWO	Carlsbad Fish and Wildlife Office
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	County of San Diego
CRPR	California Rare Plant Rank
CWA	Clean Water Act
DPR	Department of Parks and Recreation
FEOA	Fire and Emergency Operational Assessment
FESA	federal Endangered Species Act
FGC	Fish and Game Code
FS	fairy shrimp
FS Guidelines	*Survey Guidelines for the Listed Large Branchiopods*
GPS	global positioning system
HCB	Hermes copper butterfly
HCP	habitat conservation plan
HREP	Habitat Restoration and Enhancement Plan
ITP	incidental take permit
MBTA	Migratory Bird Treaty Act
MSCP	San Diego Multiple Species Conservation Program
NCCP	natural community conservation plan
NPPA	Native Plant Protection Act
NWI	National Wetlands Inventory
Project	Alpine Park Project
QCB	Quino checkerspot butterfly
QCB Guidelines	*Quino Checkerspot Butterfly Survey Guidelines*
RWQCB	Regional Water Quality Control Board

SanGIS	San Diego Geographic Information Source
USACE	U.S. Army Corps of Engineers
USDA/NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Chapter 1
Introduction

1.1 Purpose of the Report

The County of San Diego (County) Department of Parks and Recreation (DPR) is proposing to construct the approximately 23-acre Alpine Park Project (Project) in the community of Alpine, California. This Biological Resources Report documents the biological resources present and potentially present in and around the Project site; identifies impacts on biological resources resulting from the Project; and recommends measures to avoid, minimize, and mitigate significant impacts consistent with federal, state, and local regulations, including the California Environmental Quality Act (CEQA) and the San Diego Multiple Species Conservation Program (MSCP). This Biological Resources Report completely replaces the prior version, which can be found at https://ceqanet.opr.ca.gov/2021030196/3. Because of the extensive changes in this Biological Resources Report, it was not conducive to cross out/underline changes. The original version is available at the aforementioned link. The Biological Survey Area (BSA) includes the entirety of the approximately 96.6-acre Project site. Note that only 94.2 net acres required surveys because 2.4 acres of the parcel is within the public right-of-way along South Grade Road.

This document will show conformance with the County's Biological Mitigation Ordinance (BMO), the implementing document for the MSCP County of San Diego Subarea Plan (County 1997), although DPR is exempt from the BMO. Furthermore, the environmental conditions described herein have been used to demonstrate compliance with other federal, state, and local regulations, such as the federal Clean Water Act (CWA) and state Streambed Alteration Program.

The County acquired the 96.6-acre Project site in early 2019—specifically, to build a County-owned public park and establish preserve land within the remainder of the area outside of the Alpine County Park. The County would manage the approximately 67.5-acre Alpine Park Preserve in perpetuity to support the preserve assembly envisioned under the MSCP. Intensive biological surveys occurred on the Project site in 2019, as further described below.

1.2 Project Location and Description

The Project site is in the community of Alpine, California, in south-central San Diego County, approximately 1.3 miles south of the Tavern Road and Interstate 8 intersection (Figure 1, Regional Vicinity Map [all figures are included in Appendix A, Figures]). Specifically, the Project site is along South Grade Road, approximately 1 mile east of the intersection of Tavern Road and South Grade Road. The Project occurs within the U.S. Geological Survey (USGS) Alpine 7.5-minute topographical quadrangle maps (Esri 2020; Figure 2, Project Vicinity). The approximate center coordinates for the Project in decimal degree format (NAD 83) are 32.82058°N and -116.75918°W. The Project site is currently an undeveloped grassy field with multiple informal use trails but no permanent structures or infrastructure.

1.3 Survey Methods

1.3.1 Literature and Records Search

A literature and records search was conducted to establish the existence or potential occurrence of sensitive biological resources (e.g., plant or animal species) or water resources within the BSA.

The following databases/resources were reviewed:

- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2020), including occurrences within 5 miles of the BSA.
- California Native Plant Society's (CNPS's) Online Inventory of Rare and Endangered Plants, eighth edition (CNPS 2019).
- U.S. Fish and Wildlife Service (USFWS) Carlsbad Fish and Wildlife Office (CFWO) species occurrence data (USFWS CFWO 2019).
- SanBIOS sensitive species sightings (San Diego Association of Governments [SANDAG] 2019).
- National Wetlands Inventory (NWI) database (USFWS 2019).
- U.S. Department of Agriculture, Natural Resources Conservation Service, soil survey maps (USDA/NRCS 2019).

For the purposes of this report, species are considered to be sensitive or have special status if they meet at least one of the following criteria:

- Species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (FESA) (Title 50, Code of Federal Regulations, Part 17.12 [listed plants]); 50 Code of Federal Regulations, Part 17.11 (listed animals); and various notices in the *Federal Register* (proposed species).
- Species that are candidates for possible future listing as threatened or endangered under the FESA.
- Species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (14 California Code of Regulations 670.5).
- Plant species listed as rare under the California Native Plant Protection Act (NPPA) (California Fish and Game Code [FGC] 1900 et seq.).
- Species that meet the definitions of "rare" or "endangered" under CEQA (CEQA Guidelines Sections 15380 and 15125).
- Animal species designated by CDFW as Species of Special Concern.
- Animals that are "fully protected" in California (California FGC Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Species listed as having a California Rare Plant Rank (CRPR) of 1A (presumed extinct in California), 1B (rare, threatened, and endangered in California and elsewhere), or 2 (rare, threatened, or endangered in California but more common elsewhere). All of the plants constituting CRPR 1A, 1B, and 2 are eligible for state listing and meet the definition of rare or endangered under CEQA Section 15125 (c) and/or Section 15380.

- Many of the species listed as having a CRPR of 3 (review list). Nearly all of the CRPR 3 species are taxonomically problematic (CNPS 2020a). Many of the plants constituting CRPR 3 meet the definitions of threatened or endangered under the CESA and are eligible for state listing. These species are considered special status because they may meet the definition of rare or endangered under CEQA Guidelines Section 15125 (c) and/or Section 15380 (CNPS 2020a).
- CRPR List 4 species may meet the definitions of special status, as defined in the NPPA, California FGC Section 1901, or the CESA, California FGC Sections 2050 through 2098, if there are unique occurrences such as plants at the extreme limits of their range, taxa occurring on unusual substrates, unique occurrences, or individuals with unusual morphology (CNPS 2020b).
- Plant species included in the County Sensitive Plant List and animal species included in the County Sensitive Animal List, both contained within the County's *Guidelines for Determining Significance Biological Resources* (County of San Diego 2010b).

1.3.2 Survey Methodology

The BSA includes the approximately 94.2-acre Project site in the unincorporated community of Alpine in San Diego County, adjacent to Wright's Field and South Grade Road, south of the Alpine community center. ICF biologists conducted the following surveys in the BSA: (1) vegetation surveys with habitat community, special-status plant, and California Invasive Plant Council invasive plant species mapping components; (2) special-status plant surveys; and (3) special-status wildlife surveys.

The following sources were followed for taxonomy and nomenclature:

- Plant scientific names: Baldwin et al. (2012) and corresponding updates in Jepson Herbarium eFlora (2021).
- Plant common names: Rebman and Simpson (2014) and Jepson eFlora (as applicable).
- Special-status plant names: CNPS Rare Plant Inventory (CNPS 2019).
- Higher taxonomic categories of invertebrate animals: Arnett (2000) and North American Butterfly Association (2016), Opler and Wright (1999), or Hogue (1993) for invertebrate species.
- Amphibians and reptiles: Society for the Study of Amphibians and Reptiles (2021).
- Avian species: American Ornithological Society for birds (Chesser et al. 2020).
- Mammal species: Bradley et al. (2014).

Special-status wildlife whose names differ from the references listed above will conform to the CDFW Special Animals List (CDFW 2020) to ensure proper attribution of rarity status for that specific taxon. The scientific binomial from the cited reference is included with the first mention of a species in the body of this report.

1.3.2.1 Habitat Assessment and Vegetation Mapping

Vegetation mapping within the BSA was conducted by ICF biologists in February and March 2019 by walking meandering transects and observing from selected vantage points that allowed an expansive view of the BSA. An additional vegetation survey was conducted in June and July 2022 to

update vegetation conditions within the BSA as well as confirm that mapping met a 0.10-acre minimum mapping unit requirement. Vegetation communities were mapped pursuant to County guidelines (County 2010a). Vegetation communities were classified according to the dominant and characteristic plant species, in accordance with the Holland classification system (1986), as modified by Oberbauer et al. (2008).

All plants observed within the BSA were identified to the species level, including subspecies or variety, as applicable, using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012), and recorded in a species compendium. Plant common names followed the *Checklist of The Vascular Plants of San Diego County, Fifth Edition* (Rebman and Simpson 2014), if the common names were not provided in Baldwin et al. (2012).

Concurrently with vegetation mapping, the biologists conducted a habitat assessment to determine the potential for special-status species to occur on-site and assessed the need for any additional protocol wildlife surveys to be conducted. Biologists also determined if there are any potentially jurisdictional aquatic features that would require an aquatic resources delineation.

1.3.2.2 Special-Status Plant Surveys

Special-status plant surveys were conducted within the BSA between April and August 2019 (Table 1). Special-status plant survey priority areas included unique features within the BSA that have high potential to support special-status plant species. ICF botanists traversed the BSA from meandering transects to identify the locations of special-status plants. The special-status plants surveys included three site visits, one in mid-April, a second in May, and a third in July, to assess the potential for late-blooming species. Surveys were conducted in accordance with the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants* (USFWS 2000); *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), and *CNPS Botanical Survey Guidelines* (CNPS 2001). All plant species observed were documented, and plants that could not be identified in the field were identified later using taxonomic keys, including Baldwin et al. (2012). A specialized survey for chocolate lily (*Fritillaria biflora*) was conducted in 2021 in late March, during the peak time for this species bloom, throughout the BSA.

Table 1. Special-Status Plant Survey Dates

Survey Personnel	Date	Survey Personnel	Date
Ritenour, Dale	04/12/2019	Johnston, Shawn	08/09/2019
Dix, Kelsey	04/12/2019	Dix, Kelsey	08/09/2019
Estes, Camilla	04/12/2019	Estes, Camilla	08/09/2019
Johnston, Shawn	05/10/2019	Johnston, Shawn	03/23/2021*
Dix, Kelsey	05/10/2019	Cropper, Brian	03/23/2021*
Estes, Camilla	05/10/2019		

* Focused survey for chocolate lily (*Fritillaria biflora*).

1.3.3 Survey Limitations

There are inherent limitations to field surveys that affect species detections. These limitations may result in species not being detected that may, in fact, occur within the site. Survey limitations include the time of day, season, duration of survey, weather conditions, and surveyor experience. All reasonable efforts have been made by the County to reduce the possibility of species being omitted from the analysis in this report. Specifically, the analysis presented in this report regarding the potential for a species to occur on-site relies on a variety of factors, including an extensive literature and database review (see Section 1.3.1) and discussions with state and local biological resource experts, including the Back Country Land Trust and staff members from USFWS and CDFW.

1.3.3.1 Englemann Oak Surveys

To ensure the maximum avoidance possible within Engelmann oak (*Quercus engelmannii*) stands, two additional surveys were conducted within the Engelmann oak woodland mapped in and adjacent to the proposed Alpine County Park. The first survey was conducted on July 8, 2020, by ICF vegetation ecologist Makela Mangrich and biologist Sara Galindo, who mapped the locations of all Engelmann oak trees in this area as point data using a global positioning system (GPS) unit with sub-meter accuracy and recorded general data on the health and size of the oaks. A second survey was conducted on September 1, 2020, by the County's arborist, Dario Lombardo, and Makela Mangrich to confirm health and size of the oaks. Based on these surveys, additional refinements were made to the vegetation mapping for the Open Engelmann Oak Woodland polygons in this area. Section 3.5.5, Oak Woodlands, of the County's *Report Format and Content Requirements* document stipulates, "For oak woodland habitats, the edge of the canopy defines the woodland boundary…" Using both the SANDAG 2017 and 2019 full-color aerial images as well as the field point data, ICF was able to delineate the edge of the canopy for the Engelmann oaks within and adjacent to the proposed impact area. This level of detail was restricted to only those oaks adjacent to proposed impact areas; this secondary refinement was not conducted on all oaks throughout the BSA.

1.3.3.2 Fairy Shrimp Wet and Dry Season Surveys

Wet Season

ICF biologists performed surveys for listed large branchiopods (fairy shrimp [FS]) in accordance with USFWS *Survey Guidelines for the Listed Large Branchiopods* (FS Guidelines) (USFWS 2017). Wet-season surveys conducted in accordance with the FS Guidelines included hydrology verification visits after storm events to determine when features were inundated. Sampling surveys began no later than 7 days following the initial inundation and continued once every week until the features were no longer inundated or until 120 days of continuous inundation. If the features dried and refilled during the season, each feature was sampled no later than 7 days after refilling. A full sampling survey schedule and detailed methods for the wet-season survey are provided in Appendix B.

Dry Season

On September 13, 2019, FS biologist Brian Lohstroh (Permit# TE-063608-6), assisted by Ryan Layden (TE-12069D-0), collected soil samples for the dry-season survey. The survey area was an approximately 35-acre area of the property that had appropriate topography and clay soils to allow for development of road pools. Soil samples were collected when seasonally inundated depressions

were dry. A hand trowel was used to collect soil samples from the top 1 to 3 centimeters of depression soil. Whenever possible, soil samples were collected in chunks; the trowel was used to pry up intact chunks of sediment. Loosening the soil by raking or shoveling was avoided because such methods can damage cysts. For each of the 28 seasonally inundated depressions, two perpendicular transects were visually estimated, with one transect passing along the depressions' lowest point and the second transect passing through the depressions' second-lowest point. Ten samples of approximately 100-milliliter aliquots were removed at each sub-sample site (for a total of 1 liter per ponded area), ensuring that no more than 10 percent of the sampled vernal pool's surface area was disturbed. Soil samples were taken as follows: two in the pool's lowest point, one at the pool's second-lowest point, and two radiating in each of the four directions on the transect lines, at least 1 meter from the pool center. Each label included the information necessary to identify the collection date, location of feature, and name of collector for each sample.

Soil samples were processed by ICF FS biologist and USFWS permitted cyst identifier Dale Ritenour (Permit# TE-58888A-2.1), in accordance with the FS Guidelines. The soil samples were measured and placed in 10 individual plastic containers. The samples were hydrated in tap water, then washed through a set of sieves. Material passing through a Number 45 (355-micrometer) USA Standard Testing Sieve, A.S.T.M.E.-11 specification, was caught on a Number 70 (212-micrometer) sieve. The 355-micrometer sieve allows the passage of cysts; the 212-micrometer sieve was selected as the appropriate size for collecting cysts from large branchiopods whose ranges include the BSA in San Diego County, including San Diego FS (*Branchinecta sandiegonensis*), Lindahl's FS (*Branchinecta lindahli*), and Riverside FS (*Streptocephalus woottoni*). The 212-micrometer sample material was rinsed in a container with approximately 300 milliliters of a saturated brine solution to float organic material, including FS cysts. The material floating on the brine was decanted onto a paper filter. The organic material collected on the paper was examined under a stereo zoom microscope. Distinctive FS cysts were counted if present. All sieves were soaked in a bleach solution and then thoroughly cleaned after completion of the procedure for each depression to ensure that no cysts adhered to the surfaces of the sieves.

1.3.3.3 Quino Checkerspot Butterfly (*Euphydryas editha quino*) Surveys

Protocol surveys for the Quino checkerspot butterfly (QCB) (*Euphydryas editha quino*) were performed over two consecutive years, 2019 and 2020. For both years, the survey methodology followed the December 15, 2014, USFWS *Quino Checkerspot Butterfly Survey Guidelines* (QCB Guidelines) (USFWS 2014). In 2019, surveys were conducted only within the 94.2-acre County-owned parcels, of which approximately 83 acres were determined to be potential habitat for QCB and therefore surveyed in accordance with the QCB Guidelines. In 2020, surveys were repeated within the 83 acres of suitable habitat on the County-owned parcels and within suitable habitat on the 231-acre Wright's Field property, directly adjacent to the west of the County property.

For both 2019 and 2020 surveys, biologists surveyed at a rate of no more than 15 acres per hour, in accordance with the QCB Guidelines. Each survey involved walking transects throughout all non-excluded (i.e., areas with suitable habitat for QCB) portions of the survey area. The surveyors stopped periodically to scan adjacent areas for moving butterflies. Butterflies were identified by sight with the aid of close-focus binoculars. All butterfly species observed were recorded. Plant species flowering during the survey period were recorded and assessed as potential QCB nectar and/or larval host plants. A list of potential QCB nectar sources and larval host plants identified during surveys is presented in Appendix C. Butterfly identification and nomenclature is based on Shiraiwa (2009) and North American Butterfly Association (2016).

Vegetation communities are mapped based on Holland (1986) and Oberbauer et al. (2008), and plant nomenclature is based on Baldwin et al. (2012). Survey conditions and survey schedules for both the 2019 and 2020 surveys are provided in Appendix C.

2019 QCB Surveys

A site assessment was conducted by ICF biologist Brian Lohstroh (TE-063608-6) on February 8, 2019, before the first QCB survey. Brian conducted a general field survey of the site and mapped excluded areas (i.e., areas without suitable QCB habitat). Brian Lohstroh, James Hickman (TE-60218B-0), and Dale Ritenour (TE-58888A-2.1) conducted the surveys on a weekly basis under acceptable weather conditions, as defined in the QCB Guidelines (Table 3) (USFWS 2014). A total of 11 protocol surveys for adult QCB were conducted by ICF biologists between February 27 and May 3, 2019. In rainy weeks without appropriate weather conditions, two surveys were conducted in the following week, with at least one day between surveys. During the last week of the survey window, no survey days met the required weather conditions. Because surveys cannot be made up after the survey window ends, no surveys were conducted during the last week. As described in Chapter 3, QCB was observed during the seventh week of surveys. Page 2 of the QCB Guidelines states that surveys shall continue "until a Quino is detected." As a result, the surveys could have stopped after the seventh week, but the four additional surveys were conducted to provide additional depth and understanding of the degree to which QCB utilizes the site.

A portion of the northern survey area initially included in the survey was determined, upon closer examination in the field, to be too dense to support QCB and thus was determined to be a "closed canopy woody vegetation" stand, as identified in the "excluded areas" definition on page 1 of the QCB Guidelines.

2020 QCB Surveys

During 2020, the following USFWS-permitted QCB biologists performed protocol surveys for QCB within both Wright's Field and County-owned parcels: Brian Lohstroh (TE-063608-6), Korey Klutz (TE-036065-3), Brenda Bennett (TE-063230-5.4), Ian Hirschler (TE-063230-5.4), Melanie Rocks (TE-082908-2), and Ryan Meszaros (TE-20186A-3.1). Protocol surveys ceased after the third weekly survey because QCB was observed on both Wright's Field and County-owned parcels that week. However, additional QCB surveys and refinements to host plant mapping occurred after that date, from approximately March 9 to March 30, 2020.

Host Plant Mapping

In 2020, biologists mapped QCB host plants on both the County-owned parcels and Wright's Field as either a polygon or as a point (when occurrences of host plants were small) using GPS units with sub-meter accuracy. Host plant population counts were also made during the peak phenological conditions for the host plant, which occurred in March 2020. Estimates were made for host plant occurrences larger than approximately 200 to 300 plants using accepted practices (e.g., 1-meter sample plots extrapolated to the larger occurrence or other ocular estimates made after sampling a smaller subset). Multiple passes of the host plant mapping were made using the Esri Collector application to ensure accuracy in the mapping beginning in early February and ending in late March 2020.

1.3.3.4 Hermes Copper Butterfly (*Lycaena hermes*) Surveys

Presence/absence surveys for the Hermes copper butterfly (HCB) (*Lycaena hermes*) were performed over two consecutive years, 2019 and 2020. In 2019, surveys were conducted only within the 94.2-acre BSA. In 2020, surveys were repeated within the County-owned parcels and within suitable habitat on the 231-acre Wright's Field property, directly adjacent to the west of the County property. For both years, the survey methodology followed a modified version of the guidelines prepared by the County for evaluating the potential impacts within its jurisdiction (County 2010a), combined with relevant portions of the USFWS QCB Guidelines (2014). Although the County guidelines call for four surveys for HCB, the consensus among HCB biologists is that weekly surveys for this species should be conducted during its flight period, as is the practice for QCB. This modified approach maximizes the detection of the HCB and is based on recent updates to the biology of the species. In addition, the County guidelines indicate that surveys for HCB need only be conducted in areas where their larval host plant, spiny redberry (*Rhamnus crocea*), occurs in proximity (within 15 feet) to California buckwheat (*Eriogonum fasciculatum*), their primary nectar plant (i.e., suitable habitat). It should be noted that HCB has been observed using various other species as a nectar source (USFWS 2020); therefore, suitable habitat for HCB has been modified to include areas where the HCB's host plant occurs, regardless of whether it is found in proximity to California buckwheat.

The HCB surveys in 2019 and 2020 were conducted by QCB-permitted biologists because of their familiarity with the QCB Guidelines as well as the local butterfly species. The HCB surveys followed the same survey frequency and weather requirements as the USFWS 2014 QCB Guidelines (e.g., weekly surveys, air temperature at least 60 degrees Fahrenheit [°F] on clear days and 70°F on cloudy days, winds below 15 miles per hour). Surveys were conducted during the HCB flight season, which spans from the third full week of May to the first full week of July.

In 2019, a total of eight surveys for HCB were conducted by ICF biologists Brian Lohstroh (QCB permit #TE-063608-6) and James Hickman (QCB permit #TE-60218B-0). An additional survey was conducted at the site with approval of the Project proponent due to an observed extension of suitable phenological conditions and the relatively late emergence of HCB at reference sites. In 2020, a total of eight surveys for HCB were conducted by ICF biologists Brian Lohstroh (permit #TE-063608-6) and Antonette Gutierrez (permit #50992B-1). Survey conditions and survey schedules for both 2019 and 2020 surveys are provided in Appendix D.

1.3.3.5 Burrowing Owl (*Athene cunicularia*) Surveys

Due to the presence of suitable habitat within the BSA, a habitat assessment and protocol surveys were conducted for burrowing owls (*Athene cunicularia*), in accordance with the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).

Habitat Assessment

An evaluation of the BSA was performed to identify suitable habitat for burrowing owl. The entire proposed Alpine County Park and all trails were surveyed by walking 10-meter transects to ensure that all burrows were detected. As burrows were encountered, they were inspected for any burrowing owl sign (e.g., tracks, pellets, white-wash, feathers, prey parts). The locations of all potential burrows or burrow complexes were recorded and mapped as GPS point locations; these burrows were later checked during the breeding season surveys.

Protocol Surveys

Protocol surveys for burrowing owl were performed in areas determined to be potentially suitable habitat. Because burrowing owls require suitable burrows to live in year-round, only those areas with suitable burrows were considered. Areas that did not contain burrows, or did not contain burrows that would be suitable for owls to live in, were excluded from future surveys. Burrows within the study area that were identified as suitable were given an individual 500-foot buffer. These suitable burrows and 500-foot buffers composed the final burrowing owl survey area and were revisited during focused protocol surveys. Transects were walked throughout all areas within 500 feet of a suitable burrow. Each suitable burrow was also checked during each survey for any sign of burrowing owl use.

The CDFW protocol for focused burrowing owl surveys requires the first of the four required site visits to occur between February 15 and April 15 and the last three site visits to occur between April 15 and July 15, with at least one visit between June 15 and July 15 (California Department of Fish and Game 2012). The protocol surveys were conducted during weather that was conducive to observing burrowing owls outside burrows and detecting sign. These were performed in the morning (between 0600 and 1000) and/or at dusk (between 1800 and 2020). Survey dates, times, and weather conditions during the burrowing owl protocol surveys are provided in Table 2.

Table 2. Burrowing Owl Survey Dates and Conditions

Date	Survey Personnel	Weather	Time On-Site
04/06/2019	James Hickman	Overcast, 64°F–70°F	3 hours, 45 minutes
05/24/2019	James Hickman	Partly Cloudy, 42°F–59°F	3 hours
06/18/2019	James Hickman	Partly Cloudy, 54°F–64°F	3 hours, 30 minutes
07/13/2019	James Hickman	Partly Cloudy, 70°F–80°F	3 hours 30 minutes

1.3.3.6 Coastal California Gnatcatcher (*Polioptila californica californica*) Protocol Surveys

The BSA contains coastal sage scrub habitats that have potential to support coastal California gnatcatcher (CAGN), which is federally listed as threatened. The BSA exists within an approved habitat conservation plan (HCP)/natural community conservation plan (NCCP) area, the County's approved MSCP County of San Diego Subarea Plan (County 1997); therefore, in accordance with USFWS *Coastal California Gnatcatcher Survey Guidelines* (USFWS 1997), three surveys were conducted for the Project in 2019 (Table 3). The presence/absence focused surveys for CAGN were conducted for the Project between July 10 and July 24, 2019, under the authorization of USFWS permit holder and ICF biologist Brian Lohstroh (TE-063608-6). Recorded CAGN vocalizations were broadcast only to initially locate CAGN. The surveys were conducted on foot with the aid of binoculars. A full description of the survey methods is provided in Appendix F.

Table 3. CAGN Survey Dates and Conditions

Date	Survey Personnel	Weather	Time On-Site
07/10/2019	Brian Lohstroh	Sunny, 64°F–72°F	3 hours
07/17/2019	Brian Lohstroh	Sunny, 63°F–77°F	3 hours 15 minutes
07/24/2019	Brian Lohstroh	Partly cloudy, 77°F–85°F	3 hours 30 minutes

1.3.3.7 Bat Surveys (2019)

Passive and active bat surveys were conducted by Drew Stokes of the San Diego Natural History Museum in 2019. Drew used Titley Electronics Anabat bat detectors, the unaided ear, and visual techniques, which included use of a handheld spotlight. Additional methods used during these surveys are provided in Appendix G.

Passive Surveys

Four "Passive Express" Anabat bat detectors were deployed at suitable and representative habitat locations within the BSA (Table 4). The detectors were placed to maximize detections of the entire community of bat species expected in the area. They were run in the summer (July 8–10, 2019) and again in the fall (September 3–5, 2019) to document both resident and migratory bats in the preserve (Table 4). The detectors ran for 3 consecutive nights during each of the two sampling periods. The detectors automatically turned on 30 minutes before sunset and turned off 30 minutes after sunrise. During each nightly monitoring period, bat calls were automatically recorded to a data card. The calls were then downloaded and analyzed in the laboratory after the field surveys. The calls were identified to the species level in as many cases as possible by making comparisons to known bat calls. All bat call identification was carried out manually by Drew Stokes, who has more than 23 years of bat call identification and vetting experience in the Southern California and Baja California, Mexico, region.

Table 4. Passive Bat Survey Dates

Date	Survey Method
07/08/2019	"Passive Express" Anabat detector
07/09/2019	"Passive Express" Anabat detector
07/10/2019	"Passive Express" Anabat detector
09/03/2019	"Passive Express" Anabat detector
09/04/2019	"Passive Express" Anabat detector
09/05/2019	"Passive Express" Anabat detector

Active Surveys

Active Anabat surveys were carried out using a Titley Electronics Anabat "walkabout" bat detector, allowing for real-time bat call observation and identification. The bat calls were also recorded and manually identified in the laboratory after the field surveys were conducted. One active survey was conducted on August 5, 2019, starting at a point in the northern portion of the survey area and then hiking an elliptical transect counterclockwise, covering the northern half of the survey area and ending at the starting point after a 2-hour monitoring period (Table 5). The unaided ears were also used to listen for audible bat echolocation calls, such as those produced by the western mastiff bat (*Eumops perotis*). The second active survey was conducted on August 6, 2019, starting at a point in the southern portion of the preserve. An elliptical transect was hiked counterclockwise, covering the southern rocky/scrubby portion of the survey area and ended at the starting point after a 2-hour monitoring period. When possible, visual observations of bats and other nocturnal wildlife were made using a handheld spotlight.

Table 5. Active Bat Survey Dates

Date	Survey Personnel
08/05/2019	Drew Stokes
08/06/2019	Drew Stokes

1.3.3.8 Bat Surveys (2022)

ICF conducted additional bat surveys in four locations in July 2022 to assess bat usage within the southern grasslands of the BSA. Two Pettersson D500X ultrasound recording units were set up within the areas proposed for preservation lands, and two Pettersson D500X ultrasound recording units were set up within the proposed footprint for the active park. Recordings of bat echolocation calls were downloaded from each monitor and processed using Sonobat version 4.2.2. See Appendix H for additional details on the methods for this survey.

1.3.3.9 Wetlands/Aquatic Resources

During the habitat assessment conducted within the BSA as part of the initial vegetation mapping in February and March 2019, ICF biologists searched the BSA for any indication of surface water flows to determine if a delineation of potentially jurisdictional aquatic features was required. No such surface water features were observed on-site; as a result, no formal delineation of jurisdictional water features was required or conducted.

1.4 Environmental Setting (Existing Conditions)

1.4.1 Physical Characteristics

The BSA is in the central foothills of San Diego County, within the unincorporated community of Alpine. The natural setting of the BSA to the south consists of relatively flat grasslands, with the lowest point to the southwest and sloping upward slightly, heading both north and east. Terrain is rougher to the north, containing boulders and rock outcrops dominated by scrub, chaparral, and woodland. Hills are steeper than they are to the south; a small hilltop exists just east of the northeast corner of the BSA. Land surrounding the BSA is relatively flat, partially due to grading from developments. Steeper mountains with canyons, ravines, and drainages exist farther south and north, outside of Alpine. Nearby reservoirs include El Capitan Reservoir to the north and Loveland Reservoir to the south. Elevations on the BSA range from approximately 1,900 feet above mean sea level at the southwest corner along South Grade Road to approximately 2,100 feet above mean sea level at the northeast corner of the BSA.

Several dirt trails traverse the BSA, most notably in the northern portion. Trails connect the eastern edge of the property to the west and south, then connect farther west, off the property, and continue into Wright's Field. South Grade Road, a paved two-lane road, borders the BSA to the south and east.

1.4.2 Soil

The preserve is situated atop the Southern California batholith, which consists of Cretaceous granitic rocks. The Natural Resources Conservation Service has mapped the soil series Bosanko stony clay, Cieneba very rocky coarse sandy loam, Cieneba-Fallbrook rocky sandy loam, Cieneba rocky coarse

sandy loam, Cieneba coarse sandy loam, Cieneba-Fallbrook rocky sandy loams, and Fallbrook rocky sandy loam as occurring within the survey area (USDA/NRCS 2019). Most of the site is mapped as Bosanko stony clay (USDA/NRCS 2019).

The **Bosanko** soil series in the BSA is characterized as a stony clay with 20 percent stones and cobblestones in the surface layer; it slopes from 5 to 9 percent. It is 24 to 36 inches deep over decomposed rock and has a 3- to 5-inch water-holding capacity, with slow to medium runoff and slight to moderate erosion hazard (USDA/NRCS 2019). In the BSA, this soil series is found primarily in the southern half of the property on the grasslands and in a smaller area north of the boulder outcrops.

The **Cieneba** soil series in the BSA is characterized as very rocky, coarse sandy loams with slopes from 30 to 75 percent. It is typically very steep and has rock outcrops and large granodioritic boulders on the surface; runoff and erosion hazards are very high. This soil is mapped in a small area along the northern boundary of the property but does extend farther north and east.

The **Cieneba-Fallbrook** soil series in the BSA is characterized as a rocky sandy loam with slopes from 9 to 30 percent, containing about 55 percent Cieneba coarse sandy loam and 40 percent Fallbrook sandy loam. Cieneba coarse sandy loam is excessively drained, with moderately rapid permeability. Fallbrook sandy loam is well drained, with moderately slow permeability in the subsoil. Runoff is medium to rapid, and both soils have moderate to high erosion hazard. These soils are mapped in the center portion of the property amidst rock outcrops and boulders in primarily open Engelmann oak and Diegan coastal sage scrub habitat.

The **Fallbrook** soil series in the BSA is characterized as sandy to rocky sandy loams with slopes from 9 to 30 percent. It has low fertility, medium to rapid runoff, and a moderate to high erosion hazard. This soil is mapped in the northern portion of the property, a little south of the northern border.

1.4.3 Fire

The BSA contains chaparral vegetation, which is naturally maintained by infrequent fires, as well as grasslands, coastal sage scrub, and woodlands. Fire cycles in and surrounding the BSA have very likely been altered by surrounding development and brush management actions associated with the development. The BSA has not burned since the Laguna Fire in 1970 when the northern portion of the BSA was burned (California Department of Forestry and Fire Protection [CAL FIRE] 2019; San Diego Geographic Information Source [SanGIS] 2018). The West Fire in 2018 approached from the northeast but did not burn within the BSA or within the adjacent Wright's Field preserve.

1.4.4 Hydrology

The BSA is split between two watersheds. The northern, rockier half of the BSA is in the El Capitan Hydrologic Area of the San Diego River Watershed (SanGIS 2006). Surface water in this area flows into the San Diego River and, eventually, the Pacific Ocean. The southern half of the BSA is in the San Vicente Hydrologic Area of the Sweetwater River Watershed (SanGIS 2006), with surface waters flowing into the Sweetwater River and eventually to the Pacific Ocean. No surface waters are visible within the BSA.

1.4.5 Existing Land Use

The BSA is not currently open to the public. DPR personnel perform periodic ranger patrols and monitor the property to ensure it is maintained and illegal access does not occur. Access onto the property is likely to occur because of the BSA's proximity to Wright's Field, an open preserve.

1.4.6 Land Ownership in Vicinity

The BSA is bordered to the west and north by open space lands known as Wright's Field, owned by the Back Country Land Trust, with which the County is actively coordinating. Semi-rural residences border the BSA to the southwest, north, and east. Additional open space is to the south of the BSA, with one lone residence within this area.

1.4.7 Existing Roads and Trails

The BSA contains no formalized trails or roads, but several informal trails traverse the property, most notably in the northern portion. An informal dirt road begins on the eastern boundary of the BSA along South Grade Road and provides access to the property and the adjacent Wright's Field. Many trails extend west and north, in areas where the public travels to Wright's Field to the west and toward the hilltop peak in the north-central portion of the BSA. At least three additional trails extend south to South Grade Road and west to adjacent residences. Some trails and other areas within the BSA show signs of off-road vehicle activity; tire tracks can be seen from aerial imagery (Google Earth).

1.4.8 Existing Fire Fuel Management

Current Fire Fuel Reduction Zones. In accordance with the County Consolidated Fire Code and the Alpine Fire Protection District Ordinance, the County is clearing vegetation within the following fire fuel reduction zones, which, historically, have been cleared per the direction of the Alpine Fire District. These recommendations are also contained within the Fire and Emergency Operational Assessment (FEOA) prepared by Rohde & Associates.

- At the far northeastern edge of the County's parcel where it abuts residences along Engelmann Oak Lane, within 100 feet south of their property line. This area is currently cleared of all vegetation and mapped as disturbed habitat.
- Along South Grade Road, within 30 feet of the road edge along the County's parcel. This area includes predominantly Valley needlegrass grassland and smaller stands of open Engelmann oak woodland at the northern and eastern edges of the County's property, transitioning to denser scrub vegetation with moderate to steep slopes and three Engelmann oak trees toward the southern and western edge of the County's property. No Engelmann oaks were removed as part of these activities, but the trees were limbed.

1.4.9 Regional Context

The BSA is within the Metro-Lakeside-Jamul segment of the MSCP County Subarea Plan (County 1997). The entirety of the BSA was designated as Pre-approved Mitigation Area in the MSCP County Subarea Plan. The Wright's Field property, directly to the west of the BSA, is within this same Pre-approved Mitigation Area designation. Further surrounding the BSA is unincorporated land within the Metro-Lakeside-Jamul segment of the MSCP. The BSA is at the far eastern end of the MSCP County Subarea Plan.

1.4.10 Habitat Types/Vegetation Communities

Vegetation mapping within the BSA was conducted by ICF biologists in February and March 2019 by walking meandering transects and observing from selected vantage points that allowed an expansive view of the BSA. An additional vegetation survey was conducted in June and July 2022 to update vegetation conditions within the BSA and to confirm that mapping met a 0.10-acre minimum mapping unit requirement. The 94.2-acre BSA supports 11 vegetation communities/land cover types (Table 6; Figure 3). Vegetation communities were described and assigned numerical codes according to the *Terrestrial Natural Communities of California* (Holland 1986), as modified by Oberbauer et al. (2008). The habitat types/vegetation communities and land cover types observed within the BSA were disturbed habitat; Diegan coastal sage scrub; Diegan coastal sage scrub, *Baccharis* dominated; flat-topped buckwheat; coastal sage-chaparral transition; southern mixed chaparral; Valley needlegrass grassland; non-native grassland; open Engelmann oak woodland; non-native woodland; and eucalyptus woodland (Appendix A: Figure 3). Valley needlegrass grassland is the most common vegetation community in the BSA, composing approximately 26.1 acres of the 94.2-acre BSA.

Table 6. Vegetation Communities Occurring within the BSA

Oberbauer Code	Vegetation Community	Area in BSA (acres)
11300	Disturbed Habitat	2.0
	Disturbed Habitat – Northern Fire Fuel Modification Area	0.7
32500	Diegan Coastal Sage Scrub	12.2
	Disturbed Diegan Coastal Sage Scrub	0.5
32530	Diegan Coastal Sage Scrub, Baccharis dominated	2.5
32800	Flat-topped Buckwheat	10.1
	Disturbed Flat-topped Buckwheat	9.1
	Flat-topped Buckwheat – Existing Fire Fuel Reduction Zone	0.2
37G00	Coastal Sage-Chaparral Transition	11.0
37120	Southern Mixed Chaparral	4.0
42110	Valley Needlegrass Grassland	24.4
	Disturbed Valley Needlegrass Grassland	0.7
	Valley Needlegrass Grassland – Existing Fire Fuel Reduction Zone	1.1
42200	Non-native Grassland	8.4
	Non-native Grassland – Existing Fire Fuel Reduction Zone	< 0.1
71181	Open Engelmann Oak Woodland	7.1
79000	Non-native Woodland	0.2
79100	Eucalyptus Woodland	0.1
Total*		94.2

*sum of values does not equal total because of rounding.

The County currently clears vegetation in accordance with the County Consolidated Fire Code and local Alpine Fire Protection District ordinance and in coordination with the Alpine Fire District. Areas along South Grade Road are mowed very close to the ground within 30 feet of South Grade

Road, as needed, by the County of San Diego. The County also removes vegetation (to bare ground conditions) along the northern edge of the County's property within 100 feet, where adjacent to existing housing parcels, for fire fuel reduction purposes.

1.4.10.1 Disturbed Habitat (11300)

Disturbed habitat supports either no vegetation or a cover of non-native weedy species that are adapted to a regime of frequent human disturbance. Many of the characteristic species of this habitat are also indicator species of annual grasslands, although disturbed areas tend to be dominated more by forbs than grasses. Characteristic species may include tumblewood (*Salsola tragus*), tocalote (*Centaurea melitensis*), Italian thistle (*Carduus pycnocephalus*), bristly ox-tongue (*Helminthotheca echioides*), and African crown daisy (*Glebionis coronaria*).

Disturbed habitat within the BSA consists of unformalized dirt roads and unformalized multi-use trails. Disturbed habitat is not considered a sensitive vegetation community.

1.4.10.2 Diegan Coastal Sage Scrub (32500)

Diegan coastal sage scrub is a scrub community consisting of low, soft-leaved woody subshrubs, with few more than 1 meter high (Holland 1986). Most species are active in winter and early spring and drought deciduous in late spring or early summer. This community is most often dominated by California sagebrush (*Artemisia californica*) and California buckwheat.

Diegan coastal sage scrub in the BSA is dominated by California buckwheat, with California sagebrush, laurel sumac (*Malosma laurina*), deerweed (*Acmispon glaber* var*. glaber*), white sage (*Salvia apiana*), and San Diego monkey flower (*Diplacus australis*) also occurring. Diegan coastal sage scrub in the BSA exists primarily in the west-central portion of the BSA. Disturbed stands of Diegan coastal sage scrub exhibiting higher anthropomorphic disturbance (e.g., invasive species) were also noted within the BSA.

1.4.10.3 Diegan Coastal Sage Scrub, Baccharis Dominated (32530)

Diegan coastal sage scrub, Baccharis dominated, is similar to Diegan coastal sage scrub (32500) but dominated by *Baccharis* species. It is often found with other forms of Diegan coastal sage scrub and on upper terraces of river valleys. Diegan coastal sage scrub, Baccharis dominated, is found in only a few small stands in the northern portion of the BSA and dominated by broom baccharis (*Baccharis sarothroides*).

1.4.10.4 Flat-topped Buckwheat (32800)

Flat-topped buckwheat is a scrub community found in coastal areas and foothills throughout San Diego County. This monoculture community usually results from disturbance and transitioning to coastal sage scrub or chaparral. Dominant plant species include California buckwheat and deerweed. Flat-topped buckwheat was found primarily in transition areas between the coastal sage scrub stands at the north-central portions of the BSA and the grassland stands at the southern end of the BSA. An area of flat-topped buckwheat at the northeastern portion of the BSA was cleared prior to the 2019 vegetation mapping effort but has since passively recovered. This stand has a higher concentration of invasive species, such as tocalote (*Centaurea melitensis*) and broom baccharis (*Baccharis sarothroides*).

1.4.10.5 Coastal Sage-Chaparral Transition (37G00)

Coastal sage-chaparral is a transitional community, containing a mix of sclerophyllous, woody chaparral species and drought-deciduous, malacophyllous sage scrub species. The dominant plant species for this community are chamise (*Adenostoma fasciculatum*) and California sagebrush (*Artemisia californica*), which are generally equal in cover. Laurel sumac (*Malosma laurina*), black sage (*Salvia mellifera*), and lemonade berry (*Rhus integrifolia*) are more common in coastal sage scrub, while *Ceanothus* species and Mission manzanita (*Xylococcus bicolor*) are more common in chaparrals. This vegetation community was observed in only a few small stands at the far northern and far southern ends of the BSA.

1.4.10.6 Southern Mixed Chaparral (37120)

Southern mixed chaparral typically consists of broad-leaved sclerophyllous shrubs, approximately 1.5 to 3 meters tall. This vegetation community may include patches of bare soil. It sometimes forms a mosaic with coastal sage scrub. Southern mixed chaparral has high ecological value because it can contain special-status plant species and provide nesting and foraging habitat for several wildlife species. Within the BSA, this community was dominated by Mission manzanita (*Xylococcus bicolor*) and sugar bush (*Rhus ovata*).

1.4.10.7 Valley Needlegrass Grassland (42110)

Valley needlegrass grassland is a mid-height (to 2 feet) grassland dominated by perennial, tussock-forming purple needle grass (*Stipa pulchra*). Native and introduced annuals occur between the perennials. A 5 to 10 percent cover threshold of native species indicates it is native grassland.

The Valley needlegrass grassland in the BSA has high conservation value. It is at the central and southern area of the BSA and represents a large, contiguous vegetation community that is unique in the area. This community is also known to support special-status species, including QCB, and it is considered prime foraging habitat for several species of raptors. Disturbed stands of Valley needlegrass grassland at the northwest edge of the BSA, directly adjacent to Wright's Field, were noted. These stands exhibit higher anthropomorphic disturbance (e.g., invasive species).

1.4.10.8 Non-Native Grassland (42200)

Non-native grassland is characterized by a dense to sparse cover of annual grasses, reaching up to 1 meter (3 feet), which may include numerous native wildflowers, particularly in years of high rainfall. These annuals germinate with the onset of the rainy season and set seeds in the late spring or summer. This community is usually found on fine-textured soils that transition from moist or waterlogged in the winter to very dry during the summer and fall (Holland 1986). Non-native grasslands, in many circumstances, have replaced native grasslands as a result of disturbance (directly manmade [e.g., mechanical disturbance, grazing] or natural [e.g., altered fire cycles]).

The non-native grassland on the site has high conservation value due to its relative lack of disturbance and adjacency to high-quality native grasslands. Stands of non-native grassland in the BSA are devoid of noxious weeds and have a relatively high cover of native forb species. For example, in the northern portion of the large grassland block of habitat in the BSA, the non-native grasslands include approximately 50 to 75 percent absolute cover of fascicled tarplant (*Deinandra fasciulata*), with lovely blue-eyed grass (*Sisyrinchium bellum*), blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), and mariposa lilies (*Calochortus* spp.). In the southern and eastern portions of the

grassland block, non-native grasslands support as much as 15 to 20 percent absolute cover of field gumplant (*Grindelia camporum*), along with lovely blue-eyed grass, blue dicks, and mariposa lilies. In the BSA, non-native grasslands are directly adjacent to, and function as a mosaic within, the larger Valley needlegrass grassland. These non-native grasslands represent a large, contiguous vegetation community that is unique in the area. This community is also known to support special-status species, including QCB, and considered prime foraging habitat for several species of raptors.

1.4.10.9 Open Engelmann Oak Woodland (71181)

Engelmann oak woodland is an evergreen woodland dominated by Engelmann oaks, typically with an understory of annual grasses. The community is found on fine-textured soils in areas with gentle slopes and in valley bottoms. It surrounds grassland meadows and often occupies the ecotone between the grassland and the surrounding shrublands. Engelmann oak is a CRPR List 4.2 species and County List D species and the dominant plant species within the areas mapped as Engelmann oak woodland. Engelmann oak woodland occurs in the northern half of the BSA in scattered locations.

As with the other woodlands found within the survey area, the open Engelmann oak woodland has high ecological value. Oak woodlands are considered special-status vegetation communities by the County and state and provide nesting habitat and valuable cover for a wide range of wildlife species. The oak woodland within the survey area provides suitable nesting habitat for several species of raptors and other birds.

1.4.10.10 Non-native Woodland (79000)

Non-native woodlands consist of exotic trees, usually intentionally planted, that are not maintained or artificially irrigated. This vegetation classification does not usually apply where the trees have naturalized or where they are in found within riparian woodlands. In the BSA, non-native woodlands were mapped for all areas of non-native ornamental trees that were not dominated by *Eucalyptus* species. Specifically, these stands included Russian olive (*Elaeagnus angustifolia*) trees planted for ornamental purposes.

1.4.10.11 Eucalyptus Woodland (79100)

Eucalyptus woodland is a non-native woodland habitat that can be single trees with little to no shrubby understory to scattered trees with a well-developed shrubby understory. Eucalyptus species hinder the ability of other species to grow because of the large amounts of leaf and bark litter produced by eucalyptus. Three small stands of eucalyptus woodland occur in the far northern end of the BSA.

1.4.11 Flora

Overall, nearly 120 unique vascular plant species were observed within the survey area during the special-status plant field surveys, most of them native species. All vascular plant species observed are listed in Appendix I. Seven sensitive plant species observed in the survey area are discussed in Section 1.4.12, below.

1.4.12 Sensitive Plant Species

No federally or state-listed endangered or threatened plant species were observed within the BSA. Eight sensitive plant species were observed in the BSA, including seven sensitive plant species included in the CNPS Rare Plant Inventory. These seven CNPS species included decumbent goldenbush (*Isocoma menziesii* var*. decumbens*), delicate clarkia (*Clarkia delicata*), Engelmann oak (*Quercus engelmannii*), Palmer's grapplinghook (*Harpagonella palmeri*), San Diego County viguiera (*Bahiopsis laciniata*), small-flowered microseris (*Microseris douglasii* ssp*. platycarpha*), and Southern California black walnut (*Juglans californica*) (Figure 4). Chocolate lily (*Fritillaria biflora*), observed within the BSA, is a County List D plant, indicating it has a limited distribution or is uncommon but not presently rare or endangered.

The literature review and database search (see Section 1.3.1) identified 83 special-status plant species that occur within the USGS 7.5-minute Alpine quadrangle map and the surrounding nine quadrangles. Because of the large number of potentially occurring special-status plants that were returned in this query (more than 100 species), an additional elevation restriction of 1,500 to 2,500 feet was applied. This elevation range is approximately 400 feet above and below the elevation range within the BSA. These species were evaluated for their potential to occur within the BSA and are discussed in Appendix J. After evaluating each species listed from the database query, accounting for the three thorough special-status plant surveys done in 2019, which was an excellent rain year for Southern California, all species listed in the query that were not observed within the BSA were determined to have little to no potential to occur on-site.

1.4.12.1 Sensitive Plant Species Observed within the BSA

Decumbent goldenbush (*Isocoma menziesii* var*. decumbens*) is listed as a CRPR 1B.2 and a County List A species. This perennial shrub utilizes coastal sage scrub habitat intermixed with grasslands and is more partial to clay soils than other closely related varieties (Reiser 2001). Approximately 226 individuals were observed in non-native grasslands in the southern portion of the survey area and in Valley needlegrass grassland in the eastern portions of the survey area (Appendix A, Figure 4).

Chocolate lily (*Fritillaria biflora*) is a County List D species. It is a bulbiferous perennial found in grasslands and clay soils. Individuals were noted in the southwestern portion of the BSA during 2019 and again during the 2021 survey specifically designed to detect this species. Four unique locations of this species were found, and one plant was noted at each of the four locations (Appendix A, Figure 4).

Delicate clarkia (C*larkia delicata*) is listed as a CRPR 1B.2 and a County List A species. It is an annual herb found in oak woodlands and chaparral. Two individuals were observed in the survey area in Diegan coastal sage scrub habitat (Appendix A, Figure 4).

Engelmann oak (*Quercus engelmannii*) is listed as a CRPR 4.2 and a County List D species. It is commonly found in the foothills between 50 and 1,300 meters. Growing to 12 meters tall, this tree has flat, waxy blue-green leaves and tolerates drier conditions better than coast live oak. Larger individuals are sometimes found growing in savannah grasslands, but the species may also occur as a shrubby element within chaparral. Approximately 127 Engelmann oaks were observed in the northern portions of the BSA in and around the proposed Alpine County Park (Appendix A, Figure 4).

Palmer's grapplinghook (*Harpagonella palmeri*) is listed as a CRPR 4.2 and a County List D species. This annual herb is found in open grassy areas within shrubland between 20 and 955 meters. Approximately 13,857 individuals were observed during special-status plant surveys in 2019 within numerous clay lenses, primarily in the central and southern portions of the site in disturbed flat-topped buckwheat habitat (Appendix A, Figure 4).

San Diego County viguiera (*Bahiopsis laciniata*) is listed as a CRPR 4.2 and County List D species. This perennial shrub is found in chaparral and coastal scrub between 10 and 750 meters. Approximately 67 individuals were observed in coastal scrub/chaparral transitions zones in the most northern and southwestern portions of the BSA (Appendix A, Figure 4).

Small-flowered microseris (*Microseris douglasii* ssp. *platycarpha*) is listed as a CRPR 4.2 and County List D species. This annual herb can be found in clay soils in coastal scrub, valley and foothill grasslands, and vernal pools within 15 to 1,070 meters. Two individuals were observed in Valley needle grassland in the southwestern portion of the BSA (Appendix A, Figure 4).

Southern California black walnut (*Juglans californica*) is listed as a CRPR 4.2 and a County List D species. It is a perennial deciduous tree associated with chaparral, cismontane woodland, coastal scrub, and riparian woodland at elevations ranging from 50 to 900 meters. One individual was observed in the northern portion of the BSA in flat-topped buckwheat habitat (Appendix A, Figure 4).

1.4.13 Special-Status Wildlife

The following special-status wildlife species were observed within the BSA during surveys conducted in 2019, 2020, and/or 2022 and are discussed further in this section:

Invertebrates:

- Quino checkerspot butterfly (*Euphydryas editha quino*)

Reptiles:

- Belding's orange-throated whiptail (*Aspidoscelis hyperythra*)
- Blainville's (Coast) horned lizard (*Phrynosoma blainvillii*)
- Coastal western whiptail (*Aspidoscelis tigris stejnegeri*)
- Red-diamond rattlesnake (*Crotalus ruber*)

Amphibians:

- Western spadefoot (*Spea hammondii*)

Birds:

- Burrowing owl (*Athene cunicularia*) (wintering migrant)
- Cooper's hawk (*Accipiter cooperii*)
- Red-shouldered hawk (*Buteo lineatus*)
- Western bluebird (*Sialia mexicana*)

Mammals:

- Big free-tailed bat (*Nyctinomops macrotis*)
- Pallid bat (*Antrozous pallidus*)
- Pocketed free-tailed bat (*Nyctinomops femorosaccus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Western long-eared myotis (*Myotis evotis*)
- Western mastiff bat (*Eumops perotis*)
- Western red bat (*Lasiurus blossevillii*)
- Western small-footed myotis (*Myotis ciliolabrum*)
- Western yellow bat (*Lasiurus xanthinus*)
- Yuma myotis (*Myotis yumanensis*)

The following special-status wildlife species were determined to have high or moderate potential to occur because of suitable habitat conditions and current or historical ranges lying within the BSA:

Reptiles:

- Baja California coachwhip (*Masticophis fuliginosus*)
- California glossy snake (*Arizona elegans occidentalis*)
- Coast patch-nosed snake (*Salvadora hexalepis virgultea*)
- Coronado skink (*Salvadora hexalepis virgultea*)
- Southern California legless lizard (*Anniella stebbinsi*)

Birds:

- Bell's sage sparrow (*Artemisiospiza belli belli*)
- Burrowing owl (Breeding)
- Ferruginous hawk (*Buteo regalis*)
- Lawrence's goldfinch (*Spinus lawrencei*)
- Grasshopper sparrow (*Ammodramus savannarum*)
- Oregon vesper sparrow (*Pooecetes gramineus affinis*)
- Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)
- White-tailed kite (*Elanus leucarus*)

Mammals:

- Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)
- San Diego desert woodrat (*Neotoma lepida intermedia*)

Based on survey results and a literature review, the following species were determined to have low potential to occur; as a result, impacts on these species are not evaluated in subsequent chapters: HCB, listed FS (*Streptocephalus woottoni*, *Branchinecta sandiegonensis*), and CAGN. Appendix J provides a complete discussion regarding all special-status wildlife species with potential to occur.

Hermes Copper Butterfly (*Lycaena hermes*)

HCB was not detected within the survey area during the surveys in 2019 or 2020. Spiny redberry, the larval host plant of HCB, is distributed in several discrete patches throughout the scrub habitat in the BSA. Many of these redberry patches were also in proximity to patches of California buckwheat, mapped as flat-topped buckwheat stands (Figure 6). Suitable habitat was found in the northern portion and the small southwestern corner of the survey area, consisting of dense Diegan coastal sage scrub and areas of coastal sage-chaparral transition. The HCB survey report is attached as Appendix D.

San Diego and Riverside Fairy Shrimp (*Branchinecta sandiegonensis, Streptocephalus woottoni*)

Two species of federally listed endangered FS are known to occur in San Diego County: San Diego FS and Riverside FS. Twenty-eight basins were observed in the BSA during the wet season; these supported inundation for at least 30 days in 2018–2019, which is enough time for these two species to reach maturity. No FS individuals of either local species (San Diego FS and Riverside FS) were observed during wet-season sampling within the 28 sampled pools. No FS cysts were observed in any of the 28 sampled pools in the 2019 dry-season sampling. The USFWS protocol FS survey report is attached as Appendix B.

Coastal California Gnatcatcher (*Polioptila californica californica*)

CAGN was not detected during the protocol surveys in 2019, and no CAGN were incidentally detected during other biological surveys conducted for the Project in 2019, 2020, and 2022. The BSA is at the far eastern extent of the known range of CAGN and possibly just east of the known current range for this species, based on species occurrence data from USFWS (USFWS CFWO 2020), CNDDB (CDFW 2020), and the SanBIOS database (SANDAG 2020). In addition, the elevation and related weather extremes of the site may preclude occupation by CAGN. The CAGN protocol survey report is attached as Appendix F.

1.4.13.2 Invertebrates

See Appendix J for a complete list of all special-status invertebrates evaluated for occurrence within the BSA. The following sections provide details on invertebrate species that were observed within the BSA during surveys.

Quino Checkerspot Butterfly (*Euphydryas editha quino*)

The QCB survey area within the BSA supports approximately 82.8 acres of non-excluded areas, as defined by USFWS (USFWS 2014). Two adult QCB were observed within the survey area on April 8, 2019. The first QCB observed on April 8 was a female moving north and nectaring on blue dicks (*Dichelostemma capitatum*). The second QCB was a male observed defending an area of nectar plants, including blue dicks. No QCB host plants were observed within this area. These individuals

were not observed during QCB surveys on April 10 or during any subsequent protocol surveys. The 2019 QCB protocol survey report is attached as Appendix C. In 2020, QCB surveys were conducted within the BSA as well as within the adjacent Wright's Field. Two QCB were observed on March 5, 2020: one in the southwestern portion of the BSA and the other adjacent to a large patch of dot-seed plantain on Wright's Field. Figure 5 shows the location of QCB host plants and observed individuals during the 2019–2020 protocol surveys.

1.4.13.3 Reptiles and Amphibians

See Appendix J for a complete list of all special-status reptiles and amphibians evaluated for occurrence within the BSA. The following sections provide details on the special-status reptile and amphibian species that were observed within the BSA during surveys.

Belding's Orange-throated Whiptail (*Aspidoscelis hyperythra*)

Two individuals were observed incidentally within the BSA in 2019. Both were noted in the far northern portion of the BSA in scrub/chaparral habitats.

Blainville's (Coast) Horned Lizard (*Phrynosoma blainvillii*)

One individual was observed incidentally within the BSA in 2019 in the far northwestern portion of the BSA in a disturbed Valley needlegrass grassland stand.

Coastal Western Whiptail (*Aspidoscelis tigris stejnegeri*)

One individual was observed incidentally within the BSA in 2019 in the far western portion of the BSA in a Diegan coastal sage scrub stand.

Red-diamond Rattlesnake (*Crotalus ruber*)

One red-diamond rattlesnake was observed in the BSA in 2019 within oak woodlands on the rocky high point in the central portion of the BSA. This species occurs in a variety of habitats; in San Diego County, it is most common in coastal sage scrub, chaparral, pinyon-juniper woodland, and desert habitats (Lemm 2006).

Western Spadefoot (*Spea hammondii*)

The winter of 2018–2019 was an exceptionally wet winter for coastal San Diego County. During fairy shrimp surveys in 2019, a western spadefoot egg mass was observed in basin AP-7. These eggs were discovered on February 8, 2019; the basin was inundated through March 29, 2019, a total of seven weeks. It was dry after that date. No evidence of western spadefoot breeding was observed in any other basins on-site during the surveys. Larvae were never observed in basin AP-7 during weekly checks from February 8 through March 29, 2019. The single breeding attempt within AP-7 during February 2019 was very likely opportunistic in nature and indicative of the exceptionally wet winter. The basins on the County parcel appear to be too small and ephemeral in nature to allow for complete larval development during all but perhaps record rainfall years; they more often act as reproductive sinks for the species.

Based on the results of the 2022 western spadefoot survey, the seasonally inundated basins within the County's parcel are associated primarily with the trails that exist along the northern perimeter of the BSA. Approximately 48 ponded areas were surveyed within or adjacent to dirt access roads, of which approximately 35 were mapped within the County's parcel and 13 were mapped on Wright's Field.

No western spadefoot adults, larvae, or eggs were observed during surveys of seasonally inundated basins within the County's parcels in 2022. Based on the surveys conducted in 2022, the two basins on Wright's Field (WF-6 and WF-7) are the primary breeding pools for western spadefoot within the survey area, although successful western spadefoot recruitment was not observed in 2022. Based on the survey results, it appears basins within the County's parcel are too shallow and/or do not hold water long enough to support western spadefoot breeding activities during all but the wettest rain years.

Three adults were observed within the County's parcel during the nocturnal survey on March 4, 2022. All three were on the western side of the County's parcel, within approximately 70 to 150 meters of the basins on Wright's Field and more than 250 meters away from the closest inundation areas on the County's parcel. It appears that the County's parcel does provide upland habitat for western spadefoot; they were observed foraging only in the far western portions of the parcel. Western spadefoot were not documented foraging within the proposed Alpine Park boundary in 2022. Potential impacts on western spadefoot are addressed in Section 2.2.3, below; mitigation measure **MM-BIO-4** is proposed to reduce those impacts.

Appendix E provides additional details on the 2022 surveys for western spadefoot conducted in the BSA.

1.4.13.4 Birds

See Appendix J for a complete list of all special-status birds evaluated for occurrence within the BSA. The following sections provide details on avian species that were observed within the BSA during surveys.

Burrowing Owl (*Athene cunicularia*)

No breeding burrowing owls were observed within the BSA. A winter/migrant burrowing owl individual was incidentally observed within a rocky area of the BSA, outside of the proposed Alpine Park boundary during surveys in the winter of 2018–2019. No burrowing owls were observed during protocol surveys in 2019. Figure 5 (Appendix A) shows the location of the incidental burrowing owl observation. However, the County would address any potential impacts with mitigation measure **MM-BIO-6**.

Cooper's Hawk (*Accipiter cooperii*)

Cooper's hawk is a San Diego Group I species. This species utilizes open oak woodlands for foraging and nesting habitats and was observed during CAGN protocol surveys.

Red-shouldered Hawk (*Buteo lineatus*)

One red-shouldered hawk was noted in 2019 flying over the northern portion of the BSA within the Engelmann oak woodlands.

Western Bluebird (*Sialia mexicana*)

Western bluebird is a tree-nesting songbird, listed as a San Diego Group II species. It uses open oak woodlands as foraging and nesting habitat and was observed during CAGN protocol surveys.

1.4.13.5 Mammals

See Appendix J for a complete list of all special-status mammals evaluated for occurrence within the BSA. The following sections provide details on mammal species that were observed within the BSA during surveys.

Bats

During the 2019 and 2022 surveys, 15 of the 22 known bat species in San Diego County were detected. The bats detected are big brown bat, big free-tailed bat, California myotis, canyon bat, hoary bat, Mexican free-tailed bat, pallid bat, pocketed free-tailed bat, Townsend's big-eared bat, western long-eared myotis, western mastiff bat, western red bat, western small-footed myotis, western yellow bat, and Yuma myotis.

Seven of these observed bats are listed as California Species of Special Concern: pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, pocketed free-tailed bat, and big free-tailed bat. All of these species, except western yellow bat, are also listed as San Diego County Group II species. Yuma myotis was observed in 2019 and 2022 in the grasslands in the central and southern portion of the BSA and is a County Group II species. Other County Group II bat species observed on-site in 2019 include western small-footed myotis and western long-eared myotis. Suitable roosting and foraging habitat for these species can be found on-site.

1.4.14 Wetlands/Aquatic Resources

No wetland features or aquatic resources were found within the BSA during any field surveys. There are multiple nearby National Hydrography Dataset features in the vicinity of the Project area. Chocolate Creek is a stream that begins on Wright's field, 0.30 mile west of the BSA, and travels northwest approximately 4.75 miles until it reaches El Capitan Lake. Viejas Creek travels south, approximately 0.30 mile east of the BSA, and continues southeast approximately 1 mile until it reaches the Sweetwater River. One unnamed drainage begins just south of South Grade Road near the BSA and travels approximately 2 miles southwest until it meets the north fork of the Sweetwater River.

1.4.15 Habitat Connectivity and Wildlife Corridors

Wildlife movement corridors are areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features, such as canyon drainages, ridgelines, or areas with vegetative cover, provide corridors for wildlife movement. Wildlife movement corridors are important because they provide access to mates, food, and water; allow the dispersal of individuals away from high population density areas; and facilitate the exchange of genetic traits between populations.

Another important consideration is the setting of a project site with respect to regional connectivity with other undeveloped lands. Large blocks of contiguous habitat are important with respect to supporting resident populations of plants and wildlife as well as providing suitable conditions for wildlife movement and dispersal.

The BSA and the adjacent Wright's Field are surrounded by low-density exurban residential development. As such, the BSA and Wright's Field currently function as an "island" of habitat with limited connectivity to open space and other preserve areas. The proposed Project would be constructed at the eastern edge of this island of open space, leaving a smaller but similarly situated "island" of habitat to the west of the proposed park. As such, the Project site would not significantly affect a wildlife corridor or disrupt habitat connectivity.

1.5 Applicable Regulations

1.5.1 Federal Environmental Regulations

1.5.1.1 Federal Endangered Species Act

The FESA was enacted in 1973 to provide protection to threatened and endangered species and their associated ecosystems. "Take" of a listed species is prohibited, except when authorization has been granted through a permit under Section 4(d), 7, or 10(a) of the act. "Take" means to harass, harm, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any of these activities without a permit.

1.5.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) was enacted in 1918. Its purpose is to prohibit the killing or transport of covered native migratory birds—or any part, nest, or egg of any such bird—unless allowed by another regulation adopted in accordance with the MBTA. The list of species that are protected by this act includes almost all native non-game species.

1.5.1.3 Bald and Golden Eagle Protection Act

When first enacted in 1940, the Bald and Golden Eagle Protection Act prohibited the take, transport, or sale of bald eagles, their eggs, or any part of the eagle. The act was amended in 1962 to extend prohibitions to the golden eagle. Under this act, "take" means to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

1.5.1.4 Clean Water Act

In 1948, Congress first passed the Federal Water Pollution Control Act. This act was amended in 1972 and became known as the CWA. The CWA regulates the discharge of pollutants into the waters of the U.S. Under Section 404, permits need to be obtained from the U.S. Army Corps of Engineers (USACE) for the discharge of dredged or fill material into waters of the U.S. Under Section 401 of the act, water quality certification from the Regional Water Quality Control Board (RWQCB) needs to be obtained if there are to be any impacts on waters of the U.S.

1.5.2 State Environmental Regulations

1.5.2.1 California Environmental Quality Act

CEQA requires that biological resources be considered when assessing the environmental impacts resulting from proposed actions. CEQA does not specifically define what constitutes an "adverse effect" on a biological resource. Instead, lead agencies are charged with determining what specifically should be considered an impact.

1.5.2.2 California Fish and Game Code

The California FGC regulates the taking or possession of birds, mammals, fish, amphibians, and reptiles. It also provides additional protections for endangered species and regulations over lakes and streams and associated fish and wildlife habitat. Provisions regarding the protections for nesting birds are described in California FGC Section 3503 and make it unlawful to take, possess, or needlessly destroy the nest or eggs of most wild birds.

1.5.2.3 California Endangered Species Act

The CESA prohibits the "take" of any species that the California Fish and Game Commission determines to be a threatened or endangered species and is administered by CDFW. The CESA is found in California FGC Sections 2050–2116. Incidental take of these listed species can be approved by CDFW. Under this act, "take" means to hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill.

1.5.2.4 Lake and Streambed Alteration Program

The Lake and Streambed Alteration Program is administered by CDFW and found in Section 1600 et seq. of the California FGC. CDFW regulates streams and waterways and associated fish and wildlife habitat. CDFW is to be notified if a project will affect lake or streambed resources.

1.5.2.5 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is the California equivalent of the CWA. It provides for statewide coordination of water quality regulations through the establishment of the State Water Resources Control Board and nine separate RWQCBs that oversee water quality on a day-to-day basis at the regional/local level.

1.5.2.6 Natural Community Conservation Planning Act of 1991

The Natural Community Conservation Planning Act of 1991 is designed to conserve natural communities at the ecosystem scale while accommodating compatible land use. CDFW is the principal state agency implementing the act. NCCPs developed in accordance with this act provide for comprehensive management and conservation of multiple wildlife species and identify and provide for the regional or area-wide protection and perpetuation of natural wildlife diversity while allowing compatible and appropriate development and growth. The Project is within the boundaries of the San Diego MSCP, which is an adopted NCCP; the County maintains an Implementing Agreement with CDFW.

1.5.2.7 Native Plant Protection Act

The NPPA, enacted in 1977, allows the California Fish and Game Commission to designate plants as "rare" or "endangered." There are 64 species of plants that have been designated and protected as "rare" under the NPPA. Species designated as "endangered" are regulated under provisions of the CESA. The NPPA prohibits take of endangered or rare native plants, but it includes some exceptions for agricultural and nursery operations, emergencies, and—after properly notifying CDFW—certain vegetation removal. It is codified primarily in California FGC Section 1900 et seq.

Chapter 2
Project Effects

2.1 Impact Definitions

Biological resource impacts can be considered direct, indirect, or cumulative. They are also either permanent or temporary in nature.

Direct: Occur when biological resources are altered, disturbed, or destroyed during project implementation. Examples include clearance of vegetation, encroachment into wetland buffers (not applicable on this Project), diversion of surface water flows, and the loss of individual species and/or their habitats.

Indirect: Occur when project-related activities affect biological resources in a manner that is not direct. Examples include elevated noise and dust levels, increased human activity, decreased water quality, changes to hydrological conditions not resulting in type conversion of vegetation community, and the introduction of invasive wildlife (domestic cats and dogs) and plants.

Cumulative: Occur when biological resources are either directly or indirectly affected to a minor extent as a result of a specific project, but the project-related impacts are part of a larger pattern of similar minor impacts. The overall result of these multiple minor impacts from separate projects is considered a cumulative impact on biological resources.

Temporary: Temporary impacts can be direct or indirect and are considered reversible. Examples include the removal of vegetation from areas that will be revegetated, elevated noise levels, and increased levels of dust.

Permanent: Permanent impacts can be direct or indirect and are not considered reversible. Examples include removing vegetation from areas that will have permanent structures placed on them or landscaping an area with non-native plant species.

2.2 Project Impacts

All potential Project-related impacts (direct, indirect, and cumulative) were evaluated as a part of this assessment. Implementation of the Project would have primarily three classes of impacts: (1) permanent direct impacts on vegetation communities, sensitive plants species, and habitat for sensitive animals; (2) indirect temporary effects on certain sensitive natural communities, sensitive animals, or sensitive plant species from construction-related activities such as dust deposition, increased human presence, and noise associated with construction equipment; and (3) indirect permanent effects resulting from operation of the regional park system, such as an increased public presence that may indirectly affect animal movement or behaviors. Figure 3 in Appendix A shows the locations of all proposed Project impacts.

In addition to the Alpine County Park described in Section 1.2, above, the Project would result in the maintenance of approximately 1 acre of existing multi-use trails throughout the property. These are existing trails, and maintenance would not result in the removal of any native habitat. Maintenance

of the existing trail system and is not anticipated to have significant direct or indirect effects, including loss of habitat, because the trails to be maintained already exist within disturbed areas. The trail construction would have to be conducted in compliance with state and federal criminal prohibitions against taking of nesting birds and would not be expected to result in any direct or indirect mortality of general or sensitive wildlife species. As a result, the trails that would be formalized as part of the proposed Project are considered "Impact Neutral."

Areas identified in Figure 3 as "Native Habitat Avoidance Area" are within the generalized boundary of the proposed Alpine County Park, but they would not be subject to mass grading or vegetation removal during site preparation activities. These areas are at the northern end of the proposed park, adjacent to the proposed equestrian staging area. Impacts within the Native Habitat Avoidance Area are considered temporary indirect impacts.

Implementation of the Project includes the construction of public restroom facilities. The County may implement a septic system and associated leach field to accommodate sewage from the proposed restroom facilities. Another option under consideration is for the County to extend a sewer line into the proposed Alpine County Park, which would preclude the need for the septic system. For purposes of this analysis, both the sewer line and septic system are included as potential impacts. The septic system installation would not result in impacts on native habitats because it is currently within a fire management area that is regularly cleared of vegetation as needed and at the direction of the Alpine Fire District. As a result, this area is dominated by disturbance-adapted forbs and non-native grasses. Over the long term, the only change associated with the septic system would be an increase in water supply that is not anticipated to result in a change of vegetation community composition because it is anticipated to remain as a disturbed vegetation community.

Fire Fuel Reduction Zone as Part of the Project

- Along South Grade Road, where the Alpine Park boundary would be adjacent to the road, an additional 20 feet would be part of the existing fire fuel reduction zone along the road. The fire fuel reduction zone would occur within the current footprint of the proposed park. An additional 20 feet of fire fuel modification is also required along South Grade Road, approximately 100 feet south of the northeast corner of the County's parcel where it is adjacent to the Native Habitat Avoidance Area. Three Engelmann oak canopies occur within this zone.
- Within 100 feet of the volunteer parking pad in the northern portion of the proposed active park, fire fuel clearance would occur. Per the FEOA, both a Zone A (30 feet) and Zone B (100 feet) fire fuel clearance is required. Within 30 feet of the volunteer parking pad, the area would be cleared to Zone A standards, which would result in "landscape replacement" per the FEOA. No Engelmann oak trees occur within Zone A. Zone B fire clearance should achieve at least a 75 percent reduction in fire line intensity from a wildfire, which would be accomplished in this area by removing shrub fuels (predominantly flat-topped buckwheat) by a minimum of 50 percent and grass/herb fuels by a minimum of 80 percent . Canopies associated with four Engelmann oaks occur within the Zone B area. Engelmann oaks may require canopy trimming to meet the minimum 10- to 15-foot separation distance required in the FEOA for Zone B areas, in coordination with a certified arborist.

Table 7 summarizes the types of impacts associated with this Project.

Table 7. Summary of Project Components and Associated Impacts

General Location	Project Component	Impact Type	Sum of Acres
Alpine County Park	Alpine County Park	Permanent	22.2
	New Fire Fuel Modification Zones	Permanent	0.5
	Leach Field	Permanent	0.4
Total Permanent Impacts			**23.1**
Alpine Park Preserve	Native Habitat Avoidance Area	Temporary Indirect	2.1
	Sewer Pipe (if septic system not used)	Temporary Direct	< 0.1
	All Other Areas of Alpine Park Preserve	Resource Management/Habitat Enhancement Activities Only	65.4
Total Preserved			**67.5**
Existing Trails to Be Maintained		Impact Neutral	1.0
Existing Fuel Reduction Areas (not part of Project)		N/A	2.6
Grand Total			**94.2**

2.2.1 Habitats

Clearing of native vegetation during grading and site preparation is required for construction of the Project. Development of the Project would result in direct, permanent impacts on up to 23.1 acres of land, of which approximately 22.4 acres are considered sensitive natural communities, classified as Tier I through Tier III (Table 8) (Appendix A, Figure 3). Permanent direct impacts on approximately 471 square feet of sensitive natural communities[1] also would occur as part of the western spadefoot mitigation for the Project, which requires the construction of up to three new western spadefoot basins within the Alpine Park Preserve. Table 8 summarizes the maximum Project impacts on habitat types/vegetation communities from development of the Project.

Permanent impacts on sensitive natural communities would occur predominantly within Valley needlegrass grassland, disturbed flat-topped buckwheat stands, and non-native grasslands. Permanent impacts on Engelmann oak woodlands have been reduced to a minimum during the County's redesign of the Concept Plan of the proposed park in 2020. The County would avoid Engelmann oak woodlands, trees, and their associated canopy during construction to the extent feasible. Fire fuel management clearing would occur within the understory of approximately six the Engelmann oaks in the northern portion of the Project area in coordination with a certified arborist, four of which may also experience canopy thinning. Although no permanent buildings would be built within 100 feet of oaks, the volunteer parking pad, on which a recreational vehicle would be permanently parked, is located in proximity to the Engelmann oaks in the northern portion of the parcel. The nearest Engelmann oak is within approximately 60 feet of the volunteer parking pad.

Permanent impacts on native habitats (22.4 acres) represent approximately 4.9 percent of the total available open space and conserved lands within the immediate vicinity of the Project. These existing open space and conserved lands include the Wright's Field Preserve; privately held open space lands, including some with conservation easements; and the proposed Alpine Park Preserve.

[1] The County will attempt to construct western spadefoot basins in non-native grasslands. Impacts on non-native grasslands will be mitigated at a 1:1 ratio on-site or off-site at a mitigation bank. Should impacts occur on Valley needlegrass grassland from basin creation, the County will mitigate at a 2:1 ratio on-site through native grassland restoration and/or preservation of existing native grassland.

Table 8. Maximum Project Impacts on Vegetation Communities and Land Covers

Vegetation Community/Land Cover[a]	Tier[c]	Area in Acre(s)						
		Permanent Impacts[e]			Temporary Impacts		Impact Neutral	Total
		Alpine County Park[d]	Leach Field	New Fire Fuel Modification Areas	Native Habitat Avoidance Area	Sewer Pipe	Maintenance of Existing Trails	
Disturbed Habitat (11300)	IV	0.5	0.1	< 0.1	< 0.1	—	1.0	1.6
Diegan Coastal Sage Scrub (32500), Including Disturbed and Baccharis Dominated (32530)	II	< 0.1	—		< 0.1	—	—	< 0.1
Disturbed Flat-topped Buckwheat (32800)	II	1.6	0.3	0.3	1.0	<0.1	—	3.2
Flat-topped Buckwheat (32800)	II	1.7	—	0.1	0.7	<0.1	—	2.4
Flat-topped Buckwheat – Existing Fire Fuel Modification Zone (32800)	II	< 0.1	—		—	—	—	< 0.1
Coastal Sage-Chaparral Transition (37G00)	II	—	—		—	—	—	—
Southern Mixed Chaparral (37120)	III	—	—		—	—	—	—
Valley Needlegrass Grassland (42100)	I	14.4	—		< 0.1	—	—	14.5
Valley Needlegrass Grassland - Existing Fire Fuel Modification Zone (42100)		0.3	—		—	—	—	0.3
Disturbed Valley Needlegrass Grassland (42100)	I	—	—		—	—	—	—
Non-native Grassland (42220)	III	3.6	—		—	—	—	3.6
Open Engelmann Oak Woodland (71181)	I	—	—	0.1	0.4		—	0.5
Non-native Woodland (79000)	IV	< 0.1	—	< 0.1	< 0.1		—	< 0.1
Eucalyptus Woodland (79100)	IV	—	—		—		—	—
Total[b]		**22.2**	**0.4**	**0.5**	**2.1**	**<0.1**	**1.0**	**26.1**

a. Vegetation categories and numerical codes are from Holland (1986) and Oberbauer et al. (2008).
b. Individual rows may not sum to total because of rounding.
c. Tier categories are defined in the County's Biological Mitigation Ordinance.
d. The additional 20-foot fire clearance zone where the park footprint is adjacent to South Grade Road is within the current Alpine Park footprint, so no additional impacts would occur beyond what is shown below.
e. An additional 471 square feet of impacts on sensitive natural communities would occur from implementation of the western spadefoot mitigation measure (**MM-BIO-4**) requiring the construction of three basins for spadefoot. It is not known exactly where these basins would be constructed, but the County would endeavor to place these in areas with non-native grasses or flat-topped buckwheat and avoid native grassland areas to the extent feasible. Impacts associated with construction of the basins would be mitigated in accordance with **MM-BIO-9**.

A maximum of approximately 2.1 acres of sensitive habitat would be subject to temporary impacts during construction, predominantly within flat-topped buckwheat and open Engelmann oak woodland areas (Table 8). The Native Habitat Avoidance Area is directly adjacent to areas that would be developed into the equestrian staging area as part of the Project and, as such, could be subject to indirect, short-term impacts during construction. The temporary indirect impacts could include increased dust deposition on leaf surfaces from construction equipment and grading in adjacent areas and increased erosion or runoff during rain events if the adjacent areas are graded and no stormwater pollution prevention best management practices are implemented. However, dust suppression and stormwater pollution prevention best management practices would be implemented throughout construction to minimize potential impacts. Further information about impacts anticipated on Engelmann oaks is provided in Section 2.2.2, below.

2.2.2 Sensitive Plants

Of the eight sensitive plant species found within the BSA, two would be directly affected (i.e., removed) by implementation of the Project: decumbent goldenbush and Palmer's grappling hook. Decumbent goldenbush would be affected at one location in the north-central portion of the proposed Alpine County Park, within an area that supports approximately 110 individuals over approximately 3,500 square feet. Approximately 200 Palmer's grappling hook individuals would be affected within the northwestern edge of the proposed Alpine County Park. Individuals would be removed during grading and site preparation of the Project.

The County redesigned the proposed Project's equestrian staging area to avoid impacts on Engelmann oaks. Areas identified as "Native Habitat Avoidance Area" would not be subject to grading or vegetation removal during site preparation activities (see Figure 4). As a result, there are no Engelmann oak individuals or their associated canopies within the proposed grading limits of the Project. Grading and site development would occur entirely outside of the canopy drip line of all Engelmann oaks.

The County is proposing grading and site development within 0.94 acre of land that is within a 50-foot root protection zone[2] where Engelmann oak root zones are located. Activities within the root protection zone include grading/site preparation (e.g., compaction) and construction of park infrastructure (Figure 7). These activities would occur within the root protection zone of approximately 25 Engelmann oak trees, including one individual that was noted by the County's arborist in 2020 to be in very poor health and/or dying. Although these grading activities would occur within the root protection zone, as mentioned above, none of those activities would occur directly under the canopy of any Engelmann oaks, and no Engelmann oaks would be removed from construction activities associated with the Project.

Fire fuel modification activities would occur within approximately 0.1 acre of Engelmann oak woodland in coordination with a certified arborist Approximately seven Engelmann oak tree canopies are located within the area where fire fuel management would occur. Four of these oaks are in the Zone B fire fuel reduction zone where canopy thinning of some oaks may be required, in coordination with a certified arborist. The other three oaks are located directly west of South Grade Road in the 20-foot area where fire fuel management would be extended west from the

[2] Root protection zones are defined in Section 3.5.5 of the County's *Report Format and Content Requirements* document as 50 feet "outward from the outside edge of the oak canopy."

existing fire fuel management along South Grade Road. The understory vegetation in this area is dominated by purple needlegrass, non-native grasses, and flat-topped buckwheat

Short-term indirect impacts could occur on decumbent goldenbush, Palmer's grapplinghook, and Engelmann oak during construction activities because each of these sensitive species occur adjacent to areas where the proposed Alpine County Park would be built. These three species all occur within at least 200 feet of proposed construction activities. Construction-related indirect impacts could include dust deposition that could alter the photosynthetic vigor of these individual plants and the potential spread of invasive species into the Alpine Park Preserve from the construction area. These short-term indirect impacts could become permanent if invasive species become established and are not eradicated. However, dust control measures are required for this Project and would reduce these impacts to less than significant, in addition to weed abatement by County staff members. Other potential long-term indirect impacts include trampling from an increased anthropogenic presence and the possibility of off-trail activities. The public is currently walking and, at times, parking on the County's property; therefore, these impacts are not expected to be appreciably greater after construction of the proposed park. Moreover, the County has proposed additional signage, the presence of a live-in volunteer and park rangers to monitor the Alpine Park Preserve and Alpine County Park, as well as a formalized staging area for parking, which would minimize impacts on these special-status species from unauthorized activities (e.g., off-trail trampling, building of jumps/berms within the trails or parking in unauthorized areas). After implementation of the proposed Project, it is anticipated that fewer long-term impacts on special-status plants would occur compared to baseline conditions.

Chocolate lily, delicate clarkia, San Diego County viguiera, small-flowered microseris, and Southern California black walnut were all observed within the BSA. These species are not expected to be affected by implementation of the Project, either directly or indirectly, and are more than 200 feet from the proposed Alpine County Park and within the areas proposed for permanent protection and long-term management within the Alpine Park Preserve.

2.2.3 Sensitive Wildlife

2.2.3.1 Invertebrates

Fairy Shrimp

No special-status FS were observed during wet- and dry-season surveys conducted in 2018–2019; therefore, no impacts on FS are expected to occur.

Quino Checkerspot Butterfly

The Project is not within a Recovery Area or within designated critical habitat for QCB (USFWS 2003). The Project would result in impacts on two of seven locations (29 percent) where QCB adults were observed on the Project site or on Wright's Field in the past, including the observation made in 2010, as documented in the USFWS CFWO data (USFWS CFWO 2020), and during surveys in 2019 and 2020. Both locations would be affected by construction of Alpine County Park. No locations would be affected by maintenance of the existing trails. Five locations (71 percent) where QCB adults were observed in the past would be permanently protected within either the Wright's Field Preserve or the proposed Alpine Park Preserve.

Incidental take of QCB could occur in the form of harassment, harm, injury, or mortality. Direct impacts that could result in incidental take of QCB would occur through the permanent removal of up to approximately 22.4 acres of QCB occupied habitat, which is expected to be completed in the first year of Project implementation. Direct impacts on QCB adult locations and host plants are shown in Figure 5. There is also the potential for inadvertent take of a small number of QCB to occur in the Alpine Park Preserve when implementing habitat management activities described in the Habitat Restoration and Enhancement Plan and Resource Management Plan as a result of site preparation activities tied to habitat restoration and accidental trampling of QCB larvae and host plants during monitoring and or trail management.

Hermes Copper Butterfly

HCB was not observed within the Project site during comprehensive surveys during 2019 and 2020. In addition, HCB has not been documented from the County's property in publicly available databases, such as SANDAG 2011 and CNDDB (CDFW 2020). Occurrences nearby have been documented at the northern portion of Wright's Field where spiny redberry is much more abundant than on the County's property and on a privately held parcel south of Wright's Field. There are only approximately 68 spiny redberry within the County's parcel, representing approximately 4 percent of the 1,679 spiny redberry individuals mapped on the County's parcel and Wright's Field. Furthermore, no impacts on spiny redberry would occur from construction of the proposed Alpine County Park, proposed new fire fuel reduction areas, or the associated maintenance of existing trails. As a result, no impacts on HCB individuals are anticipated from the proposed Project.

Although park development would result in permanent development of 20.3 acres of designated critical habitat, only 4.0 acres contains the physical and biological features critical to the conservation of the species, which includes areas of flat-topped buckwheat (including disturbed flat-topped buckwheat) and Engelmann oak woodland. See Section 3.2 for additional information on impacts on designated critical habitat for HCB.

2.2.3.2 Reptiles and Amphibians

The Belding's orange-throated whiptail, Blainville's (coast) horned lizard, coastal western whiptail, and red-diamond rattlesnake were observed within the BSA. Baja California coachwhip, California glossy snake, coast patch-nosed snake, Coronado skink and Southern California legless lizard were not observed during surveys but have moderate or high potential to occur within the BSA. These species could be directly and indirectly affected through implementation of Alpine County Park, both during construction and post-construction. Direct impacts include the conversion of native and naturalized habitat that could support these species to a developed park. Direct impacts could occur during construction of the park if individuals are in the construction footprint. However, the proposed preserve portion of the County property, as part of Project implementation, in addition to the other adjacent open space and preserved land, would provide habitat for these species. The long-term survival of the species would be benefited through the permanent preservation of a portion of the County property, in addition to proposed restoration of native grassland.

Indirect impacts on these species could occur during construction and maintenance of the Project. Indirect temporary impacts during construction include increased dust from grading and construction, increased noise from construction crews and equipment, and increased foot traffic during construction. However, dust suppression and stormwater pollution prevention best management practices would be implemented throughout construction to minimize potential

impacts. In addition, the public is currently accessing the County property. Through implementation of the Project with formalized trails, an on-site volunteer, County rangers, trash cans, bathrooms, signs, and a designated staging area for parking, foot traffic would be reduced in the undesignated areas that the public is currently accessing by foot and/or vehicle.

Post-construction, the existence of Alpine County Park could increase the amount of anthropogenic influence in the areas immediately surrounding the park footprint. There is a possibility for increased littering and foot traffic within the park and the maintained trail system, which exists in habitat that could support these species. However, the presence of trash cans, signs, park rangers, and an on-site volunteer, in addition to coordination with Back Country Land Trust and formalized trails, could decrease potential impacts on these species' habitat with the implementation of the proposed preserve and Alpine Park. Other indirect impacts include introduction of non-native or invasive plant/animal species (i.e., domestic dogs and horses). These indirect impacts may cumulatively result in reduced use of habitat immediately surrounding the Project footprint. However, the County is proposing restoration of native grassland and permanent preservation of approximately 67.5 acres of the County property, in addition to long-term active management of this area. The restoration efforts and active management of the proposed preserve portion of the Project would assist in preventing the spread of invasive plants and benefit native habitats. Signs would be posted and the public would be subject to park rules within the proposed preserve land and the Alpine Park to prevent impacts from domestic and horses within sensitive habitats. Ranger-led hikes would also assist the public in learning further about the resources the County proposes to protect in perpetuity and importance of staying on designated trails and picking up after domestic animals. Impacts could be significant. However, through the design measures and on-site management through implementation of the Project, in addition to implementation of mitigation measures **MM-BIO-10**, which requires native grassland restoration, and **MM-BIO-9**, which requires habitat-based mitigation be provided, as well as through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the remaining habitat for these species in perpetuity, the impact would be less than significant.

Western Spadefoot

Based on the results of the 2022 western spadefoot survey, the seasonally inundated basins within the County's parcel are associated primarily with the trails that exist along the northern perimeter of the BSA. Approximately 48 ponded areas were surveyed within or adjacent to dirt access roads, of which approximately 35 were mapped within the County's parcel and 13 were mapped on Wright's Field.

No western spadefoot adults, larvae, or eggs were observed during surveys of seasonally inundated basins within the County's parcels in 2022. Based on the surveys conducted in 2022, it is clear that two basins on Wright's Field (WF-6 and WF-7) are the primary breeding pools for western spadefoot within the survey area, although successful western spadefoot recruitment was not observed in 2022. Basins within the County's parcel are too shallow and/or do not hold water long enough to support western spadefoot breeding activities during all but the wettest rain years.

Western spadefoot may be affected by the Project. One breeding pool of approximately 157 square feet (AP-7) was documented within the active park development footprint in 2019. This breeding pool may be utilized by western spadefoot seeking to expand from the core population on Wright's Field Preserve during exceptionally wet years, such as 2019 when an egg mass was observed in AP-7. AP-7 would be filled in during construction of the active park (**Impact-BIO-4**). Impacts on this potential breeding pool would be significant absent mitigation.

As described in the Western Spadefoot Survey Report (Appendix E), the core breeding population of western spadefoot is located within seasonally inundated basins on Wright's Field Preserve. Three adults were observed within the County's parcel during the nocturnal survey on March 4, 2022. All three were on the western side of the County's parcel, within approximately 70 to 150 meters of the basins on Wright's Field and more than 250 meters away from the closest inundation areas on the County's parcel. It appears that the County's parcel does provide upland habitat for western spadefoot, but western spadefoot were documented foraging only in the far western portions of the parcel during the 2022 surveys.

Based on a recent study (Baumberger et al. 2019) that documented the distances from breeding pools to burrow locations, burrows and estivating adults could be expected to occur within approximately 262 meters of the known breeding pools on Wright's Field Preserve. The area within this 262-meter distance includes the western portion of the BSA but not areas within the proposed active park where grading would occur (see Figure 4.4-4).

Adult western spadefoot also emerge a few nights per year to forage and breed (San Diego Management and Monitoring Program 2022). These activities are most likely to occur within the same general area as burrowing habitat, although the presence of eggs within the basin AP-7 during 2019 demonstrate that they can migrate farther east and into the area proposed for park development during these nocturnal breeding events but very likely only during particularly wet years. Because these foraging and breeding events happen in the evening when construction equipment would not be active, it is unlikely that direct impacts on western spadefoot, such as crushing or illegal collecting, would occur during foraging and breeding events. However, there is a possibility that some estivating western spadefoots would occur within the proposed Project footprint where grading would occur. If western spadefoots were estivating in areas where grading is proposed, individuals could be crushed from construction equipment. These impacts are significance, absent mitigation, as described further in Section 3.2. The County would address potential impacts with mitigation measure **MM-BIO-4**; therefore, the impact would be less than significant.

2.2.3.3 Birds

Construction of Alpine County Park would have potential permanent direct impacts and indirect impacts on avian species endemic to the region. Burrowing owl, a California Species of Special Concern; California Cooper's hawk, a California Species of Special Concern; red-shouldered hawk, a County Group I species; and western bluebird, a County Group 2 species, were observed in the BSA during surveys in 2019 and 2020 and could be affected by the Project. Although the burrowing owl that was observed was a transient winter migrant and breeding season surveys were negative, burrowing owl could still occur within the BSA and possibly within the areas proposed for grading for the active use park. Ground squirrel burrows exist throughout the BSA, and if breeding burrowing owls were present during construction activities, direct mortality to this species, including eggs or chicks, could occur.

White-tailed kite is also a wide-ranging avian species that has high potential to occur within the BSA, in addition to Bell's sage sparrow, ferruginous hawk, grasshopper sparrow, and Southern California rufous-crowned sparrow, which have moderate potential to occur within the BSA. Approximately 22.4 acres of foraging and/or breeding habitat for these species would be permanently affected when the grasslands and scrub habitats are graded during construction. These habitats may also be utilized for foraging by other resident raptor species residing in the Alpine region. However, the proposed preserve portion of the County property, as part of Project implementation, in addition to the other adjacent open space and preserved land, would provide habitat for these species.

Grassland obligate bird species, or avian species that strongly prefer open grassland habitats, also would be affected by the proposed Project. These include the burrowing owl (observed wintering only), grasshopper sparrow, Oregon vesper sparrow, and ferruginous hawk. Approximately 19 acres of native and non-native grasslands used by these species are proposed to be removed during construction of the active use park. However, the proposed preserve portion of the County property as part of Project implementation, in addition to the other adjacent open space and preserved land, would provide habitat for these species.

Bell's sage sparrow, a County Group I species; Lawrence's goldfinch, a Bird of Conservation Concern; and Southern California rufous-crowned sparrow, a County Group I species, could occur within the approximately 3.6 acres of open flat-topped buckwheat scrub stands within the proposed active park area. These species would experience the permanent loss of this habitat as a result of construction of the active park. However, the proposed preserve portion of the County property, as part of Project implementation, in addition to the other adjacent open space and preserved land, would provide habitat for these species.

Temporary direct impacts would occur during construction of the Project. Expected impacts include increased dust from grading and construction, increased noise from construction crews and equipment, increased foot traffic during construction, and increased noise pollution from crews and equipment. This may temporarily alter the natural behaviors of avian species in the area. However, the proposed preserve portion of the County property, as part of Project implementation, in addition to the other adjacent open space and preserved land, would provide habitat for these species. The long-term survival of the species would be benefited through the permanent preservation of a portion of the County property, in addition to proposed restoration of native grassland. In addition, dust suppression and stormwater pollution prevention best management practices would occur throughout construction to minimize potential impacts. Furthermore, the public is currently accessing the County property; through implementation of the Project with an on-site volunteer, County rangers, trash cans, bathrooms, signs, formalized trails, and a designated staging area for parking, foot traffic would be reduced in undesignated areas that the public is currently accessing by foot and/or vehicle.

Post-construction, the existence of Alpine County Park would increase the amount of anthropogenic influence in the areas immediately surrounding the park footprint. There is a possibility for increased littering and foot traffic within the park and in the maintained trail system, which exists in habitat that could support these species, although all three species will readily forage in the vicinity of human activities. However, the presence of trash cans, signs, park rangers, an on-site volunteer, a designated parking area, in addition to coordination with Back Country Land Trust and formalized trails, would decrease potential impacts on these species' habitat with the implementation of the proposed preserve and Alpine Park.

The equestrian staging area would contain receptacles for waste and equestrian manure, and a Manure Management Plan would be prepared for the proposed Project to control disease vectors and pests, such as mosquitoes and other animals/insects that are vectors for disease or capable of affecting human health. Other indirect impacts include the introduction of non-native or invasive plant species, which, if not maintained, could affect viable habitat. However, the restoration efforts and active management of the proposed preserve portion of the Project would assist in preventing the spread of invasive plants and benefit the native habitats these species rely on for foraging. There is the also the possibility for increased presence of human and dogs through the park and trails as well as an increase in car traffic within the park footprint. These indirect impacts may cumulatively

result in reduced use of habitat immediately surrounding the Project footprint. However, the presence of trash cans, signs, park rangers, an on-site volunteer, a designated parking area, in addition to coordination with Back Country Land Trust and formalized trails, would decrease potential impacts on these species' habitat with the implementation of the proposed preserve and Alpine Park. In addition, implementation of mitigation measures **MM-BIO-5**, to avoid impacts on nesting birds; **MM-BIO-6,** preconstruction burrowing owl surveys; **MM-BIO-10,** native grassland restoration; and **MM-BIO-9,** preservation of sensitive habitat types, would reduce the impacts to less than significant.

2.2.3.4 Mammals

Special-Status Bats

During the 2019 and 2022 bat surveys, 15 of the 22 known bat species in San Diego County were detected. The bats detected are big-free tailed bat, a County Group 2 species; pallid bat, a County Group 2 species; pocketed free-tailed bat, a County Group 2 species; Townsend's big-eared bat, a County Group 2 species; western long-eared myotis, western mastiff bat, a County Group 2 species; western red bat, a County Group 2 species; western small-footed myotis, a County Group 2 species; western yellow bat; and Yuma myotis, a County Group 2 species. Seven of these species are listed as California Species of Special Concern: pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, pocketed free-tailed bat, and big free-tailed bat. Permanent direct and temporary indirect impacts on these species are expected to occur.

The bat species were observed foraging over most of the native habitats in the BSA, especially within the open Engelmann oak woodland, flat-topped buckwheat, and native and non-native grasslands within the Project footprint. Direct impacts on sensitive habitats (Table 8) would remove foraging habitat for these bat species during vegetation clearing associated with construction of Alpine County Park. However, the County is proposing restoration of native grassland and permanent preservation of a portion of the County property, in addition to active management on-site for the proposed preserve land and Alpine Park. The restoration efforts and active management of the proposed preserve portion of the Project would assist in preventing the spread of invasive plants and benefit the native habitats some of these species rely on for foraging. Signs would be posted and the public would be subject to park rules within the proposed preserve land and Alpine Park to prevent impacts from domestic and horses within sensitive habitats. Ranger-led hikes would also assist the public in learning further about the resources the County proposes to protect in perpetuity and the importance of staying on designated trails and picking up after domestic animals. Impacts would potentially be significant. However, through the design measures and on-site management through implementation of the Project, in addition to implementation of mitigation measures **MM-BIO-6,** pallid bat boxes; **MM-BIO-7,** bat roost avoidance; **MM-BIO-9,** native grassland restoration; and **MM-BIO-10,** preservation of sensitive habitat types, as well as through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the remaining habitat for these species in perpetuity, the impact would less than significant.

Implementations of the Project would not directly affect any known roosting habitat or maternal colony sites; however, roost sites are difficult to detect and can shift from year to year. It is presumed that the bats present in the BSA are utilizing oak woodlands and/or grasslands as foraging or roosting sites, but there also may be some potential for bats to use the rock outcrops or crevices within boulders as roost sites. No large rock outcrops or trees would be removed as part of construction of the Project. However, construction would occur directly adjacent to oaks and in the

vicinity of rock outcrops/boulders where bats could be roosting. These construction activities have the potential to disrupt the breeding success of pregnant females and their pups, potentially causing direct mortality in some instances. These potential effects are discussed further in Section 3.2, below, and would be mitigated to less than significant through **MM-BIO-8**, requiring bat roost avoidance.

Indirect impacts on bat species, such as disruption of foraging behavior, could occur if construction takes place during evening hours. Because bats are nocturnal species and construction is expected to occur during daytime hours, indirect impacts on these species due to construction activities are not expected to alter natural behaviors. Maintenance of existing trails near or within oak woodlands is not expected to alter the quality of forage or affect roosting habitat for these species because these trails occur within disturbed, bare-ground areas already, and trail maintenance would occur during daytime hours.

Other Special-Status Mammals

The northwestern San Diego pocket mouse, a County Group 2 species; San Diego black-tailed jackrabbit, a County Group 2 species; and San Diego desert woodrat, a Group 2 species were determined to have moderate potential to occur within the BSA (Appendix J) and the potential to be affected by implementation of the Project. Suitable habitat for all three species can be found in the Valley needlegrass grasslands, non-native grasslands, and open flat-topped buckwheat scrub habitats within the BSA and within the construction footprint of the Alpine County Park. Grasslands and flat-topped buckwheat within the construction footprint would be directly affected and converted to a developed park, removing it as habitat that could support these species. However, the County is proposing restoration of native grassland and permanent preservation of a portion of the County property, in addition to active management on-site for the proposed preserve land and Alpine Park. The restoration efforts and active management of the proposed preserve portion of the Project would assist in preventing the spread of invasive plants and benefit native habitats these species rely on for foraging. Signs would be posted and the public would be subject to park rules within the proposed preserve land and the Alpine Park to prevent impacts from domestic animals and horses within sensitive habitats. Ranger-led hikes would also assist the public in learning further about the resources the County proposes to protect in perpetuity and the importance of staying on designated trails and picking up after domestic animals. Impacts would potentially be significant. However, through the design measures and on-site management through implementation of the Project, in addition to implementation of mitigation measures **MM-BIO-9,** native grassland restoration, and **MM-BIO-10,** preservation of sensitive habitat types, as well as through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the remaining habitat for these species in perpetuity, the impact would be less than significant.

Temporary direct and indirect impacts on these species may occur during and post-construction of the Project. During construction, temporary direct impacts on these species include possible accidental take due to construction activities, increased dust from grading and construction, increased noise from construction crews and equipment, and increased foot traffic during construction. Natural behaviors of these species could be affected. However, dust suppression and stormwater pollution prevention best management practices would occur throughout construction to minimize potential impacts. In addition, the public is currently accessing the County property; through implementation of the Project with formalized trails, an on-site volunteer, County rangers, trash cans, bathrooms, signs, and a designated staging area for parking, foot traffic would be reduced in the undesignated areas that the public is currently accessing by foot and/or vehicle. In

addition, through the design measures and on-site management through implementation of the Project, in addition to implementation of mitigation measures **MM-BIO-10,** native grassland restoration, and **MM-BIO-9,** preservation of sensitive habitat types, as well as through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the remaining habitat for these species in perpetuity, the impact would be less than significant.

Because the species are active at mostly night (Tremor et al. 2017), foraging habits are not anticipated to be significantly affected, but construction activities may cause the species to be active during the day to avoid construction activities. These forced disruptions to the circadian rhythm could have negative effects on their ability to regulate their temperature and metabolism, causing general stress to these individuals. The San Diego pocket mouse is known to utilize burrows as its form of shelter. Because this species is less active during the day, when construction would be most active, there is potential for impacts on this species, which might be resting in burrows.

Post-construction, the existence of Alpine County Park could increase the amount of anthropogenic influence in the areas immediately surrounding the park footprint. There is a possibility for increased littering, human waste, and foot traffic within the park and in the maintained trail system, which exists in habitat that could support this species. There is the also the possibility for increased presence of dogs within the trail system and an increase in car traffic. However, the public is currently accessing the County property; through implementation of the Project with formalized trails, an on-site volunteer, County rangers, trash cans, bathrooms, signs, and a designated staging area for parking, these impacts would be reduced in the undesignated areas that the public is currently accessing by foot and/or vehicle. Signs would be posted and the public would be subject to park rules within the proposed preserve land and the Alpine Park to prevent impacts from domestic dogs and horses within sensitive habitats.

Other indirect impacts include the introduction of non-native or invasive plant species, which, if not maintained, could affect viable habitat. These indirect impacts may cumulatively result in reduced use of habitat immediately surrounding the Project footprint. However, the County is proposing restoration of native grassland (see Chapter 4, **MM-BIO-10**) in addition to active management on-site for the proposed preserve land and Alpine Park. The restoration efforts and active management of the proposed preserve portion of the Project would assist in preventing the spread of invasive plants and benefit the native habitats these species rely on for foraging.

2.2.4 Core Wildlife Area/Wildlife Corridors

Development of the Project would not significantly alter the way that wildlife utilize this contiguous block of open space. The conversion of 22.4 acres of native habitat to a developed park facility would not significantly constrain wildlife movement because the park would be adjacent to existing development on three sides and situated at the far eastern edge of the approximately 450-acre contiguous block of habitat in the immediate vicinity (i.e., the adjacent Wright's Field Preserve and privately held, directly contiguous open space lands in the immediate vicinity of the proposed Project, some of which are protected through a conservation easement). As described above, the Alpine Park Preserve would be created on the western edge of the park, contiguous to Wright's Field Preserve, and maintained as an MSCP preserve in perpetuity. Trails would be utilized by medium and large mammals for ease of movement through the preserve, similar to baseline conditions.

The Project would permanently affect up to 22.4 acres of native habitat within a core wildlife area. Although these impacts may affect certain sensitive species, as detailed in Sections 2.2.3 and 2.2.4,

the daytime usage of the preserve would not significantly affect the functioning of the preserve as a core wildlife area.

Chapter 3
Special-Status Species

3.1 Guidelines for the Determination of Significance

CEQA Appendix G states that a project would have a potentially significant effect on biological resources if it would:

> …have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service

Specifically, according to the County, any of the following conditions would be considered significant (County 2010b):

- 3.A. The Project would affect one or more individuals of a species listed as federally or state endangered or threatened.
- 3.B. The Project would affect an on-site population of a County List A or B plant species or a County Group I animal species or a species listed as a state Species of Special Concern.
- 3.C. The Project would affect the local long-term survival of a County List C or D plant species or a County Group II animal species.
- 3.D. The Project may affect arroyo toad aestivation, foraging, or breeding habitat.
- 3.E. The Project would affect golden eagle habitat.
- 3.F. The Project would result in a loss of functional foraging habitat for raptors.
- 3.G. The Project would affect the viability of a core wildlife area, defined as a large block of habitat that supports a viable population of a sensitive wildlife species or an area that supports multiple wildlife species.
- 3.H. The Project would cause indirect impacts that would very likely harm sensitive species over the long term.
- 3.I. The Project would affect occupied burrowing owl habitat.
- 3.J. The Project would affect occupied coastal cactus wren habitat.
- 3.K. The Project would affect occupied Hermes copper habitat.
- 3.L. The Project would affect the nesting success of sensitive animals (as listed in the Guidelines for Determining Significance) through grading, clearing, fire fuel modification, and/or noise generating activities such as construction.

Each of these significance criteria is discussed in Section 3.2, below, with respect to the proposed Project.

3.2 Analysis of Project Effects

Each of the significance criteria listed in Section 3.1 is discussed below with respect to the Project's anticipated effects. Those criteria for which impacts are not anticipated are discussed briefly at the end of the section.

- 3.A. The Project would affect one or more individuals of a species federally or state-listed as endangered or threatened.

  Occupied QCB habitat would be affected by the construction and maintenance of the Project. Impacts on occupied QCB habitat would be significant. Mitigation for significant impacts on QCB would be provided through **MM-BIO-3**, which stipulates that the County would provide permanent protection of occupied QCB habitat within the Alpine Park Preserve, ensure no net loss of QCB host plants through enhancement and restoration of habitat, provide ongoing species monitoring, and comply with all Endangered Species Act requirements to address impacts on the species. The County intends to secure an incidental take permit (ITP) for impacts on occupied QCB habitat and implement all conservation measures contained therein. Specifically, the County would prepare an HCP to address and mitigate impacts on occupied QCB habitat. The remainder of the County parcel not affected by the Alpine County Park would be preserved in perpetuity as the Alpine Park Preserve. QCB habitat also would be re-established on the proposed Alpine Park Preserve. Impacts would be mitigated to less-than-significant levels through implementation of **MM-BIO-3**, which would ensure no net loss of host plants through restoration and enhancement of habitat, provide permanent protection of QCB habitat within the proposed preserve portion of the Project, and ensure ongoing monitoring by the County.

- 3.B. The Project would affect an on-site population of a County List A or B plant species or a County Group I animal species or a species listed as a state Species of Special Concern.

  Of the 226 decumbent goldenbush individuals observed within the survey area, 110 would be affected by implementation of the Project, which is nearly half of the on-site population. These impacts would be significant, absent mitigation, on the existing population of decumbent goldenbush. The remaining individuals would be protected in perpetuity by the establishment of the Alpine Park Preserve.

  The County would implement **MM-BIO-1**, which would require salvage of on-site decumbent goldenbush plants and replacing lost individuals at a 3:1 ratio. After implementation of this mitigation measure, there would be no net loss of this individual, an increase in the population within the County-owned land, and no substantial adverse effect on the local long-term survival of this species. Establishing the Alpine Park Preserve and implementing **MM-BIO-1** would reduce impacts on decumbent goldenbush to less-than-significant levels.

  The following reptile state Species of Special Concern were observed within the BSA: the coast horned lizard, the coastal western whiptail, the orange-throated whiptail, and the red-diamond rattlesnake. Although not observed within the BSA, the following state Species of Special Concern reptiles have moderate to high potential to occur within the BSA: Baja California coachwhip, the California glossy snake, the coast patch-nosed snake, the Coronado skink, and the Southern California legless lizard. These species would be directly and indirectly affected through implementation of the active park during construction. Impacts on up to approximately 22.4 acres of habitat (i.e., scrub and/or grasslands) for these reptile species would be a significant impact. Impacts would be mitigated to less-than-significant levels through the

establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the habitat within the County's parcel (and potentially in some off-site locations) for these species in perpetuity. Furthermore, impacts on habitat would be mitigated in accordance with **MM-BIO-9**, which would require compensatory mitigation to be provided.

Western spadefoot may also be affected by the proposed Project. One breeding pool (AP-7) may be utilized by western spadefoot seeking to expand from the core population on Wright's Field Preserve during exceptionally wet years, such as 2019 when the egg mass was observed in AP-7. This breeding pool is present within the existing trails on-site but within the active park footprint. As a result, it would be filled in during construction of the park. Impacts on this one potential breeding pool would be significant absent mitigation. The County would mitigate at a 3:1 ratio for impacts on this breeding pool by creating three breeding pools closer to the core Wright's Field population. Basins would be constructed within clay soils in the Alpine Park Preserve, within micro-watersheds capable of filling the basins during rain events. Basins would be constructed with an adequate depth to increase the chance of survival during dry years compared to baseline conditions documented in 2022. Monitoring of the new basins would be conducted for 5 years following completion of the basin construction to document breeding outcomes and determine if adaptive management is needed to increase survival and recruitment within the constructed basins. The County would also monitor the core population on the Wright's Field Preserve to document population dynamics over time within this core population. Impacts would be mitigated to less-than-significant levels through implementation of **MM-BIO-4**, which would create additional breeding habitat for western spadefoot toads, **APM-BIO-1,** and **MM-BIO-9**, which would preserve potential foraging habitat in perpetuity.

The following County Group I avian species were observed within the BSA: Cooper's hawk and red-shouldered hawk. Although not observed within the BSA, the following avian County Group I species have moderate to high potential to occur on-site: Bell's sage sparrow, ferruginous hawk, grasshopper sparrow (also a state Species of Special Concern), Southern California rufous-crowned sparrow, and white-tailed kite. There is potential for nesting of some of these species in the mature Engelmann oaks and foraging in the grasslands and/or shrub/chaparral stands in the BSA. Other species can nest in grasslands, shrubs, and other vegetated areas. Oregon vesper sparrow, a state Species of Special Concern (not on the County Group I list) has high potential to occur within the Project site. Impacts on nests for any of the avian species discussed in this section, such as removal of an active nest during construction or the loss of eggs or chicks, would be significant. However, no tree removal activities would occur from the proposed Project, and pre-construction nesting bird surveys would be required for the Project under **MM-BIO-5**, which would reduce potential impacts on nesting birds to less than significant. Impacts on up to approximately 22.4 acres of habitat (i.e., scrub and/or grasslands and oak woodlands) for these avian species also would be a significant impact. Impacts would be mitigated to less-than-significant levels through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the foraging and/or nesting habitat within the County's parcel (and potentially in some off-site locations) for these species in perpetuity. Furthermore, impacts on habitat would be mitigated in accordance with **MM-BIO-9**, which would require compensatory mitigation be provided.

As mentioned in Chapter 2, breeding burrowing owl could occur within the BSA in the future and possibly within the areas proposed for grading for the active park. Ground squirrel burrows exist throughout the BSA, and if breeding burrowing owls were present during construction activities, direct mortality to this species, including eggs or chicks, could occur. These impacts

would be significant, absent mitigation. **MM-BIO-6** would require pre-construction take avoidance surveys for this species, which would reduce these potential impacts to less than significant.

The following state Species of Special Concern mammal species were documented within the BSA or have moderate or high potential to occur and, therefore, could be affected by the proposed Project: big free-tailed bat, Northwestern San Diego pocket mouse, pallid bat, pocketed free-tailed bat, San Diego black-tailed jackrabbit, San Diego desert (Bryant's) woodrat, Townsend's big-eared bat, western mastiff bat, western red bat, and western yellow bat. The loss of approximately 22.4 acres of habitat for these species would result in a significant impact. Impacts would be reduced to less-than-significant through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the habitat within the County's parcel (and potentially in some off-site locations) for these species in perpetuity. Furthermore, impacts on habitat would be mitigated in accordance with **MM-BIO-9**, which would require compensatory mitigation be provided.

There are only two known pallid bat colony sites in San Diego County (Stokes 2018). The pallid bat individuals observed during focused bat surveys are believed to belong to the maternal colony that roosts in Viejas on a private residence. This species has very specific foraging strategy and utilizes grasslands and open oak woodlands as its main foraging habitat. In addition, this species has characteristics that affect its success with increased urbanization. This includes its tendency to fly at low altitude, its inability to fly over prolonged distances, and its specialized foraging strategies. The loss of approximately 22.4 acres of pallid bat foraging habitat would result in a significant impact that would be mitigated through the establishment of the Alpine Park Preserve (**APM-BIO-1**) and compensatory mitigation provided under **MM-BIO-9**, which would protect habitat for pallid bat within the County's parcel (and potentially in some off-site locations) for this species in perpetuity. Furthermore, impacts on pallid bat would be further reduced through implementation of **MM-BIO-7,** which would require the County to further support pallid bat populations through the installation of bat boxes

Bat species are particularly vulnerable to impacts on maternal roost sites, such as within oaks or rock crevices. As mentioned in Chapter 2, impacts on maternal roost sites may occur during construction activities that occur in proximity to these sites. These impacts would cause direct impacts on California Species of Special Concern, including the potential for direct mortality, especially of pregnant females or pups. These impacts would be significant under the County's guidelines (County of San Diego 2010b), absent mitigation. Impacts on roosting special-status bat species would be reduced through implementation of **MM-BIO-8**, which would require bat roost sites to be avoided during construction to the extent possible.

These significant impacts would be reduced to less-than-significant levels through implementation of **APM-BIO-1**, which would protect the species' habitat in perpetuity, in addition to **MM-BIO-2**, which would implement Engelmann oak tree avoidance and minimization measures; **MM-BIO-6**, which would install and monitor bat boxes; **MM-BIO-7,** which would avoid bat roosts; **MM-BIO-8**, which would restore non-native grassland to native grassland within the proposed preserve portion of the Project and a portion of Wright's Field; and **MM-BIO-9**, which would require habitat-based mitigation and preserve sensitive habitats in perpetuity.

- 3.C. The Project would affect the local long-term survival of a County List C or D plant species or a County Group II animal species.

  The following Group II reptile species were observed within the BSA or have moderate or high potential to occur: coast horned lizard, coastal western whiptail, red-diamond rattlesnake, coast patch-nosed snake, Coronado skink, and Southern California legless lizard. Impacts on these species are described under Threshold 3.B, above, because these species are also California Species of Special Concern.

  Western spadefoot, a County Group II amphibian species, may also be affected by the proposed Project. Impacts on this species are described under Threshold 3.B, above, because this species is also a California Species of Special Concern.

  Western bluebird, a County Group II avian species, was observed within the BSA. Lawrence's goldfinch (*Spinus lawrencei*), a Bird of Conservation Concern (not on County Group II list) has high potential to occur within the BSA. Impacts on nests for these avian species, such as removal of an active nest during construction or the loss of eggs or chicks, would be significant. However, no tree removal activities would occur from the proposed Project, and pre-construction nesting bird surveys would be required for the Project. Impacts on up to approximately 22.4 acres of habitat (i.e., scrub and/or grasslands) for these avian species would be a significant impact. Impacts would be mitigated to less-than-significant levels through implementation of **MM-BIO-5,** which would require pre-construction nesting bird surveys, and through the establishment of the Alpine Park Preserve (**APM-BIO-1**), which would protect the foraging and/or nesting habitat within the County's parcel (and potentially in some off-site locations) for these species in perpetuity. Furthermore, impacts on habitat would be mitigated in accordance with **MM-BIO-9**, which would require compensatory mitigation to be provided.

  The following County Group II mammal species were documented within the BSA or have moderate or high potential to occur within the BSA and are already analyzed in Threshold 3.B., above: big free-tailed bat, Northwestern San Diego pocket mouse, pallid bat, pocketed free-tailed bat, Townsend's big-eared bat, San Diego black-tailed jackrabbit, San Diego desert (Bryant's) woodrat, western mastiff bat, and western red bat.

  The western long-eared myotis, western small-footed myotis, and Yuma myotis are County Group II bat species not previously discussed. The impacts on these three bats would be similar to those disclosed for the bats described in Threshold 3.B. Although it is less clear that these impacts would affect the long-term local survival of these species, the loss of approximately 22.4 acres of habitat could result in a significant impact. These significant impacts would be reduced to less-than-significant levels through implementation of **APM-BIO-1**, which would protect the species habitat in perpetuity, and **MM-BIO-9**, which would require habitat-based mitigation and preserve sensitive habitats in perpetuity. Impacts on maternal bat roosts of these species may occur during construction, which would be significant. Impacts on roosting special-status bat species would be reduced through implementation of **MM-BIO-8**, which would require bat roost sites to be avoided during construction to the extent possible.

  Engelmann oak is a County List D species that occurs in the BSA. No direct removal of any Engelmann oaks would occur because of implementation of the Project. Canopy thinning may be required for four oaks located within the new fire fuel management zones proposed as part of the Project, in coordination with a certified arborist. Indirect impacts may result from grading activities within the root protection zone of 25 Engelmann oaks. These impacts would not occur

within the dripline/canopy of these trees. Approximately 0.94 acre would be within the root protection zone where grading/site preparation (e.g., compaction) and construction of park infrastructure would occur (Figure 7). Engelmann oaks have endured challenges in recent years that threatened the long-term survival of the species; these challenges include development, pest infestations, and climate change impacts. As a result, impacts associated with fire fuel management and grading within the root protection zone would be potentially significant, absent mitigation. Potential impacts on Engelmann oaks would be mitigated through implementation of **MM-BIO-2**.

- 3.F. The Project would result in a loss of functional foraging habitat for raptors.

  Implementation of the Project would result in loss of approximately 22.4 acres of functional foraging habitat for raptors. Valley needle grassland and non-native grassland both serve as prime foraging habitat for raptors, as do the open scrub habitats on-site. The Project footprint would affect all of these types of habitats, resulting in a loss of functional foraging habitat for raptors. These impacts would be significant. Impacts would be mitigated to less-than-significant levels through habitat-based mitigation provided through **MM-BIO-9** (see Chapter 4) and the preservation of the Alpine Park Preserve, which would conserve functional foraging habitat for raptors in perpetuity.

- 3.G. The Project would affect the viability of a core wildlife area, defined as a large block of habitat (typically 500 acres or more, not limited to Project boundaries, though smaller areas with particularly valuable resources may also be considered a core wildlife area) that supports a viable population of a sensitive wildlife species or supports multiple wildlife species.

  Alteration of any portion of a core habitat could be considered less than significant only if a biologically based determination can be made that the Project would not have a substantially adverse effect on the core area and the species it supports.

  The Project could affect the viability of a core wildlife area. The BSA and the adjacent Wright's Field support multiple special-status plant and wildlife species, including the federally listed QCB. Collectively, contiguous open space areas in the immediate vicinity of the proposed Project total approximately 380 acres when the BSA, Wright's Field, and privately held open space parcels are included. Although this number is less than the 500 acres required to consider the site a "core wildlife area," the area supports particularly sensitive biological resources such as QCB and large stands of intact native grasslands. Although the proposed Project would affect only approximately 23.1 acres of the 380 acres, those impacts would represent approximately 6 percent of the available core habitat area. Based on the extent of impacts and the number of wildlife species potentially affected, these impacts on a core wildlife area would be significant, absent mitigation. Mitigation would be provided through the establishment of the Alpine Park Preserve (**APM-BIO-1**) and **MM-BIO-9**, which would protect the up to approximately 67.5 acres of habitat within the County's parcel for these species in perpetuity. Furthermore, impacts on the core wildlife area also would be mitigated in accordance with **MM-BIO-10**, which would require native grassland restoration (see Chapter 4).

- 3.I. The Project would affect occupied burrowing owl habitat.

  As discussed above, under Threshold 3.B, the Project would have the potential to affect occupied burrowing owl habitat at some point in the future. One transient wintering burrowing owl was observed incidentally on the Project site, outside of proposed impact areas associated with Alpine County Park. Breeding season surveys were negative. However, suitable grassland

habitat and ground squirrel burrows were observed on-site, and as a result, there is some potential for impacts on burrow locations during construction. These impacts would be significant, absent mitigation. Mitigation is provided under **MM-BIO-6**, which would require pre-construction take avoidance surveys to be completed and coordination with CDFW and USFWS to avoid potential impacts on burrowing owl if found.

- 3.L. The Project would affect nesting success of sensitive animals (as listed in the Guidelines for Determining Significance) through grading, clearing, fire fuel modification, and/or noise-generating activities such as construction.

  Implementation of the Project would have the potential to affect the nesting success of sensitive animals if vegetation clearing for initial construction of the park or any subsequent fuel modification activities are conducted during the breeding season for avian species or the roosting/pupping season for bat species. Impacts on the nesting success of sensitive animals would be a potentially significant impact. Implementation of **MM-BIO-5** would reduce impacts on avian species to less-than-significant levels. Implementation of **MM-BIO-8** would reduce impacts on roosting bats.

The proposed Project would not result in significant impacts under the following guidelines for the following reasons:

- 3.C. The Project would affect the local long-term survival of a County List C or D plant species or a County Group II animal species.

  Approximately 13,857 Palmer's grapplinghook individuals were observed during special-status plant surveys in 2019. Of the 13,857 individuals, 200 would be affected by the Project footprint, representing approximately 1 percent of the on-site population. Because of the low number of individuals being affected, the relatively large number of individuals in the entirety of the BSA, and the available habitat that would be protected in perpetuity in the preserve, impacts would not result in a regional decline in the species and therefore would be less than significant.

  No Impacts on chocolate lily would occur, either directly or indirectly, because all chocolate lilies occur more than 200 feet from the proposed Alpine County Park footprint. There is low potential for some chocolate lily bulbs being present within the Project footprint that could be removed during construction, even though no chocolate lily individuals were observed inside the proposed footprint during surveys. Potential impacts on underground bulbs and suitable habitat for this species (clay soils in grasslands) would not significantly affect the regional long-term survival of this species because of the amount of available habitat present in the Alpine Park Preserve.

- 3.D. The Project may affect arroyo toad aestivation, foraging, or breeding habitat.

  Any alteration of suitable habitat within 1 kilometer (3,280 feet) in any direction of occupied breeding habitat or suitable stream segments (unless very steep slopes or other barriers constrain movement) could be considered less than significant only if a biologically based determination can be made that the Project would not affect the aestivation or breeding behavior of arroyo toads.

  No suitable arroyo toad breeding or aestivation habitat occurs on-site. Arroyo toad is not known from the area. No impacts on arroyo toad would occur.

- 3.E. The Project would affect golden eagle habitat.

  Any alteration of habitat within 4,000 feet of an active golden eagle nest could be considered less than significant only if a biologically based determination can be made that the Project would not have a substantially adverse effect on the long-term survival of the identified pair of golden eagles.

  The Project would not have a substantial adverse effect on the long-term survival of golden eagle individuals. The Project area would not have suitable breeding habitat for golden eagle. A reduction in potential foraging habitat would not result in a substantial adverse effect on the long-term survival of this species.

- 3.H. The Project would cause indirect impacts, particularly at the edge of proposed development adjacent to proposed or existing open space or other natural habitat areas, to levels that would very likely harm sensitive species over the long term.

  The following issues should be addressed in determining the significance of indirect impacts: increasing human access; increasing predation or competition from domestic animals, pests, or exotic species; altering natural drainage; and increasing noise and/or nighttime lighting to a level above ambient that has been shown to adversely affect sensitive species.

  It is unlikely that construction of the Alpine County Park would cause indirect impacts to a level that would harm sensitive species over the long term. There would be no night lighting from the park, and construction of a formal trail system would keep visitors from veering into the wild spaces within the Alpine Park Preserve. The changes in hydrology expected from implementation of the septic system (i.e., increase in water used compared to baseline conditions) would occur within disturbed habitat that is currently regularly disced for fire prevention/fuel modification. As a result, an increase in the amount of water used in these areas would not result in a significant impact on sensitive species because none currently occur in this disturbed area.

- 3.J. The Project would not have impacts on cactus wren habitat.

  No cactus wren habitat occurs within the preserve, and no coastal cactus wren or suitable cactus wren habitat was observed within the BSA.

- 3.K. The Project would affect proposed designated critical habitat for HCB, including areas that have the physical and biological requirements for this species.

  Approximately six spiny redberry individuals occur within the fire fuel modification areas and may be affected by vegetation thinning in these areas. However, this species was not observed within the BSA or on the adjacent Wright's Field during surveys. As a result, there would be no impacts on occupied HCB habitat as a result of the Project.

3.3 Cumulative Impact Analysis

The BSA is entirely within the MSCP. County guidelines state that if the appropriate study area is entirely within the MSCP, a project may rely on the MSCP to determine that the project's impacts are not cumulatively considerable (County 2010b). The Project would be consistent with the MSCP and the BMO, although DPR is exempt from the BMO. Therefore, any Project impacts would not be cumulatively considerable.

3.4 Mitigation Measures and Design Considerations

Under CEQA, mitigation is required for Project effects on biological resources that are identified as being significant. An appropriate level of mitigation is determined primarily through two considerations, as follows:

- The nature and relative magnitude of the Project's impacts on the resource, and
- The resource's degree of sensitivity.

The County proposes the following mitigation measures to reduce potentially significant impacts to below a level of significance.

MM-BIO-1: Decumbent Goldenbush Mitigation. To mitigate for significant impacts on decumbent goldenbush, the County will replace at a 3:1 mitigation ratio any affected decumbent goldenbush individuals. Individual plants and/or seeds will be salvaged from the on-site population prior to the start of construction and installed within Alpine Park Preserve. Plantings will be monitored for a minimum of 3 years to ensure the 3:1 mitigation ratio has been met and that the planted individuals have properly established themselves. Seed/material from on-site populations may be contract grown to provide replacement plantings.

MM-BIO-2: Implement Engelmann Oak Avoidance and Minimization Measures. The following measures will minimize and avoid potential impacts on Engelmann oaks resulting from the Project:

1. Engelmann oaks within 50 feet of any mass grading shall be fenced entirely around the tree dripline to ensure that no construction activities, including equipment staging, vegetation grubbing, driving, or grading, occur within the tree's dripline. These restrictions shall be communicated to the construction contractor prior to work in this area.
2. To mitigate for any potential significant impacts to Engelmann oak trees, the County will monitor the health of all Engelmann oaks within 200 feet of the proposed Alpine County Park development footprint for 5 years following construction. A certified arborist with experience monitoring oak health will conduct the monitoring. Mortality or serious declines in the health of the Engelmann oaks during these 5 years within this area will be mitigated at a 3:1 ratio, should significant impacts occur. Specifically, three Engelmann oaks will be planted for each oak tree that has died or is in serious decline. The mitigation would occur within on-site Engelmann oak woodland areas that will be permanently protected. Planting shall occur within either the Native Habitat Protection Area or within the northwestern portion of the open space preserve. All oak plantings must be certified pathogen free, including for *Phytophthora* species.
3. Any areas within the Engelmann oak root protection zone (i.e., all areas within 50 feet of Engelmann oak canopy) shall be identified on a map that is provided to the construction contractor. Any grading or construction activities within the root protection zone shall be monitored to minimize impacts on oaks to the maximum extent possible. Training shall be provided for the construction contractor by a biological monitor prior to the start of construction activities in this area. This training will detail ways that the construction contractor can reduce impacts as much as possible on Engelmann oaks within the root protection zone. The following avoidance and minimization measures must be implemented: (1) minimizing repetitive travel routes within the root protection zone,

(2) restricting any long-term storage of heavy materials within the root protection zone, and (3) restricting work within the root protection zone when the ground is wet to avoid compaction as much as possible after a rain event. Additional avoidance and minimization measures not envisioned here that can be feasibly implemented during construction must be identified and implemented.

MM-BIO-3: Ensure No Net Loss of Quino Host Plants and Provide Permanent Protection of Quino Habitat. The County DPR shall seek a Section 10 ITP (or Section 7 ITP if there is a federal nexus) for impacts on QCB-occupied habitat. Regardless of the conservation measures required under the ITP, the County will mitigate for impacts on occupied QCB habitat by providing, at a minimum, on-site preservation of occupied habitat for QCB within the open space preserve as well as the assurance that no net loss of QCB host plants will occur because of the Project. The County DPR shall ensure that there is no net loss of QCB host plants by performing on-site enhancement and restoration activities within QCB habitat, including planting dot-seed plantain, removing thatch to support healthy populations of dot-seed plantain, and maintaining and monitoring these enhancement areas for a minimum of 5 years. Construction activities will not occur until the ITP is secured. Conservation measures shall be implemented pursuant to that ITP and will include measures to restore and enhance QCB and provide permanent habitat protection and maintenance activities within the open space preserve.

As part of its ongoing monitoring, the County will demonstrate that QCB persists on the Project site at the end of the 5-year restoration and enhancement period. If QCB can no longer be found on either the County's preserve or within the adjacent Wright's Field in a normal flight year at the end of the 5-year restoration period, the County will secure a specific off-site parcel that will contribute meaningfully to the specie'' long-term conservation.

MM-BIO: 4 Western Spadefoot. The County will mitigate for impacts on one western spadefoot breeding pool, encompassing approximately 157 square feet, by creating three permanent basins, encompassing a minimum of 471 square feet and designed to support western spadefoot breeding. These constructed basins will be created within clay soils on the permanently protected lands on the County's parcel, no closer than 100 feet from the western edge of the Alpine County Park. Basins will be constructed within approximately 262 meters from the core breeding population on Wright's Field to maximize opportunities for western spadefoots on Wright's Field to naturally expand into these newly constructed basins. No basins will be constructed within the areas proposed for QCB habitat enhancement activities.

Hydrological analysis will be conducted prior to site selection to map the micro-watersheds in potential sites and ensure the constructed basins fill naturally with rainwater. Basins will be constructed to allow for maximum inundated depths of approximately 18 to 24 inches (20 to 60 centimeters), with the goal that they remain inundated long enough to increase the chances that breeding will be successful during dry years. Conversely, the newly constructed basins shall be designed in such a way that they support standing water for only several weeks following seasonal rains so that aquatic predators (e.g., fish, bullfrogs, and crayfish) cannot become established. Because ponding duration is so critical to the success of this effort, additional studies may be needed to estimate infiltration rates, soil profile, depth of clay soil layer, etc. The County will conduct these studies, as needed, to estimate ponding duration within constructed

basins. Terrestrial habitat surrounding the proposed relocation site shall be as similar in type, aspect, and density to the location of the existing pool(s), as feasible.

The County will develop a Western Spadefoot Habitat Mitigation and Monitoring Plan to describe requirements for the constructed basins, how basin sites are chosen, what activities will be conducted during the installation of the new basins, adaptive management, maintenance activities, access controls (e.g., fences), and what monitoring and reporting activities will occur and when. The data for the micro-habitat hydrological analysis will also be presented within this plan. The Western Spadefoot Habitat Mitigation and Monitoring Plan will be provided to the CDFW and USFWS for review and comment.

The new basins will be constructed concurrently with Alpine County Park, and western spadefoots observed within the Project footprint will be relocated to suitable basins outside the Project footprint.

Monitoring of the newly constructed basins will be conducted during the wet season (approximately December through April) at approximately 1-week intervals, beginning with the first significant rain event each year for 5 years following completion of the basin construction. The County's biologist will map the spatial extent of the basins, document inundation depths of the basins and breeding outcomes, and determine if adaptive management is needed to increase survival and recruitment within the constructed basins. Notes will be made if egg masses or larvae are observed. One nocturnal adult survey will also be conducted in each of the 5 years when a breeding event is occurring to document the foraging/mobility patterns of western spadefoots in the area of the new basins. The County will also monitor the core breeding population on the Wright's Field Preserve, using the same methods described above (basin mapping and weekly checks, nocturnal survey, etc.) to document population dynamics of the entire population over time.

Monitoring/survey data will be provided to CDFW and USFWS by the monitoring biologist following each monitoring period, and a written report summarizing the monitoring results will be provided to CDFW and USFWS at the end of the monitoring effort each year. Success criteria for the monitoring program shall include evidence of a ponding duration suitable to support western spadefoot reproduction within at least one of the constructed basins in at least one of the 5 years of monitoring.

After exclusionary fencing has been installed around all initial ground-disturbing construction, but prior to initiation of initial ground disturbance, the spadefoot biologist will conduct at least three nighttime surveys for spadefoots within the fenced area. Surveys will continue until no more spadefoots are captured and relocated out of the fenced footprint and/or upon the recommendations of the spadefoot biologist. These surveys will be conducted during appropriate climatic conditions and during the appropriate hours (i.e., nighttime, during rain events in breeding season) to maximize the likelihood of encountering spadefoots. If climatic conditions are not highly suitable for spadefoot activity, spadefoot habitat in the Project footprint will be watered to encourage aestivating toads to surface. All spadefoots found within the Project area will be captured and translocated by the spadefoot biologist to the nearest suitable habitat outside of the work area. Upon completion of these surveys and prior to initiation of construction activities, the spadefoot biologist will report the capture and release locations of all spadefoots found and relocated during these surveys to CDFW and USFWS.

MM-BIO-5: Avoid and Minimize Impacts on Special-Status Avian Species and Other Birds Protected under the MBTA. To mitigate for potentially significant impacts on sensitive nesting birds and raptors, the County DPR shall avoid ground-disturbing activities during the bird breeding season to keep the Project in compliance with state and federal regulations regarding nesting birds (i.e., the federal MBTA and California FGC). The bird breeding season is defined as January 15 to September 15, which includes the tree-nesting raptor breeding season of January 15 to July 15, the ground-nesting raptor breeding season of February 1 to July 15, and the general avian breeding season of February 1 to September 15.

If removal cannot be avoided during the bird and/or raptor nesting season, a nesting bird survey will be conducted no more than 72 hours prior to ground-disturbing activities by a qualified avian biologist within 500 feet of proposed ground- or vegetation-disturbing activities. Biologists will also survey for raptor nests up to 1,500 feet from proposed ground- or vegetation-disturbing activities. This is necessary to definitively ascertain whether raptors or other migratory birds are actively nesting at the Project site or in an area that could be indirectly affected by work activities (i.e., through noise or visual disturbances). Special attention will be paid to determining the presence of nesting grassland-endemic bird species, such as grasshopper sparrow, that may be nesting within dense grasses present within the proposed development footprint.

If any active nests are detected, the area will be flagged and mapped on construction plans, along with a buffer, as recommended by the qualified biologist. The buffer area(s) established by the qualified biologist will be avoided until the nesting cycle is complete or it is determined that the nest is no longer active. The qualified biologist shall be a person familiar with bird breeding behavior and capable of identifying the bird species of San Diego County by sight and sound and determining alterations of behavior as a result of human interaction. Buffers may be adjusted, based on the observations by the biological monitoring on the response of the nesting birds to human activity.

MM-BIO-6: Burrowing Owl Preconstruction Surveys. Prior to initiation of Project clearing, grading, grubbing, or other construction activities, pre-construction surveys for the presence of burrowing owl to verify species absence will be conducted, including surveying suitable habitat within the Project footprint and a 300-foot buffer by a qualified biologist; no grading shall occur within 300 feet of an active burrowing owl burrow. The pre-construction surveys shall follow the take avoidance survey methods outlined in the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). The first survey shall be conducted within 30 days of initial site disturbance, and the second survey shall occur within 24 hours of initial site disturbance.

Following the initial pre-grading survey, the Project site will be monitored for new burrows each week until grading is complete. Subsequent pre-construction surveys will be required if lapses in the Project occur exceeding 72 hours. If present in the Project construction footprint or within 300 feet of the Project site, coordination with CDFW and USFWS shall occur to establish measures to avoid potential impacts on burrowing owl. Such measures will be decided in coordination with the CDFW and USFWS and will follow the "Strategy for Mitigating Impacts to Burrowing Owls in the Unincorporated County" (Attachment A of the County's Report Format and Content Requirements – Biological Resources).

Following the first pre-construction survey, within 30 days of initial site disturbance, the qualified biologist will submit a Pre-Grading Survey Report to the County, CDFW, and USFWS within 14 days of the survey and include maps of the Project site. If any burrowing owls are observed, the burrowing owl locations on aerial photos and in the format described in the mapping guidelines of the County's Report Format and Content Requirements – Biological Resources will be included. A qualified biologist will attend the pre-construction meeting to inform construction personnel about the burrowing owl requirements.

MM-BIO-7: Protect Pallid Bat. The County DPR shall work with a bat expert to design and install bat boxes that attract pallid bat prior to vegetation removal activities commencing on site. These bat boxes shall be designed to accommodate both solitary individuals and maternal roost sites. Bat box designs shall reflect best practices at the time of installation and be specific to larger-sized bats like pallid bat with respect to roost chamber sizes, etc. The design and placement of bat boxes shall also consider how to best maintain proper roost temperature. When possible, the bat boxes shall be placed along the edges of the wooded areas on-site. The final design, numbers, and placement of bat boxes will be determined by the bat expert in consultation with County DPR staff using the best practices known at the time.

Monitoring of the bat boxes shall be conducted quarterly for the first 2 years and twice yearly during years 3 through 5 after installation. Any problems that are noted (e.g., mortality, predation) shall be addressed in consultation with the bat expert. Occupancy status, including species, numbers, etc., shall be documented to the extent possible without disturbing the occupants. If, after the first 2 years, a bat box remains unoccupied by any bat species, the County DPR and bat expert will discuss if the bat box needs to be repositioned on-site or redesigned. An annual report shall be prepared by the bat expert or designee to document the findings of the monitoring visits. The County will provide copies of this annual report to CDFW and also include updates on the bat box monitoring on the site in the County's annual report for the MSCP.

MM-BIO-8: Bat Roost Avoidance. Because of the difficulty in detecting all potentially occurring roosting bats (e.g., the western red bat within the Engelmann oaks, pallid bats within rock crevices, etc.), no construction activities that could disturb a maternal roost site will occur during the pupping season (typically April 1 through August 31). This measure specifically precludes high-frequency surveying as well as intensive noise-generating activities (e.g., jack-hammering, etc.) within 200 feet of any Engelmann oaks or rock outcrops during the pupping season. If construction activities must occur within this 200-foot avoidance buffer during the pupping season, the County will conduct definitive bat roost surveys to determine the presence or absence of maternal day-roost and/or night- roost locations within the 200-foot avoidance buffer that overlaps the construction footprint. The bat biologist(s) who will conduct these surveys shall have the appropriate education, training, and experience to conduct the roost surveys. The bat roost survey methodology will be described in a Bat Roost Management, Monitoring, and Mitigation Plan, which will be prepared at least 30 days prior to the start of construction and provided to CDFW.

Bat roost survey methods may include mist netting and tracking individual bats using telemetry and/or additional acoustic surveys timed to determine if individual Engelmann oaks or rock outcrops within the 200-foot avoidance buffer are supporting bat roost sites. If any maternal roost sites within the 200-foot avoidance buffer are identified, an appropriate avoidance buffer shall be established around that roost site in accordance with the requirements established in

the Bat Roost Management, Monitoring, and Mitigation Plan. Avoidance buffer distances will account for the ability of that individual bat species to tolerate specific types of low- and high-frequency construction noise and other human disturbance associated with the Project. No construction activities that could disrupt the roost site will be permitted within the established avoidance buffer.

Bat biologists will monitor construction activities occurring adjacent to the avoidance areas for the bat roost sites in accordance with the Bat Roost Management, Monitoring, and Mitigation Plan. Monitoring frequency and duration also will conform to the Bat Roost Management, Monitoring, and Mitigation Plan and be able to determine that the established bat roost avoidance buffers are large enough to prevent maternal roost site impacts, including, but not limited to, roost site abandonment. Avoidance buffers will be expanded if any stress or disturbance to the maternal roost site is observed during monitoring. In years 1, 3, and 5 following construction completion, the County will conduct bat surveys, including maternal bat roost surveys, within the areas originally surveyed prior to construction. If the maternal bat roost sites previously observed prior and during construction are still observed during these monitoring surveys, no additional mitigation will be required. If any maternal roost sites observed prior to or during construction are no longer present (i.e., are not observed in any of the three post-construction surveys), the County will mitigate for the loss of the maternal roost site at a 2:1 ratio, using methods agreed upon in the Bat Roost Management, Monitoring, and Mitigation Plan. This may include planting additional Engelmann oaks within the proposed preserve if the affected maternal roost site utilized Engelmann oak trees or by building artificial bat roosts for the affected bat species.

3.5 Conclusions

The proposed measures detailed above would reduce the Project's impacts on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS to a less-than-significant level.

Chapter 4
Riparian Habitat or Sensitive Natural Communities

4.1 Guidelines for the Determination of Significance

CEQA Appendix G states that a project would have a potentially significant effect on biological resources if it would:

> …have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service

Specifically, according to the County, the following conditions would be considered significant (County 2010b):

- 4.A. Project-related grading, clearing, construction or other activities would temporarily or permanently remove sensitive native or naturalized habitat on or off the project site.
- 4.B. Any of the following will occur to or within jurisdictional wetlands and/or riparian habitats, as defined by USACE, CDFW and the County: removal of vegetation; grading; obstruction or diversion of water flow; adverse change in velocity, siltation, volume of flow, or runoff rate; placement of fill; placement of structures; construction of a road crossing; placement of culverts or other underground piping; any disturbance of the substratum; and/or any activity that may cause an adverse change in native species composition, diversity, and abundance.
- 4.C. The Project would draw down the groundwater table to the detriment of groundwater-dependent habitat, typically a drop of 3 feet or more from historical low groundwater levels.
- 4.D. The Project would cause indirect impacts to levels that would very likely harm sensitive habitats over the long term.
- 4.E. The Project would not include a wetland buffer adequate to protect the functions and values of existing wetlands.

Each of these significance criteria is discussed in Section 4.2, below, with respect to the proposed Project.

4.2 Analysis of Project Effects

Each of the significance criteria listed in Section 4.1 is discussed below with respect to the Project's anticipated effects. Those criteria for which impacts are not anticipated are discussed briefly at the end of the section.

- 4.A. The Project would remove sensitive native or naturalized habitat.

  The Project would directly and permanently affect Valley needlegrass, non-native grassland, Engelmann oak woodland, and flat-topped buckwheat within a Biological Resource Core Area (BRCA). Valley needlegrass and Engelmann oak woodlands are listed as Tier I vegetation communities, flat-topped buckwheat is listed as a Tier II vegetation community, and non-native

grassland is listed as a Tier III vegetation community in Attachment K of the BMO. Table 8 shows how many acres of these sensitive natural communities could be affected by implementation of the Alpine County Park and how many would be protected in the Alpine Park Preserve.

Impacts on sensitive natural communities or naturalized habitats would be significant. Impacts would be reduced to less-than-significant levels through implementation of **APM-BIO-1**, **MM-BIO-9**, **MM-BIO-10** and a Resource Management Plan for Alpine Park Preserve. These measures are discussed below in Section 4.4.

The proposed Project would not result in significant impacts under the following guidelines for the following reasons:

- 4.B. Impacts on USACE/RWQCB, CDFW, and County jurisdictional habitat would not occur because there none of these resources are identified on-site.
- 4.C. The Project would not use groundwater and therefore would not draw down the groundwater table to the detriment of groundwater-dependent habitat.
- 4.D. The Project is not anticipated to cause indirect impacts at levels that would be likely to harm sensitive habitats over the long term. Although anthropogenic presence is likely to increase through construction of Alpine County Park, measures have been sought to reduce impacts on the sensitive natural communities in the neighboring Alpine Park Preserve. The current informal trail system would be converted to a more formalized system, discouraging unauthorized uses within Alpine Park Preserve. A permanent live-in volunteer would also be situated within Alpine County Park, which would further reduce indirect impacts on sensitive habitats through an increased monitoring presence in the area. The presence of trash cans, signs, park rangers, and an on-site volunteer would further reduce indirect impacts on sensitive habitat with implementation of the proposed preserve and Alpine Park
- 4.E. The Project would not support wetlands waters or riparian habitats.

4.3 Cumulative Impact Analysis

The BSA is entirely within the MSCP. County guidelines state that if the appropriate study area is entirely within the MSCP, a project may rely on the MSCP to determine that the project's impacts are not cumulatively considerable (County 2010b). The Project would be consistent with the MSCP and the BMO, although DPR is exempt from the BMO. Therefore, any Project impacts would not be cumulatively considerable.

4.4 Mitigation Measure and Applicant-Proposed Measure

Under CEQA, mitigation is required for significant project effects on biological resources. As defined by CEQA Section 15370, mitigation includes measure to avoid, minimize, or rectify impacts. An appropriate level of mitigation is determined primarily through two considerations, as follows:

- The nature and relative magnitude of the Project's impacts on the resource, and
- The resource's degree of sensitivity.

The County proposes the following mitigation measures and applicant-proposed measure (APM) to reduce potentially significant impacts to below a level of significance:

- 4.A. Potentially significant direct and permanent impacts on sensitive vegetation communities would be mitigated to below a level of significance by habitat-based mitigation, as described below.

  APM-BIO-1: Establishment of the Alpine Park Preserve: As required under the County's MSCP Subarea Plan, Alpine Park Preserve will be managed in perpetuity in accordance with a Resource Management Plan. This plan will outline management activities to be carried out by the County. Activities likely to be included in the Resource Management Plan would enhance and preserve the affected sensitive natural communities. These activities include long-term monitoring of on-site preservation areas, non-native and invasive species vegetation management, and habitat restoration on the preserve as applicable. Through these strategic measures to mitigate for impacts, the preserved sensitive natural communities will be managed to maintain high-quality and functioning habitat. Through these initiatives, the County will demonstrate its long-term commitment to species conservation within Alpine Park Preserve.

  MM-BIO-9: Compensatory Habitat-Based Mitigation. To mitigate for potentially significant impacts on Tier I, Tier II, and Tier III sensitive habitats, the County will provide compensatory mitigation consistent with its BMO to reduce significant impacts on sensitive vegetation communities. Mitigation will be provided within Alpine Park Preserve and/or within off-site location(s), as summarized below:

Mitigation Requirements

Tier[a]	Total Impacts	Mitigation Ratio	Mitigation Requirement	On-site Mitigation	Off-site Mitigation
Tier I	14.86	2:1	29.73	17.48 acres of preservation plus 4.84 acres of restoration (see **MM-BIO-10**)	7.41 acres of restoration on Wright's Field Preserve (see **MM-BIO-10**)
Tier II	3.97	1.5:1	5.95	5.95	None
Tier III	3.57	1:1	3.57	None	3.57[b]

a. Tiers correspond to those described in the County's BMO, and mitigation sites will meet the criteria for BRCA.
b. Habitat-based mitigation for permanent direct impacts on non-native grasslands will be satisfied through purchase of credits and/or land acquisition of a similar high-quality non-native grassland in an off-site location.

MM-BIO-10: Native Grassland Mitigation. Impacts on up to 14.79 acres of Valley needlegrass grassland will be mitigated at a 2:1 ratio through preservation of 10.60 acres of Valley needlegrass grassland and 6.88 acres of open Engelmann oak woodland on-site, in addition to 4.84 acres of restoration of non-native grassland to Valley needlegrass grassland within the County's parcel and 7.41 acres of restoration on Wright's Field Preserve. All restoration will be conducted in accordance with a Habitat Restoration and Enhancement Plan (HREP) approved by the Wildlife Agencies (USFWS and CDFW). Success criteria established in that HREP will include meeting at least a 5 percent absolute cover of purple needlegrass within restoration areas while retaining similar cover and species composition of native forbs currently present within non-native grassland areas on-site. If restoration does not meet the restoration goals, the County will implement adaptive management measures to be approved by the Wildlife Agencies.

4.5 Conclusions

Potentially significant direct and permanent impacts on sensitive vegetation communities would be mitigated to below a level of significance by the implementation of **APM-BIO-1**, **MM-BIO-9,** and **MM-BIO-10**.

Chapter 5
Federal and State Wetlands and Waterways

5.1 Guidelines for the Determination of Significance

CEQA Appendix G states that a project would have a potentially significant effect on biological resources if it would:

> …have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means

Specifically, according to the County, any of the following conditions would be considered significant (County 2010b):

- 5.A. Any of the following will occur to or within jurisdictional wetlands, as defined by USACE: removal of vegetation; grading; obstruction or diversion of water flow; adverse change in velocity, siltation, volume of flow, or runoff rate; placement of fill; placement of structures; construction of a road crossing; placement of culverts or other underground piping; any disturbance of the substratum; and/or any activity that may cause an adverse change in native species composition, diversity, and abundance.
- 5.B. The Project would draw down the groundwater table to the detriment of groundwater-dependent federal wetlands, typically a drop of 3 feet or more from historical low groundwater levels.
- 5.C. The Project would not include a wetland buffer adequate to protect the functions and values of existing wetlands.

These significance criteria, for which impacts are not anticipated, are discussed briefly in Section 5.2, below.

5.2 Analysis of Project Effects

The proposed Project would not result in significant impacts under the following guidelines for the following reasons:

- 5.A. No federal wetlands were mapped within the BSA, and no impacts on federal wetlands would occur. The Project would also avoid impacts on CDFW jurisdictional habitat.
- 5.B. This Project would not use groundwater.
- 5.C. The Project would not affect the functions and values of existing wetlands.

5.3 Cumulative Impact Analysis

The proposed Project would not result in impacts on state or federal wetlands and therefore would not contribute to the cumulative loss of state or federal wetlands.

5.4 Mitigation Measures and Design Consideration

The proposed Project would not result in impacts on state or federal wetlands; no mitigation measures are required.

5.5 Conclusions

No federal wetlands were mapped within the BSA, and no impacts on federal wetlands would occur. No significant impacts would occur.

Chapter 6
Wildlife Movement and Nursery Sites

6.1 Guidelines for the Determination of Significance

CEQA Appendix G states that a project would have a potentially significant effect on biological resources if it would:

> …interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites

Specifically, according to the County, any of the following conditions would be considered significant (County 2010b):

- 6.A. The Project would prevent wildlife access to foraging habitat, breeding habitat, water sources, or other areas necessary for their reproduction.
- 6.B. The Project would substantially interfere with connectivity between blocks of habitat or could block or substantially interfere with a local or regional wildlife corridor or linkage.
- 6.C. The Project would create artificial wildlife corridors that would not follow natural movement patterns.
- 6.D. The Project would increase noise and/or nighttime lighting in a wildlife corridor or linkage to levels proven to affect the behavior of the animals identified in a site-specific analysis of wildlife movement.
- 6.E. The Project would not maintain an adequate width for an existing wildlife corridor or linkage and/or would further constrain an already-narrow corridor through activities such as (but not limited to) reduction of corridor width, removal of available vegetative cover, placement of incompatible uses adjacent to it, and placement of barriers in the movement path.
- 6.F. The Project would not maintain adequate visual continuity (i.e., long lines of sight) within wildlife corridors or linkages.

These significance criteria, for which impacts are not anticipated, are discussed briefly in Section 6.2, below.

6.2 Analysis of Project Effects

The Project would not result in significant impacts under the following guidelines for the following reasons:

- 6.A. The Project would not prevent wildlife access to foraging habitat, breeding habitat, or water sources. The BSA and the adjacent Wright's Field are surrounded by low-density exurban residential development. As such, the BSA and Wright's Field currently function as an "island" of habitat with limited connectivity to open space and other preserve areas. The proposed Project would be constructed at the eastern edge of this island of open space, leaving a smaller but similarly situated "island" of habitat to the west of the proposed park. The Alpine County Park

and Alpine Park Preserve would serve as an island of habitat surrounded by exurban development on all sides. As such, development of this Project would not exclude any existing wildlife from accessing foraging habitat, breeding habitat, or water sources.

- 6.B. The Project would not interfere with connectivity or wildlife corridors. Alpine County Park would be adjacent to existing development to the north, south, and east and directly adjacent to a busy arterial road, South Grade Road, that already limits wildlife movement in the area.

  Residential development within the past 15 to 20 years in the vicinity of the proposed Project has substantively changed how wildlife can move to the north and east of the County's parcel. Specifically, three large houses to the north of the County parcel along Engelmann Oak Lane were built during this time period and restrict movement of terrestrial mesofauna to the north. Two additional homes east of the intersection of South Grade and Boulder Oak Lane were also built in this timeframe. These homes constrain wildlife movement from the far northeastern corner of the County parcel to points farther east. Large-lot residential developments, many with fences around their perimeters, currently restrict wildlife movement from due east of the County parcel to points farther east. Wildlife movement, therefore, on the north and east of the County parcel is already constrained to backyards where there are gaps in fences or where animals can move under or over fences. Development of the equestrian center at the northern end of the proposed active park would further restrict east–west movement at this northeastern edge of the County parcel, but there would be an area of open space (where the leach field for the septic system is proposed) of approximately 100 feet in width remaining in this area for east–west movement of terrestrial fauna.

  On the southern end of the proposed park, the development would potentially constrain wildlife movement from the south to the north for approximately 500 feet where the proposed active park is proposed directly north of the Findel Ranch portion of Wright's Field. This 500-foot stretch represents only approximately 30 percent of the total linear distance where wildlife ostensibly cross from protected lands (i.e., the Findel Ranch section of Wright's Field) south of South Grade Road into the Wright's Field/County parcel to the north, or vice-versa. Approximately 1,060 feet remain where wildlife could cross from the Findel Ranch portion of Wright's Field into the proposed Alpine Park Preserve, ensuring that wildlife movement would continue to the extent it currently does in that portion. Most small mammals/meso-carnivore that are expected to use these habitat blocks can utilize widths of less than 1,000 feet as movement corridors. As a result, a reduction of approximately 30 percent of the width of this corridor from the proposed Project would not substantially change wildlife movement patterns from baseline conditions.

  Development of the Project would not significantly alter the way that wildlife utilize this contiguous block of open space. The conversion of 22.4 acres of native habitat to a developed park facility would not significantly constrain wildlife movement because the park would be adjacent to existing development on three sides and situated at the far eastern edge of the approximately 450-acre contiguous block of habitat in the immediate vicinity (i.e., the adjacent Wright's Field Preserve and privately held, directly contiguous open space lands in the immediate vicinity of the proposed Project, some of which are protected through a conservation easement). The Alpine Park Preserve would be created on the western edge of the park, contiguous to Wright's Field Preserve, and maintained as an MSCP preserve in perpetuity. Trails would be utilized by medium and large mammals for ease of movement through the preserve, similar to baseline conditions. No features would be constructed that would impinge any movement areas, including ridgelines or canyons.

As a result, Alpine County Park would not interfere within connectivity or wildlife corridors.

- 6.C. The Project would not create artificial wildlife corridors. The trails may be utilized by medium to large mammals. The Project would not modify or constrain any corridors on the preserve. Alpine County Park would be adjacent to existing development to the north, south, and east and directly adjacent to a busy arterial road, South Grade Road, that already limits wildlife movement in the area. As a result, Alpine County Park would not create an artificial wildlife corridor.
- 6.D. The Project would not propose any new nighttime lighting or nighttime usage of the preserve. Public access to the preserve would be limited to a low level and would not substantially increase noise within the preserve.
- 6.E. The Project would not impede movement in wildlife corridors. Public access is proposed only during daylight hours and would not affect the nighttime movement of medium to large mammals. Implementation of the Project would not constrain the movement of reptiles, small mammals, or birds.
- 6.F. The Project would not constrain the visual continuity of wildlife corridors or linkages. Development would be focused on the eastern edge of the existing open space adjacent to the busy South Grade Road. Trails would not interrupt visual continuity.

6.3 Cumulative Impact Analysis

The Project would not result in significant impacts on a wildlife corridor; therefore, impacts would not be cumulatively significant.

6.4 Mitigation Measures and Design Consideration

The Project would not result in significant impacts on wildlife corridors and linkages; therefore, mitigation is not proposed.

6.5 Conclusions

The Project would not result in significant impacts on wildlife corridors and linkages.

Chapter 7
Local Policies, Ordinances, and Adopted Plans

7.1 Guidelines for the Determination of Significance

CEQA Appendix G states that a project would have a potentially significant effect on biological resources if it would:

> …conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

Specifically, according to the County, any of the following conditions would be considered significant (County 2010b):

- 7.A. For lands outside of the MSCP, the Project would affect coastal sage scrub vegetation in excess of the County's 5 percent habitat loss threshold, as defined by the Southern California Coastal Sage Scrub Natural Community Conservation Planning Guidelines.
- 7.B. The Project would preclude or prevent the preparation of the subregional NCCP. For example, the project proposes development within areas that have been identified by the County or resource agencies as critical to future habitat preserves.
- 7.C. The Project would affect any amount of sensitive habitat lands, as outlined in the Resource Protection Ordinance.
- 7.D. The Project would not minimize and/or mitigate coastal sage scrub habitat loss in accordance with Section 4.3 of the Natural Community Conservation Planning Guidelines.
- 7.E. The Project would not conform to the goals and requirements outlined in any applicable HCP, Habitat Management Plan, Special Area Management Plan, Watershed Plan, or similar regional planning effort.
- 7.F. For lands within the MSCP, the Project would not minimize impacts on BRCAs, as defined in the BMO.
- 7.G. The Project would preclude connectivity between areas of high habitat values, as defined by the Southern California Coastal Sage Scrub Natural Community Conservation Planning Guidelines.
- 7.H. The Project would not maintain existing movement corridors and/or habitat linkages, as defined by the BMO.
- 7.I. The Project would not avoid impacts on MSCP narrow endemic species and would affect core populations of narrow endemics.
- 7.J. The Project would reduce the likelihood of survival and recovery of listed species in the wild.
- 7.K. The Project would result in the killing of migratory birds or destruction of active migratory bird nests and/or eggs (MBTA).

- 7.L. The Project would result in the take of eagles, eagle eggs, or any part of an eagle (Bald and Golden Eagle Protection Act).

Each of these significance criteria is discussed in Section 7.2, below, with respect to the proposed Project. Those criteria for which impacts are not anticipated are discussed briefly at the end of the section.

7.2 Analysis of Project Effects

Each of the significance criteria listed in Section 7.1 is discussed below with respect to the Project's anticipated effects. Those criteria for which impacts are not anticipated are discussed briefly at the end of the section.

- 7.K. Construction-related impacts could result in the killing of migratory birds or destruction of active migratory bird nests and/or eggs protected under the MBTA and California FGC.

  The construction of the Project would have potential to destroy birds or bird nests protected under the federal MBTA and California FGC if grading or vegetation clearing is conducted during the breeding season for these taxa, defined as January 15–July 15 for tree-nesting raptors and February 15–September 15 for other birds. Impacts on birds or their nesting success would violate the MBTA and California FGC and be considered significant. These impacts would be reduced to less-than-significant levels with implementation of **MM-BIO-5**.

The proposed Project would not result in significant impacts under the following guidelines for the following reasons:

- 7.A&D. The Project is within the MSCP Plan Area, and as such, these criteria are not applicable to the Project.
- 7.B. The Project is consistent with the existing NCCP and the San Diego MSCP and would not prelude the preparation of another subregional NCCP.
- 7.C. The Resource Protection Ordinance does not apply to this Project and the project would be within the MSCP. The Project would be consistent with the BMO, although DPR is exempt from the BMO.
- 7.E. This Project would be consistent with the San Diego MSCP. The preserve would be managed by a Resource Management Plan that would be prepared by the County. The Resource Management Plan would be consistent with the MSCP and promote the implementation of the MSCP preserve system.
- 7.F. This site is within the MSCP and considered a BRCA. This Project has been designed to minimize impacts on the BRCA by keeping the development footprint as small as possible while still meeting the Project purpose and need. Multi-use trails have been designed to be as narrow as possible while allowing for public access. Project-related impacts on habitat within the BRCA would be mitigated consistent with the BMO through the implementation of mitigation measure **MM-BIO-9**.
- 7.G. The Project would not preclude connectivity. Trails would be expected to be used by nocturnal mammals and reptiles for movement.
- 7.H. The Project would not result in impacts on existing movement corridors or habitat linkages.

- 7.I. A wintering burrowing owl was observed within the Study Area. The Project would preserve at a 1:1 or higher ratio suitable habitat for burrowing owl through **MM-BIO-9**, **MM-BIO-10**, and **APM-BIO-1**. Pre-construction surveys for burrowing owl would also occur through **MM-BIO-6**.
- Breeding populations of narrow endemic species are not present within any portion of the Alpine County Park Project area or within Alpine Park Preserve.
- 7.J. The Project would not reduce the likelihood of recovery of listed species. Although the Project would result in impacts on occupied QCB habitat, those impacts would be mitigated through implementation of **MM-BIO-3** and the associated HCP and Habitat Restoration and Enhancement Plan for the Project. The Section 10 species permitting process would ensure that there would be no reduced likelihood of recovery of QCB.
- 7.L. The Project would not result in take of golden eagles. The Project would be situated within eagle foraging habitat, but the impacts associated with implementation of the Project would not significantly affect eagle foraging and would not result in take. No Project elements are proposed within 4,000 feet of a golden eagle nest.

County Consolidated Fire Code

Although not specifically identified in Thresholds 7.A. through 7.L., a conflict with one provision of the County Consolidated Fire Code would occur as part Project implementation. The proposed volunteer parking pad would be within the northern end of the proposed Alpine County Park. The location of this pad would result in the need for a Zone A and Zone B fire fuel modification zone, as described above. The County Consolidated Fire Code, Section 4907.2, Fuel Modification (f), states:

> When the subject property contains an area designated to protect biological or other sensitive habitat or resource, no building or other structure requiring a fuel modification zone shall be located so as to extend the fuel modification zone into a protected area.

The County re-designed the site plan in the fall of 2022 to move the volunteer parking pad from its previous location, approximately 12 feet from the edge of the proposed preserve. The County moved the location of the pad to avoid the fuel modification zone (Zone A and Zone B) extending into the preserve. Its new location is more centrally located directly adjacent to the equestrian staging area; it extends into the Native Habitat Avoidance Area inside of the equestrian center loop road. The Native Habitat Avoidance Area would become part of the preserve after construction is complete. As such, the placement of this volunteer parking pad is not entirelyconsistent with these provisions in the County Consolidated Fire Code and as such, these impacts would be significant. These impacts would be mitigated consistent with the BMO through the implementation of mitigation measure **APM-BIO-1** and **MM-BIO-9.**

7.3 Cumulative Impact Analysis

The Project would be consistent with the MSCP and would not conflict with any local policies or ordinances or any HCP, NCCP, or other approved local, regional, or state HCP. Therefore, the Project would not add to cumulative impacts related to local policies or plans.

7.4 Mitigation Measures and Design Consideration

Under CEQA, mitigation is required for Project effects on biological resources that are identified as being significant. An appropriate level of mitigation is determined primarily through two considerations, as follows:

- The nature and relative magnitude of the Project's impacts on the resource, and
- The resource's degree of sensitivity.

The County proposes the following mitigation measures to reduce potentially significant impacts to below a level of significance:

- **MM-BIO-3** (discussed in Section 3.4),
- **MM-BIO-5** (discussed in Section 3.4), and
- **MM-BIO-9** (discussed in Section 4.4).

7.5 Conclusions

The Project would avoid significant impacts on local policies, ordinances, and plans. Implementation of **MM-BIO-5** would ensure that impacts on protected MBTA birds from Project construction would be avoided and that no significant impact would occur. Implementation of **MM-BIO-3** and the associated HCP and Habitat Restoration and Enhancement Plan would mitigate impacts on QCB habitat. Mitigation measures **APM-BIO-1**, **MM-BIO-9,** and **MM-BIO-10** would ensure that any impacts on the BRCA would be mitigated to below a level of significance, as would mitigation for impacts associated with fire fuel management zones extending into areas intended to become part of the Alpine Park Preserve in the future.

Chapter 8
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Chapter 9
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9.1 Preparers

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9.2 Contacts

County of San Diego, Department of Parks and Recreation

Appendix A
Figures

1 Regional Location

2 Project Vicinity

3 Vegetation Communities

4 Special-Status Plants

5 Special-Status Wildlife

6 Hermes Copper Proposed Critical Habitat and Known Occurrences

7 Engelmann Oak Root Protection Zone Impacts

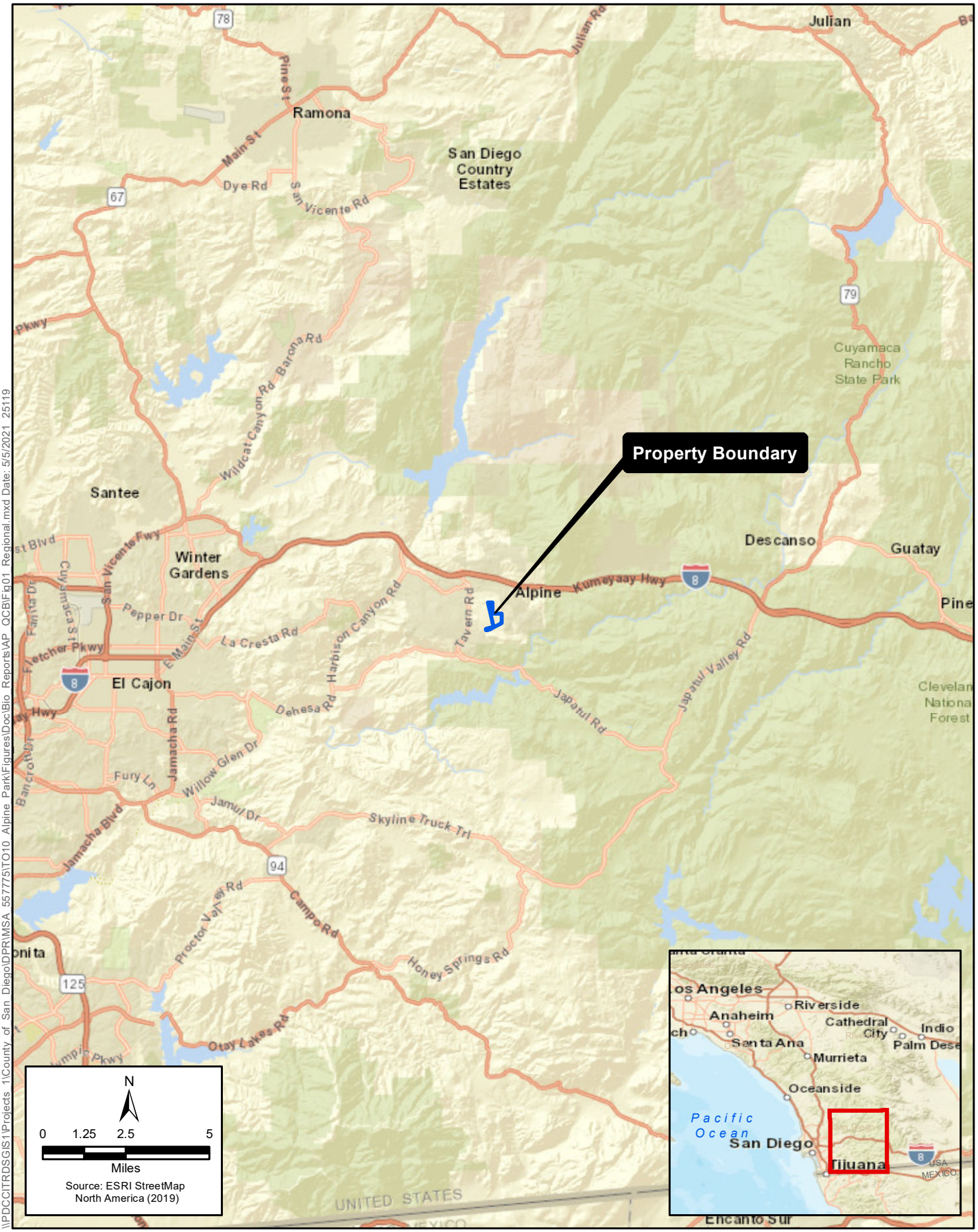

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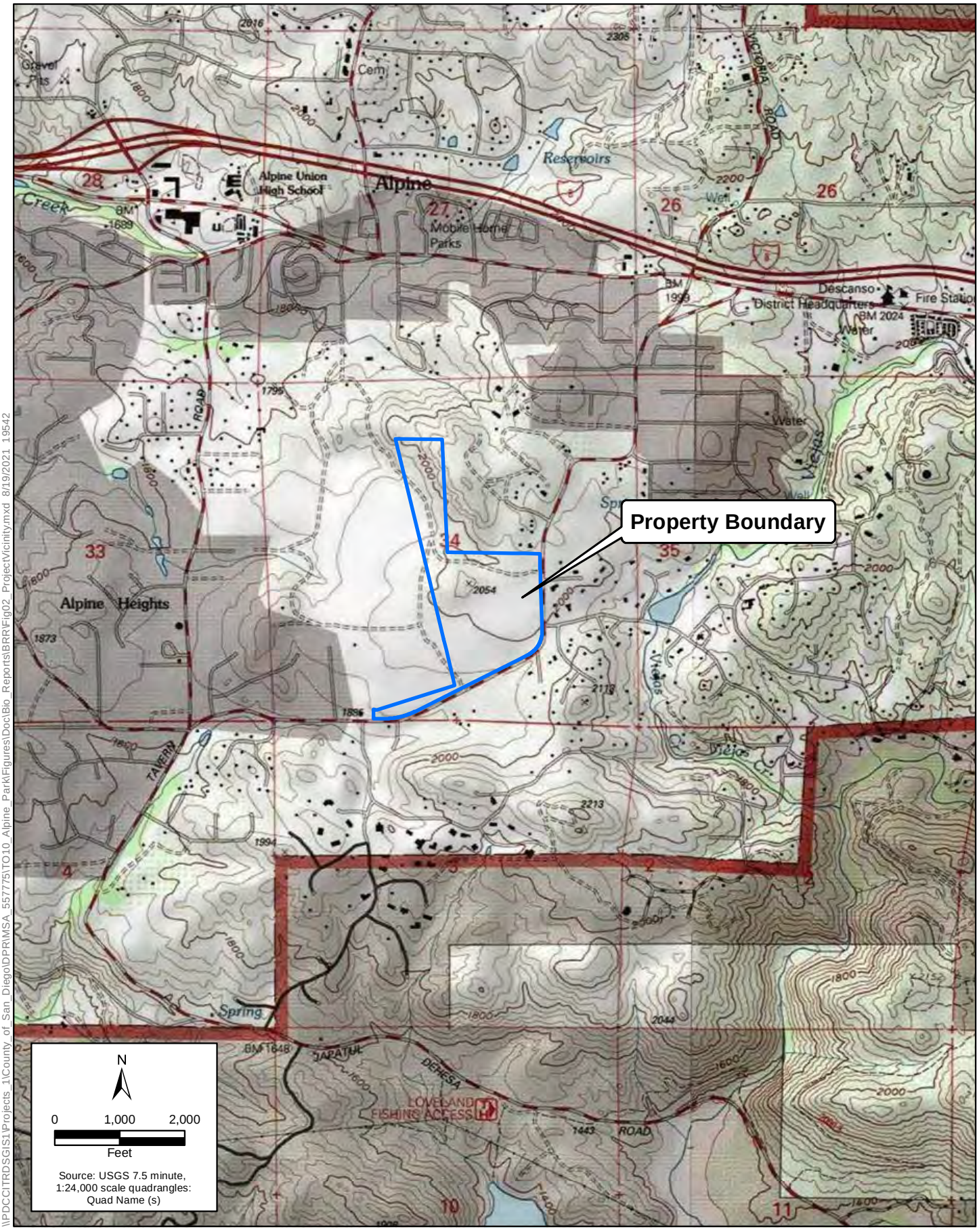
Figure 1
Regional Location
Alpine County Park Project



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Project Vicinity
Alpine County Park Project

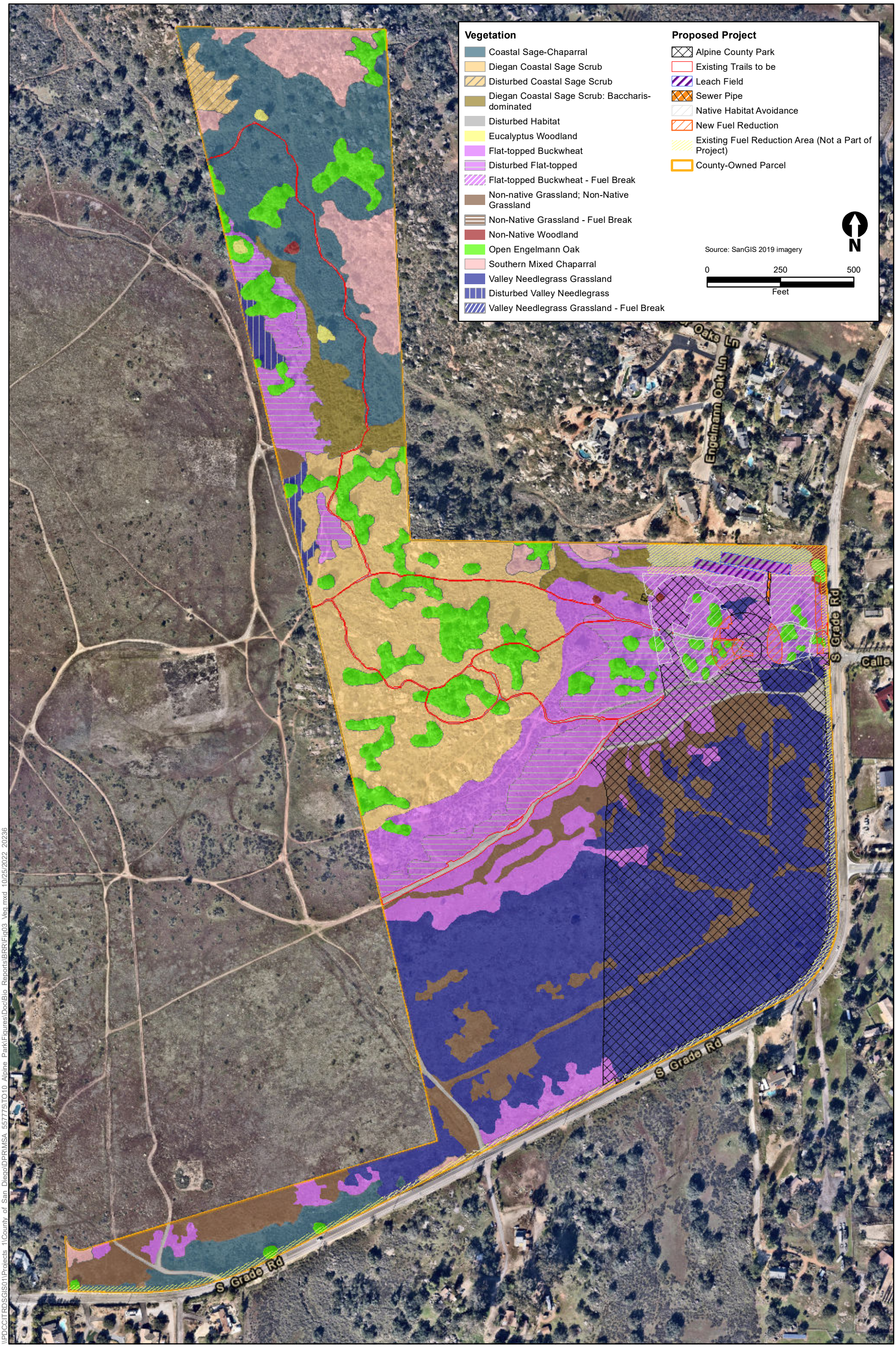

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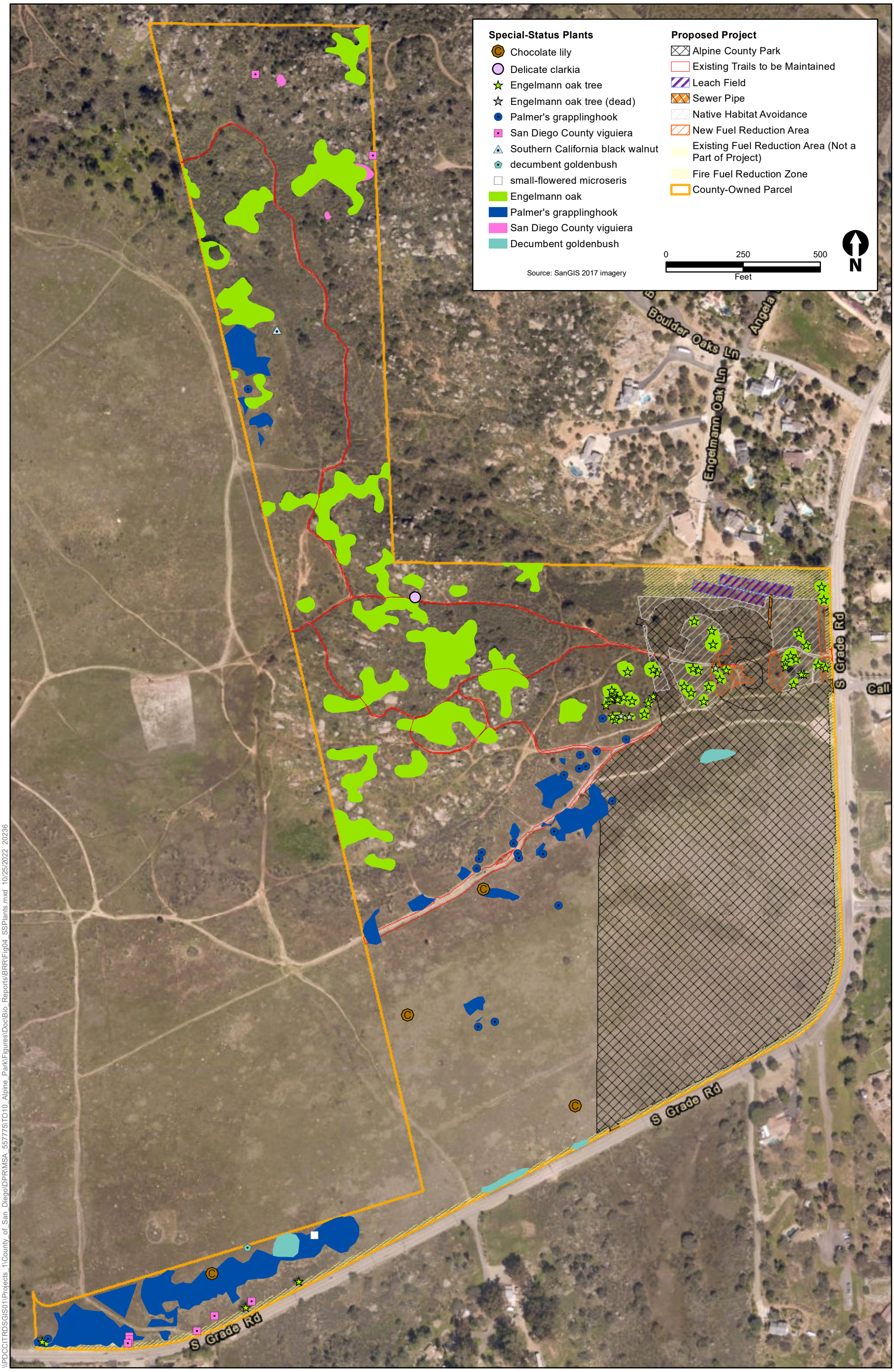
Figure 3
Vegetation Communities
Alpine County Park Project



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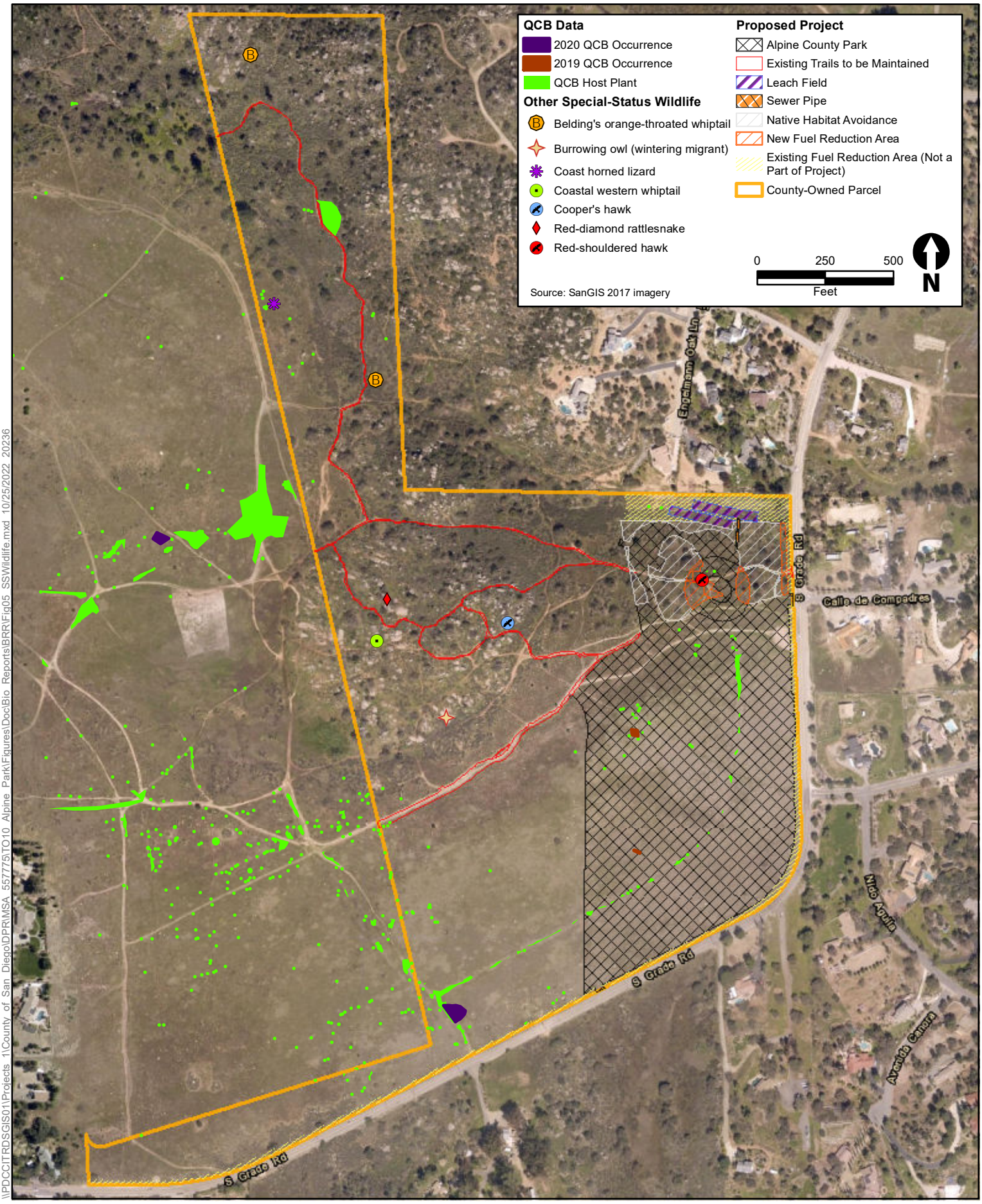
Special-Status Plants
Alpine County Park Project



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Special-Status Wildlife
Alpine County Park Project

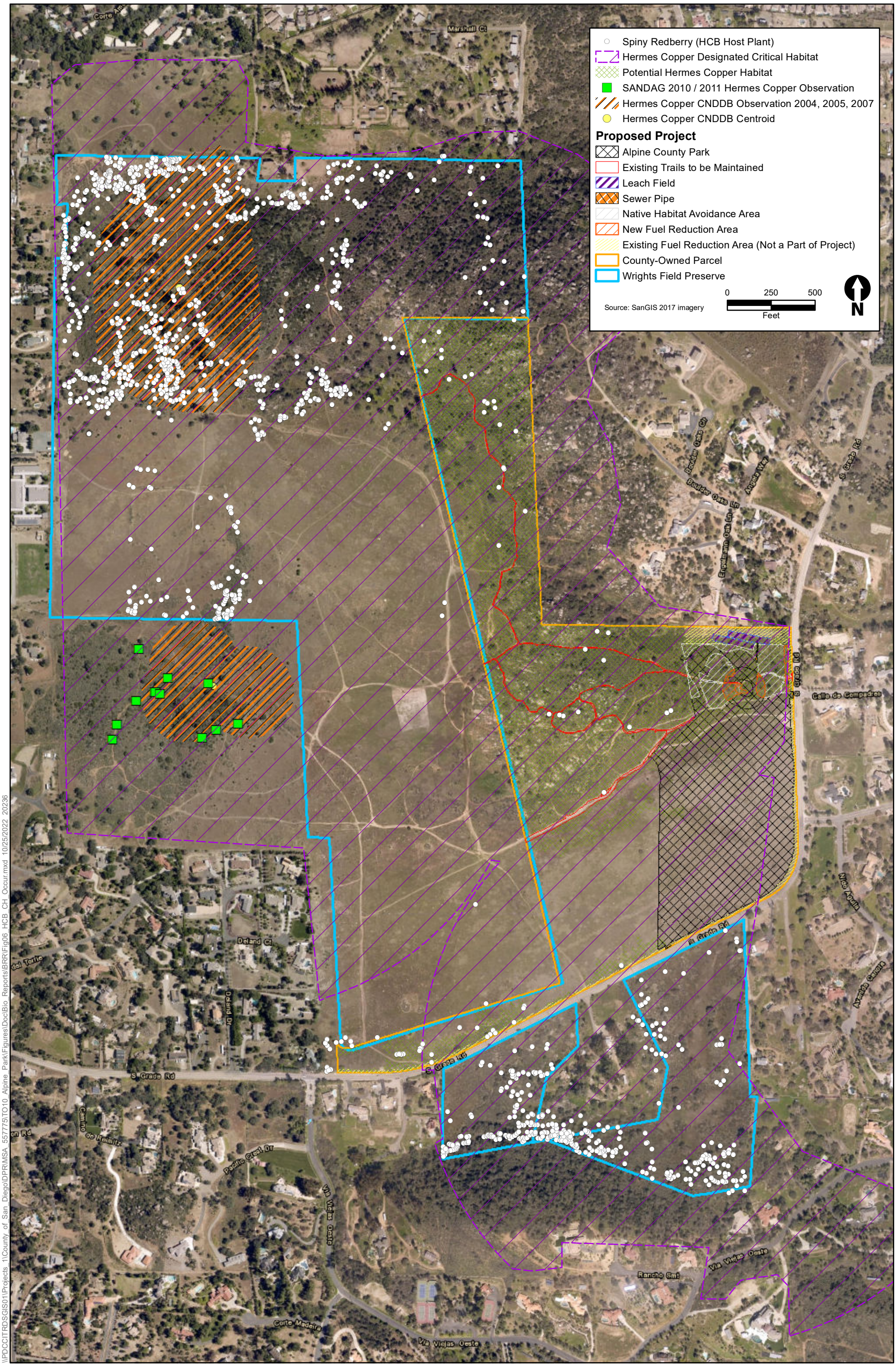

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Figure 6
Hermes Copper Proposed Critical Habitat and Known Occurrences
Alpine County Park Project

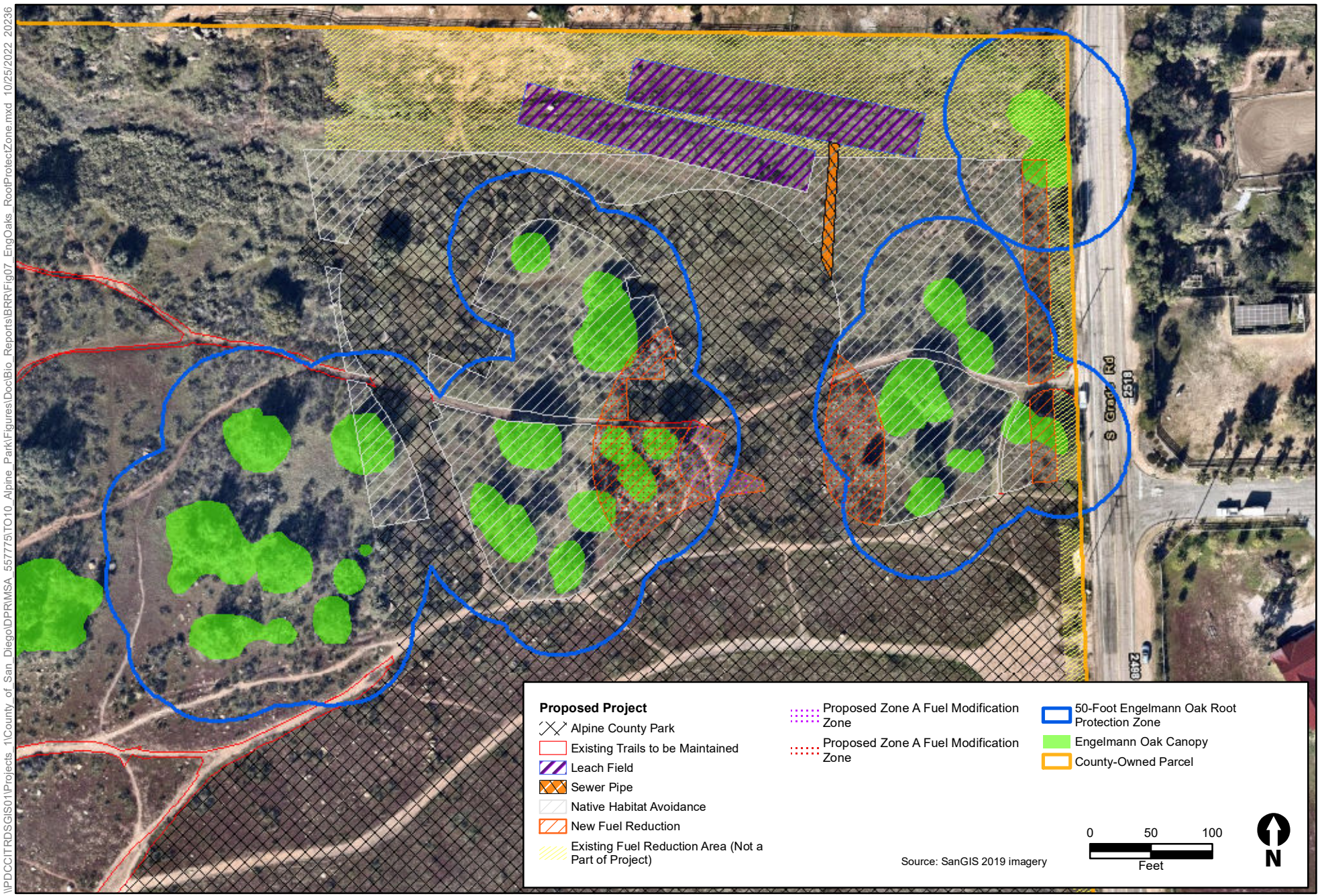

Figure 7
Engelmann Oak Root Protection Zone Impacts
Alpine County Park Project

Appendix B

2018–2019 Wet- and Dry-Season Fairy Shrimp Surveys

2018-19 Wet and Dry Season Fairy Shrimp Surveys for Alpine Park

Prepared for:

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October 2019



ICF. 2019. 2018-19 Wet and Dry Season Fairy Shrimp Surveys for Alpine Park. October.

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Appendix D Representative Photos

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1.0 Introduction

The County of San Diego Department of Parks and Recreation retained ICF to conduct protocol-level wet and dry season surveys for listed large branchiopods within an open space parcel located in Alpine, California within the Alpine U.S. Geological Survey 7.5-minute topographic map (Figures 1 and 2) in San Diego County, California.

The surveys in 2018-2019 were conducted within the approximately 35-acre area of the property had appropriate topography and clay soils to allow for development of road pools. No vernal pool/mima mound habitat was present on the property.

The goal of this survey was to determine presence or absence of listed large branchiopods (fairy shrimp) in seasonally inundated depressions within the study area (Figure 3). The large branchiopods known from seasonal freshwater basins in southern San Diego County are San Diego fairy shrimp *(Branchinecta sandiegonensis)*, Lindahl's fairy shrimp *(Branchinecta lindahli*), and Riverside fairy shrimp (*Streptocephalus woottoni*).

No fairy shrimp were observed during wet or dry season surveys of seasonally inundated basins within the study area.

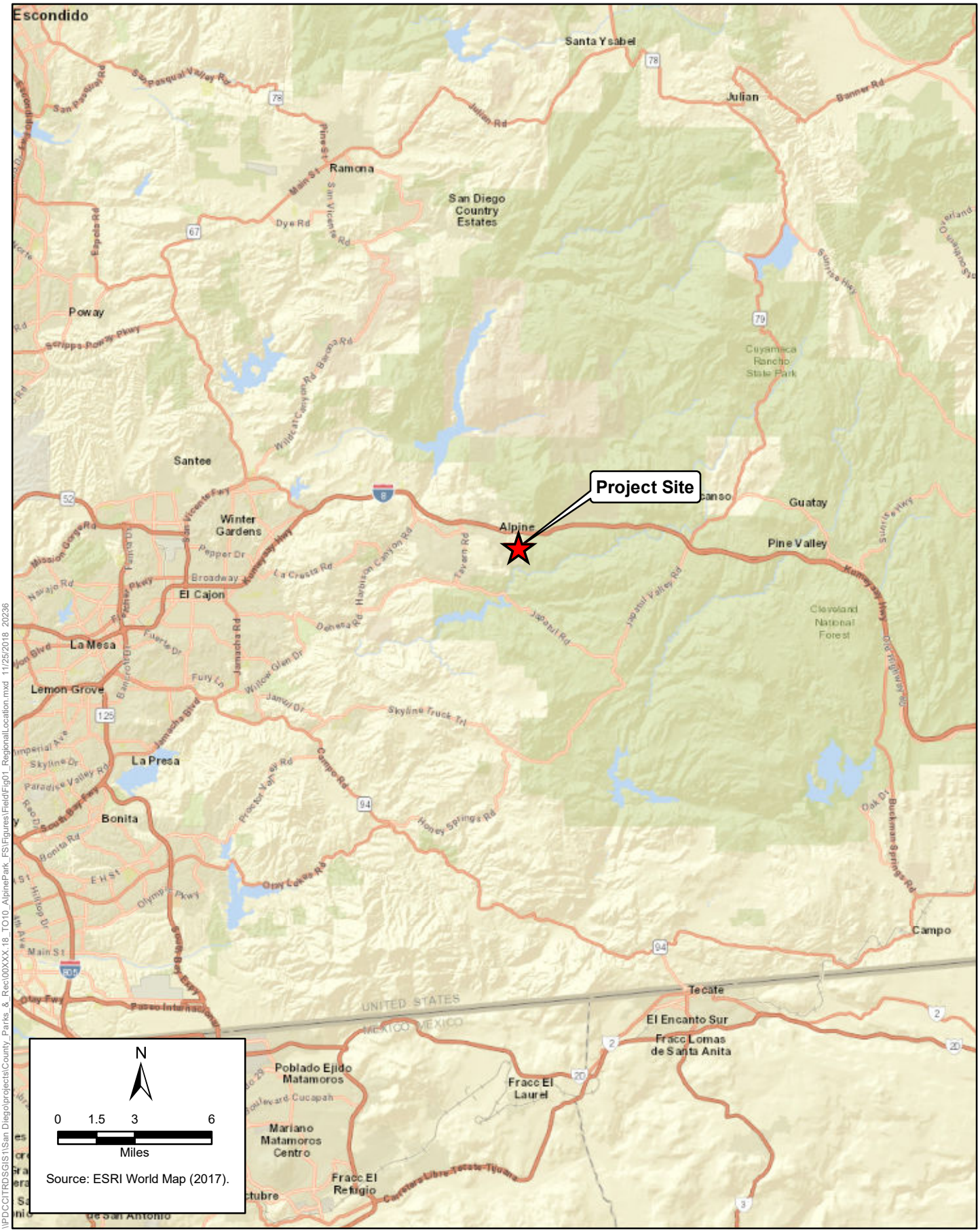
2.0 Methods

ICF conducted protocol level wet and dry season surveys on the 28 seasonally-inundated basins observed within the study area (Figure 3). Survey methodology follows the USFWS *Survey Guidelines for the Listed Large Branchiopods* (Guidelines; USFWS 2017) as described below. Prior to initiating the wet and dry season surveys, pre-survey notification letters were sent to the USFWS Carlsbad Fish and Wildlife Office informing intent to conduct a protocol dry season survey for listed fairy shrimp (Appendix A).

2.1 Wet Season Survey

ICF fairy shrimp permitted biologist Brian Lohstroh (TE-063608-6) conducted the wet season surveys at the Alpine site, with occasional assistance from ICF biologist Ryan Layden (permit application filed). Rainfall events were tracked to ascertain when basins became inundated using National Weather Service forecasts and observations (NWS 2018), along with observations from nearby Weather Underground personal weather stations (WU 2018). Hydrology checks were performed as needed to confirm basin inundation, and sampling was performed at one-week intervals after initial inundation (Table 1).

Sampling was performed using a 1 mm mesh dip net suitable for capturing fairy shrimp adults, as well as a 255-micron mesh net to make observations of nauplii and other smaller aquatic invertebrates. Water temperature was ascertained using an infrared thermometer after gentle agitation of the water column to homogenize any potential temperature variations within the water column. Basin perimeters were logged with a Trimble R1 submeter Bluetooth GPS using ArcGIS Collector. Additional data collected for each basin included basin type (natural/constructed/road rut), other aquatic animal species present, pool condition and if necessary, disturbance type.



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ICF

Figure 1
Regional Location
Alpine Park 2018-2019 Wet and Dry Season Fairy Shrimp Surveys

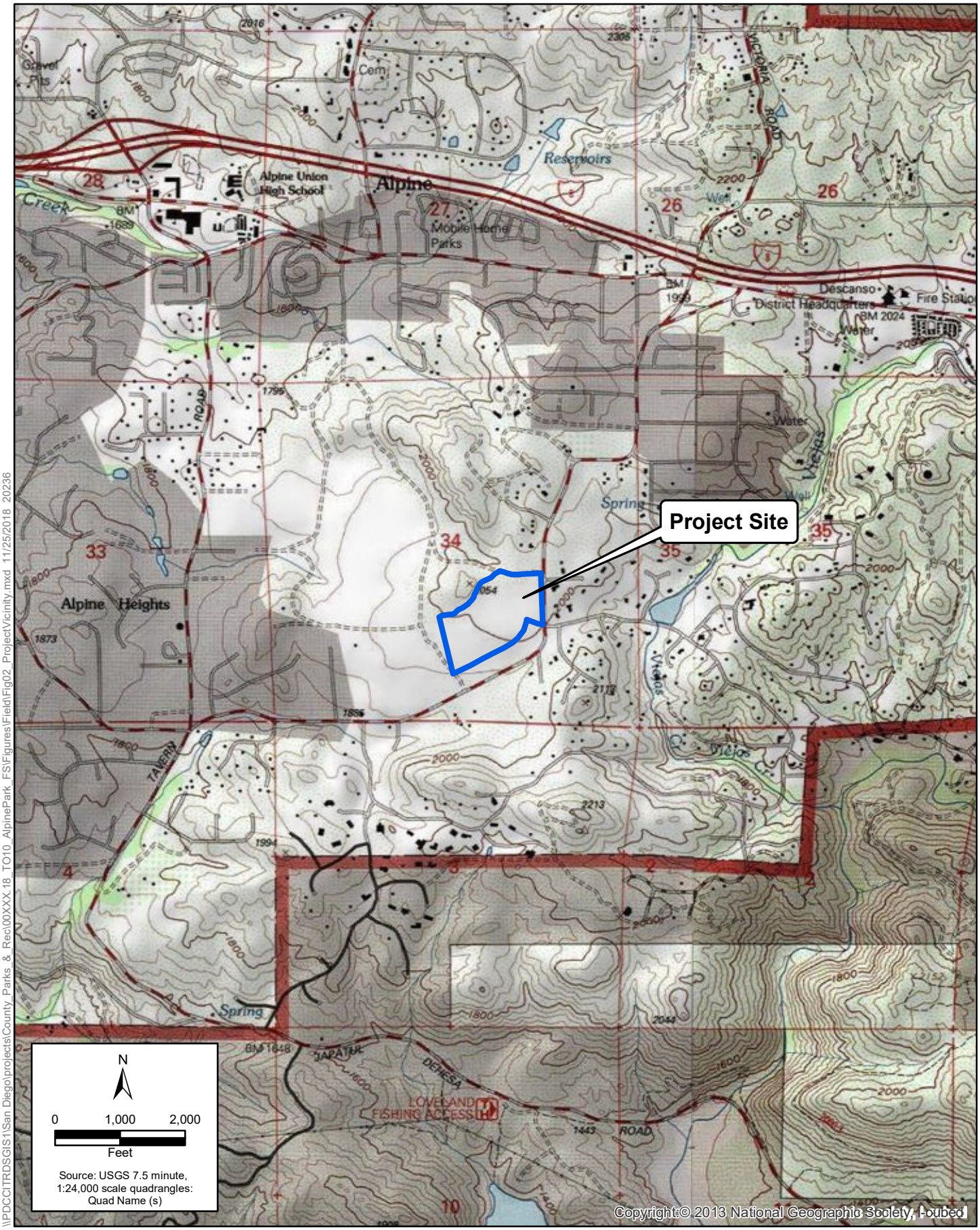

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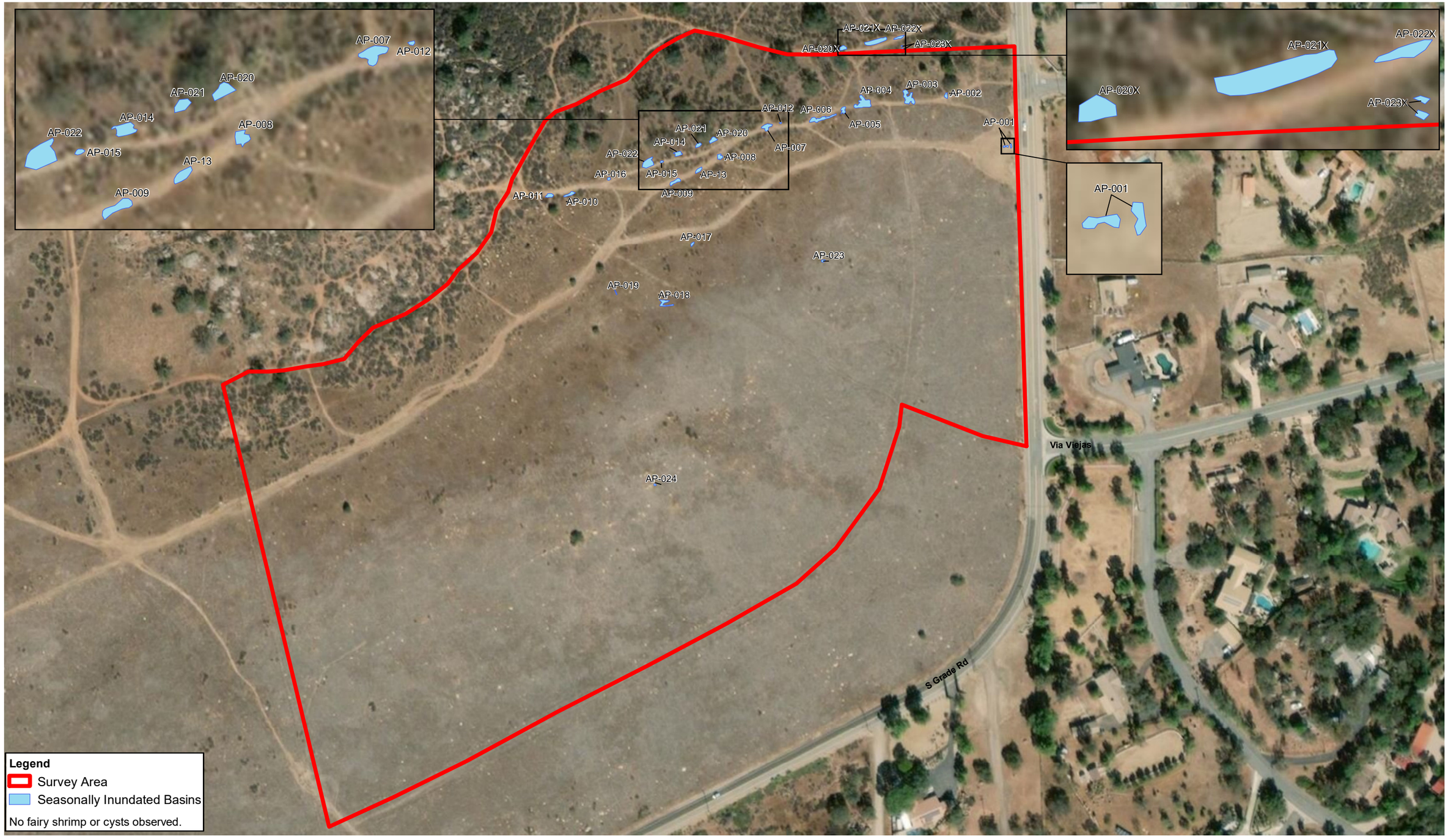
Figure 2
Project Vicinity
Alpine Park 2018-2019 Wet and Dry Season Fairy Shrimp Surveys



Source: Esri, DigitalGlobe (2018)

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Figure 3
Sampled Basins
Alpine Park 2018-2019 Wet and Dry Season Fairy Shrimp Surveys

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Dip nets were cleaned with sanitized water between basins to prevent cross-contamination and all equipment used in the water, including boots, were cleaned and sanitized with a 3-6% sodium hypochlorite solution before and after each sampling survey visit.

Table 1. Wet Season Sampling Dates and Conditions

Date	Time on site		Temp (ºF)	Sky Cover (%)	Wind Speed (MPH)	Personnel	Survey Type
12/3/2018	Start	0715	39	10	0-3	RL	Hydrology Check
	End	0945	51	0	0-3		
12/7/2018	Start	0740	52	30	3-5	BL	Wet Season Survey 1
	End	0820	51	0	3-5		
12/14/2018	Start	0900	59	100	0-3	BL, RL	Hydrology Check
	End	0945	60	100	0-3		
1/1/2019	Start	1040	48	0	10-18	BL	Wet Season Survey 2
	End	1023	52	0	10-18		
1/8/2019	Start	0930	63	10	0-3	BL, RL	Wet Season Survey 3
	End	1050	67	10	3-5		
1/15/2019	Start	0910	48	100	3-5	BL, RL	Wet Season Survey 4
	End	1130	49	100	3-5		
1/22/2019	Start	0900	52	0	3-5	BL	Wet Season Survey 5
	End	1045	59	0	3-5		
2/8/2019	Start	0945	54	0	0-2	BL	Wet Season Survey 6
	End	1100	55	0	0-3		
2/15/2019	Start	0625	46	100	0-2	BL	Wet Season Survey 7
	End	0730	45	100	0-2		
2/22/2019	Start	0740	36	10	0-2	BL	Wet Season Survey 8
	End	0900	52	0	0-1		
3/1/2019	Start	0800	60	20	0-1	BL	Wet Season Survey 9
	End	0845	64	20	0-1		
3/8/2019	Start	0915	46	100	3-7	BL	Wet Season Survey 10
	End	1045	52	60	3-10		
3/15/2019	Start	0745	52	30	5-15	BL	Wet Season Survey 11
	End	0845	53	20	7-15		
3/22/2019	Start	0830	48	0	0-1	BL	Wet Season Survey 12
	End	0930	61	0	0-1		
3/29/2019	Start	0850	61	0	0-1	BL	Wet Season Survey 13
	End	0930	62	0	0-2		
5/31/2019	Start	1300	70	0	0-5	BL	Wet Season Survey 14
	End	1345	72	0	1-5		

RL: Ryan Layden

BL: Brian Lohstroh

2.2 Dry Season Survey

2.2.1 Soil Collection

On August 13, 2019, fairy shrimp biologist Brian Lohstroh (Permit# TE- 063608-6), assisted by Ryan Layden (permit application filed), collected soil samples for the dry season survey. Soil samples were collected when seasonally inundated depressions were dry. A hand trowel was used to collect soil samples from the top 1-3 centimeters of depressions soil. Whenever possible, soil samples were collected in chunks and the trowel was used to pry up intact chunks of sediment. Loosening the soil by raking or shoveling was avoided as such methods can damage cysts. For each of the 28 seasonally inundated depressions, two perpendicular transects were visually estimated, with one transect passing along the depressions lowest point and the second transect passing through the depressions second lowest point. Ten samples of approximately 100-milliliter (ml) aliquots were removed at each sub-sample site (for a total of 1 liter/ponded area), ensuring that no more than 10% of the sampled vernal pool's surface area was disturbed. Soil samples were taken as follows: two in the pool's lowest point, one at the pool's second lowest point, and two radiating in each of the four directions on the transect lines, at least 1.0 m from the pool center.

Ten 100-mililiter soil samples were collected from each pool. Each label included information necessary to identify the collection date, location of feature and name of collector for each sample.

2.2.2 Soil Processing and Analysis

Soil samples were processed by ICF fairy shrimp biologist and USFWS permitted cyst-identifier Dale Ritenour (Permit# TE-58888A-2.1) in accordance with the Guidelines. The soil samples were measured into ten individual plastic containers. These samples were hydrated in tap water then washed through a set of sieves. Material passing through a Number 45 (355 micrometer) USA Standard Testing Sieve, A.S.T.M.E.-11 specification was caught on a Number 70 (212 micrometer) Sieve. The 355-micrometer sieve allows the passage of cysts while the 212- micrometer sieves was selected as the appropriate size to collect cysts from large branchiopods whose ranges include the study area in San Diego County, including San Diego fairy shrimp, Lindahl's fairy shrimp, and Riverside fairy shrimp. The 212-micrometer sample material was rinsed into a container with approximately 300 milliliters of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter. The organic material collected on the paper was examined under a stereo zoom microscope. Distinctive fairy shrimp cysts were counted if present. All sieves were soaked in a beach solution and then thoroughly cleaned after completion of the procedure for each depression, to ensure no cysts adhered to the surfaces of the sieves.

3.0 Results and Discussion

The study area can be characterized as a gradually sloped grassland with scrub vegetation associated with the slightly higher terrain that exists along the northern portion of the site. There is also a patchwork of hiking trails in the northern portion of the study area, along with some evidence of off-road vehicle activity. Dominant vegetation communities present within the study area include native grassland, non-native grassland and buckwheat scrub. Occasional Engelmann oaks (*Quercus engelmannii*) are also present in the northern portion of the study area.

The basins sampled onsite are primarily associated with the trails that exist along the northern perimeter of the study area. Two of the basins were located within the native grassland and did not appear to be affected by disturbance. However, they were relatively small basins that were associated with rock outcrops.

No fairy shrimp were observed during wet or dry season surveys of seasonally inundated basins within the study area.

3.1 Wet Season Survey

No fairy shrimp were observed in any of the 28 sampled pools in the 2018-19 wet season sampling (Table 2). Data sheets for Wet Season Sampling for Listed Large Branchiopods is included as Appendix B.

2018-19 was an exceptionally wet winter for coastal San Diego County and if any fairy shrimp existed onsite, they most likely would have been observed during the 2018-2018 wet season. Of the 28 basins that were observed in the study area in 2018-19, very few remained inundated long enough for either species of *Branchinecta* to reach maturity. In addition, the seasonally inundated basins on the Alpine Park site were generally shallow and are not expected to have inundation sufficient to be potential habitat for Riverside fairy shrimp.

Table 2. Wet Season Sampling Results

Basin	Basin Type	Basin Condition	Results	Other Observations
AP-001	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola, Nematoda
AP-002	Road rut	Minor Disturbance	No Fairy Shrimp Observed	none
AP-003	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Ostracoda, Collembola, Culicidae, Chironomidae
AP-004	Road rut	Minor Disturbnace	No Fairy Shrimp Observed	Collembola
AP-005	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola, Culicidae
AP-006	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola, Culicidae, Chironomidae, Hydracharina
AP-007	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Western Spadefoot eggs, Ostracoda, Collembola, Culicidae, Chironomidae, Hydracharina
AP-008	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola, Culicidae, Chironomidae
AP-009	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola, Culicidae
AP-010	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-011	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-012	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-013	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-014	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-015	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-016	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-017	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-018	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-019	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	Collembola
AP-020	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-020x	Road rut	Undisturbed	No Fairy Shrimp Observed	none
AP-021	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-021x	Road rut	Undisturbed	No Fairy Shrimp Observed	none
AP-022	Road rut	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-022x	Road rut	Disturbed, Tire Tracks	No Fairy Shrimp Observed	none
AP-023	Natural	Undisturbed	No Fairy Shrimp Observed	Collembola
AP-023x	Road rut	Undisturbed	No Fairy Shrimp Observed	none
AP-024	Natural	Undisturbed	No Fairy Shrimp Observed	Collembola

3.2 Dry Season Survey

No fairy shrimp cysts were observed in any of the 28 sampled pools in the 2019 dry season sampling (Table 3). The Data sheet for Dry Season Sample Analysis for Listed Large Branchiopods is included as Appendix C.

Table 3. Dry Season Sampling Results

Basin	Shrimp cysts observed	Cyst Abundance
AP-1	None	None
AP-2	None	None
AP-3	None	None
AP-4	None	None
AP-5	None	None
AP-6	None	None
AP-7	None	None
AP-8	None	None
AP-9	None	None
AP-10	None	None
AP-11	None	None
AP-12	None	None
AP-13	None	None
AP-14	None	None
AP-15	None	None
AP-16	None	None
AP-17	None	None
AP-18	None	None
AP-19	None	None
AP-20	None	None
AP-20X	None	None
AP-21	None	None
AP-21X	None	None
AP-22	None	None
AP-22X	None	None
AP-23	None	None
AP-23X	None	None
AP-24	None	None

4.0 References

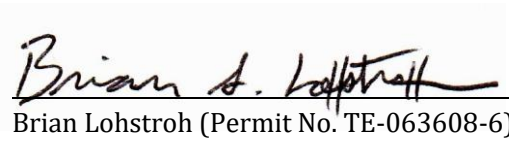
National Weather Service (NWS). 2018. Extended Forecast for Alpine, CA. https://www.weather.gov/sgx/ Accessed November 2018-June 2019.

Weather Underground (WU). 2018. Personal Weather Stations near Alpine, CA. https://www.wunderground.com/ Accessed November 2018-June 2019.

U.S. Fish and Wildlife Service (USFWS). 2017. Survey Guidelines for the Listed Large Branchiopods. November 13.

5.0 Certification

I certify that the information in this survey report and attached exhibits fully and accurately represent my work.



Brian Lohstroh (Permit No. TE-063608-6) October 2, 2019
Vernal Pool Biologist
Author and USFWS Permitted Biologist



Dale Ritenour (Permit No. TE-58888A-2.1) October 2, 2019
Vernal Pool Biologist
Author and USFWS Approved Cyst Identification

Appendix A
USFWS Notification

November 26, 2018

Ms. Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: 15-Day Notice for Protocol Surveys for Listed Vernal Pool Branchiopods at Alpine Park

Dear Ms. Love:

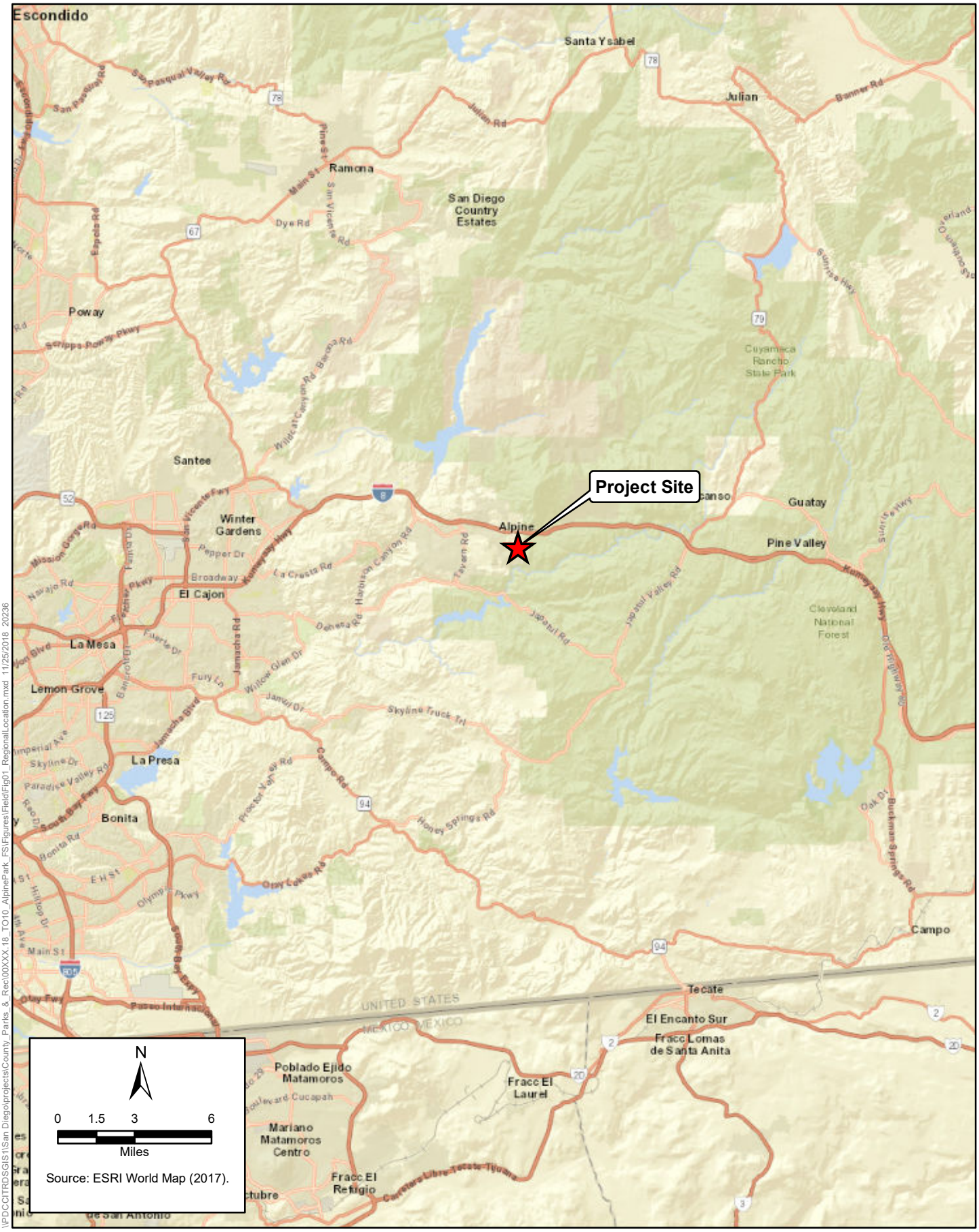
The County of San Diego Parks & Recreation Department (County Parks) has requested that ICF conduct wet season fairy shrimp surveys for listed vernal pool branchiopods within an open space parcel located in Alpine, California within the Alpine U.S. Geological Survey 7.5 minute topographic map (Figures 1 and 2) in San Diego County, California. Surveys are being conducted as part of County Parks' need to conduct due diligence surveys in advance of a possible land acquisition and not as part of any development project. I will conduct a habitat assessment, followed by wet season protocol-level surveys for all ephemerally-inundated features within the approximately 35-acre project site for federal-listed vernal pool fairy shrimp species. The site is estimated to support at least 15-20 features. The surveys will be conducted according to the United States Fish and Wildlife Service (USFWS) Survey Guidelines for Listed Large Brachiopods (United States Fish and Wildlife Service Rev. Nov 13, 2017).

Wet season surveys in accordance with the USFWS wet season survey guidelines will include conducting hydrology verification visits after storm events to determine when features have been inundated. Sampling surveys will begin no later than 7 days following the initial inundation and continue once every week until they are no longer inundated or until 120 days of continuous inundation. If the features dry and refill during the season, each feature will be sampled no later than 7 days after refilling. With permission from the USFWS, surveys will cease at a given feature if it is determined to be occupied by a listed large branchiopod species. I will conduct all of the surveys, with support from ICF support staff, as needed.

Please do not hesitate to contact me with any questions or comments.
Sincerely,



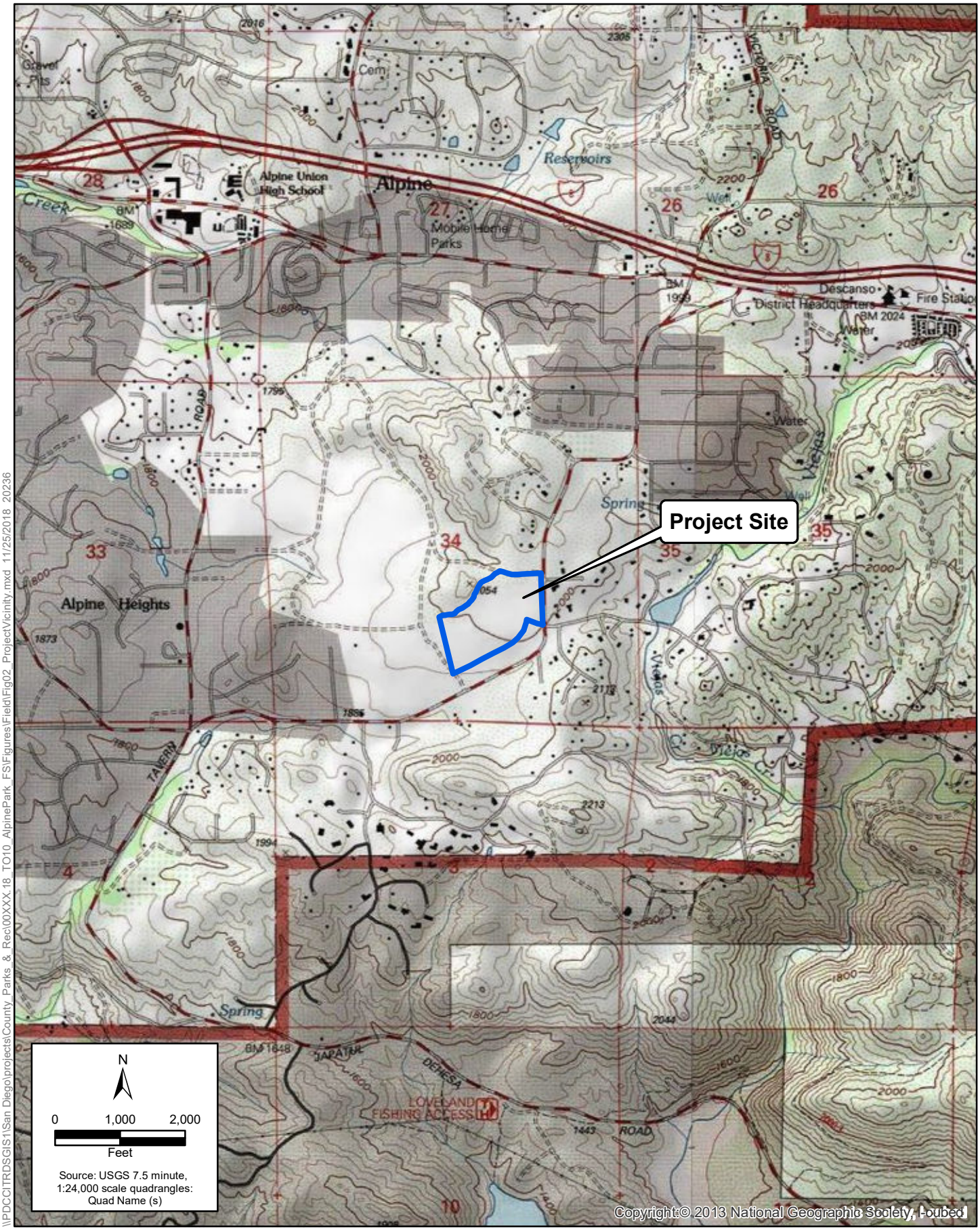
Brian Lohstroh
TE-063608-6
(858) 750-9300
brian@lohstrohbio.com



\\PDCCITRDSGIS1\San Diego\projects\County_Parks_&_Rec\00XXX.18_TO10_AlpinePark_FS\Figures\FieldFig01_RegionalLocation.mxd 11/25/2018 20236

ICF

Figure 1
Regional Location
Alpine Park Wet Season Branchiopod Surveys



\\PDCCITRDSGIS1\San Diego\projects\County_Parks_&_Rec\00XXX.18_TO10_AlpinePark_FSIFigures\Field\Fig02_ProjectVicinity.mxd 11/25/2018 20236

Figure 2
Project Vicinity
Alpine Park Wet Season Branchiopod Surveys

Appendix B
USFWS Wet Season Data Sheets

Fairy Shrimp Survey Form

Surveyor: BRIAN LOHSTROH Add'l Persons: — Date: 12/7/18

Project: Alpine Park Survey # 1

Start Time: 0740 T: 52 %CC: 30 Wind MPH: 3-5 General Weather Condition: Lite breezy Post Rain

End Time: 0810 T: 51 %CC: 0 Wind MPH: 3-5 General Weather Condition: "

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
AP-001				11	5	7.5	5	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
0				None

Pool Type: Natural / Constructed / (Road Rut) **Pool Condition:** Undisturbed / (disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Series of 4 Ruts

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments: Rain previous 2 days

Fairy Shrimp Survey Form

Surveyor: Lotts Trail Add'l Persons: None Date: Jan 1 2019

Project: Park Survey #: 2

Start Time: 1040 T: 48 %CC: 0 Wind MPH: 10-18 General Weather Condition: Wind + clear

End Time: 1230 T: 52 %CC: 0 Wind MPH: 12-14 General Weather Condition: "

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				11	5	9.5	3	1

Fairy Shrimp Species	# Collected	# Collected	Population Est
0			

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae n/a

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Dried of 4 Pots (checked all)

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
2				11.6	-	1.5	1.5	1.5

Fairy Shrimp Species	# Collected	# Collected	Population Est
0			

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				9.2		7	4	4

Fairy Shrimp Species	# Collected	# Collected	Population Est
Y			

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Small Ext

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
4				10.5	2	3.5	3	.16

Fairy Shrimp Species	# ♂ Collected	# Collected	Population Est
1			

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

General site Comments

Fairy Shrimp Survey Form (cont'd) Surveyor: P Lalicata Site: Alpine Park Date: Page - of

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
5				1 1	1 -	- 7	1 5	1.2

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
♂				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
6					6	8.5	3	2.5

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
♀				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Mites on surface

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				9.4	6	9 5	5	3

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
♂				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed cks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
-				10.4	4	6 5	3	1.5

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
♂				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Pool 5 fit Males

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
8				10 4	2	4	2	0.7

Fairy Shrimp pecies	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
♂				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Fairy Shrimp Survey Form (cont'd) Surveyor: BL Site: Alamo Pk Date: 1/1/19 Page 3 of 3

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10				11.5	3	5.5	3	0.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
11				12.5	2	5.5	2.5	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Hiker/dog tracks

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Form

Surveyor: BRIAN LOHSTROH Add'l Persons: RYAN LARSEN Date: 1/8/19

Project: Alpine Park Survey # 3

Start Time: 0930 T: 63°F %CC: 10 Wind MPH: 0-3 General Weather Condition: SUNNY AND CALM

End Time: 1050 T: 67°F %CC: 10 Wind MPH: 3-5 General Weather Condition: SUNNY W/ LIGHT WIND

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
AP-001			63°F	15.8		9	2.8	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / (Road Rut) Pool Condition: Undisturbed / (disturbed (tire tracks) trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: 4 SEPARATE POOLS

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
003			63°F	14.2		14	3	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda (Collembola) Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / (Road Rut) Pool Condition: Undisturbed / (disturbed (tire tracks) trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) (algal blooms)

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
005			63°F	14.5		2	1	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: (Natural) / Constructed / Road Rut Pool Condition: Undisturbed / (disturbed (tire tracks) trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) (algal blooms)

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
006			63°F	12.8		10	2	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera (Hydracharina) Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda (Collembola) Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / (Road Rut) Pool Condition: Undisturbed / (disturbed (tire tracks) trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments: AP-002: DRY; AP-004: DRY

Fairy Shrimp Survey Form (cont'd) Surveyor: R. LOWSTROM Site: ALPINE PARK Date: 1/8/19 Page 2 of 2

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
007			63°F	12.9		14	4	2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
008			63°F	13.4		7	2.2	.9
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
009			63°F	14.2		6	1.25	.2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
011			63°F	17.4		6	.5	.15
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments: MAIN POOL DEPTH 2cm HORSE TRACK - 6cm								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

AP-613: DRY

Fairy Shrimp Survey Form

Surveyor: BRIAN LOHSTROH Add'l Persons: BRIAN LARSEN Date: 1/15/19

Project: ALPINE PARK Survey # 4

Start Time: 0910 T: 48°F %CC: 100% Wind MPH: 3-5 General Weather Condition: LIGHT DRIZZLE

End Time: 1130 T: 49°F %CC: 100% Wind MPH: 3-5 General Weather Condition: CLOUDY & CALM

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
A POOL			48°F	9.8		13.2	3.5	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut

Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
002			48°F	10.4		2.5	1.3	2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut

Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
003			48°F	10.1		9.8	5.2	3.75

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut

Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: RUNOFF FROM 002

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
004			48°F	10.5		5.5	6.5	3.75

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.

Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae

Pool Type: Natural / Constructed / Road Rut

Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: RUNOFF FROM 003

General site Comments: ADDED 020, 021, OFFSITE PONDS. 022, 023

Fairy Shrimp Survey Form (cont'd) Surveyor: [illegible] Site: ALPINE TANK Date: Page 2 of 4

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
005			[illegible] °F	[illegible]		1.5	[illegible]	[illegible]
Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
006			48°F	10.8		9.5	11	1.5
Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
012			48°F	11.8				.8
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
007			[illegible] °F	[illegible]		[illegible]	418	
Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
008			48°F	11.9		8.2		1.3
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Fairy Shrimp Survey Form (cont'd) Surveyor: B. Lonstein Site: Alpine Dam Date: 1/15/19

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
009			48°F	12.2		4.9	5	1.2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
013			48°F	12.2		5.6	3.2	.75
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
014			48°F	12.3		5.1	2.4	1.8
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
015			48°F	12.5		6.1	1.2	.8
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
016			48°F	12.2		6.6	1	1
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Fairy Shrimp Survey Form (cont'd) Surveyor: B. Loustalot Site: Alpine Dairy Date: 1/15/19 Page 4 of 4

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
010			48°F	12		8.1	4.5	.8
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
011			48°F	12.2		7	3.5	2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
017			48°F	12.3		10.4	1.5	.9
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
018			49°F	13.1		9.5	5	.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
019			48°F	13.4		7	1.5	.15
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

20X: No shrimp present
21X: "
22X: "
23X: "

} Basins on S. 4 boundary

Fairy Shrimp Survey Form

Surveyor: B Lohrmeh Add'l Persons: None Date: 1/22/19

Project: Alpine Park Survey # 5

Start Time: 0900 T: 52 %CC: 0 Wind MPH: 3-5 General Weather Condition: clear

End Time: 1045 T: 59 %CC: 0 Wind MPH: 3-5 General Weather Condition: clear

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				5		6	1.5	1

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: Puddle 4

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				9.3	5	12	3.5	1.5

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments.

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
4				10.3		2.8	0.3	0.2

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
1				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				10.1		2.5	1.3	

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

General site Comments:

DR 4:2

Fairy Shrimp Survey Form (cont'd) Surveyor: BL Site: Alpine Date: 1/22/19 Page 2 of 2

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				9.6	3	10.3	2.3	2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				8.9	7	11.5	3	2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
8				9.5	3	7.5	3	1.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9				11.4	2	4.7	1.8	0.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

DEY: 12, 13, 14, 15, 16, 10, 11, 19, 18, 17

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: B. Lobistcola Add'l Persons: None Date: 2/8/19

Project: Alpine Park Survey #: 6

Start Time: 0945 T: 54 %CC: 0 Wind MPH: 0-2 mph General Weather Condition: clear & cool

End Time: 1100 T: 55 %CC: 0 Wind MPH: 0-3 mph General Weather Condition:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				12.9		8	3	1.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: complex of 4 pools

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				13.0		13	4	5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
4				13.5		6	6	5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				14.2		5	2	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments:
Pool 2 dry.

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: Alpine Park Date: 2/8/19

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				13.1		13	20	5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				11.6		14	4	3

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
8				12.4		9	4	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
13				15.9		1	0.2	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9				14.6		3	1	0.15

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

DRY: 12

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: Alpine Pk Date: 2/8/19 Page 3 of 3

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
14				13.3		9	3	3

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
11				15.3		11	4	2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
19				14.5		16	2	0.6

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

DRy: 15, 16, 10, 12, 18

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: B. Lohmeh Add'l Persons: _____ Date: 2/15/19

Project: Alpine PL Survey #: 7

Start Time: 0675 T: 46 %CC: 100 Wind MPH: 0-2 mph General Weather Condition: cloudy

End Time: 0730 T: 45 %CC: 100 Wind MPH: 0-2 General Weather Condition: misty

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				15		7.1	1.5	1.2

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: 4 Ruts

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
2				7		42	2.5	1

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				9.5		75	2	6

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracha ptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda bola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/S rvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
4				9.4		71	5	3

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments

Fairy Shrimp Survey Data (cont'd) Surveyor: Site: Date: 7/15/19 Page _ of _

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
						10 C		

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
N				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				9.2		8.4	-	?

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				9.3		8.3	1 -	1

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				9.3		11.7	6	

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
N				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments: No Cysts

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: APL Date: 2/15/19

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9				9.0		85	3	2.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
13				8.7		5	4	1.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9				7.9		6.5	6	1.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
21				9.4		12.7	4	2.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments: NEW								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
14				9.4		12.5	6	3
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: Alpine Park Date: 2/15/19 Page 4 of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
15				9.3		5.5	1.5	0.6

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
22				9.5		12	4	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
16				9.3		5	1	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10				9.9		11.4	6	2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
11				9.7		9	4	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: APark Date: 2/15/19 Page 5 of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
18				10.1		9.5	20	04
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
17				10.1		11	2	0.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
2								
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
19				10.9		22	2	1.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
2								
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut				**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms				
Comments:								

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: B. Lohsroth Add'l Persons: none Date: 2/22/19

Project: Alpine Pit Survey # 8

Start Time: 0740 T: 36 %CC: 10% Wind MPH: 0-2 mph General Weather Condition: clearing + cold snow in shade

End Time: 0900 T: 52 %CC: 0 Wind MPH: 0-1 General Weather Condition: "

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				0.6		8	2.5	1.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
2				1.0		4	3	2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				0.3		7	6	4
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
4				0.6		10.5	5.5	2.5
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
0								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

General site Comments:

thin layer of ice on pools, scattered snow adj

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: Alpine Park Date: 7/22/19

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				0.1		10.5	35	3

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				0.2		9	12	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
12				0.3		9	1.5	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				3.1		14	2.5	4

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10				0.5		15	4	2.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Data (cont'd) Surveyor: Site: 2/22 1 Date: Page of

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
21				0.6		15	27	2

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition**: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7							25	

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition**: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				0.9			4	1

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition**: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9				2.5		9	3	1.5

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition**: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
14				1.6		13.5	6	

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition**: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Fairy Shrimp Survey Data (cont'd) Surveyor: [illegible] Site: Alpine Park Date: 2/22/19 Page [illegible] of [illegible]

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1						-	2	0.6

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
2						-		1

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				0.9		6		1

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10				1.1		11.2	7	2

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				2.1		10	4	2.5

Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
X				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: APark Date: 7/22/19 Page 5 of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Rut 19				36		6.5	2.5	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
18				1.2		10	5	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
17				0.6		10	1	0.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
23				3.6		30	4	1.7

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
4				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: B. Johnston Add'l Persons: None Date: 3/1/19

Project: Alpine Pk Survey # 9

Start Time: 0800 T: 60 %CC: 20 Wind MPH: 0-1 General Weather Condition: pc calm

End Time: 0845 T: 64 %CC: 20 Wind MPH: 0-1 General Weather Condition: "

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				13.9		5	0.1	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				14.1		5.8	.25	0.2

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				13.7		10	2.5	1.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
2				14.2		4		

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments:

DI4: 1, 2, 4, 5, 12, 20, 21, 13, 9, 15, 22, 16, 10, 11, 17, 18, 19, 14

Fairy Shrimp Survey Data (cont'd) Surveyor: - Site: Alpine Park Date: 7/1/19 Page 2 of 2

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
22				12.6				12

Fairy Shrimp Species	# ♂ Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
\				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg. Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# ♂ Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments.

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: B. Johnson Add'l Persons: None Date: 3/8/19

Project: Pine Park Survey # 10

Start Time: 0915 T: %CC: 100 Wind MPH General Weather Condition: cloudy

End Time: 1045 T. %CC: 60 Wind MPH General Weather Condition: raining

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
				12.2				0

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
4				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition.** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
2								

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition.** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)
1				9				

Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
1				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments.

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: Alpine Park Date: 3/8/19 Page 3 of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				12.6		6	2	1.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
?				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				13.3		9.5	15	4

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
?				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
12				13.2		4.5	0.5	0.3

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
?				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				12.5		15	6	4

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
?				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
20				14.1		3	0.3	0.08

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
?				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Fairy Shrimp Survey Data (cont'd) Surveyor: Site: Alpine Park Date: 3/8/19 Page of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
8				13		10	3	2
Fairy Shrimp Species	# Collected	# Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
∅								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
								1
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
								1
Fairy Shrimp Species	# Collected	# Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
11							5	
Fairy Shrimp Species	# Collected	# Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10				2		5	5	2.5
Fairy Shrimp Species	# Collected	# Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
∅								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Fairy Shrimp Survey Data (cont'd) Surveyor: Site: Date: Page of

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				/				
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
16				13		2	2	
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Y								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				12.6				
Fairy Shrimp Species	# Collected	# Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# Collected	# Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments								

Fairy Shrimp Survey Data (cont'd) Surveyor: BL Site: APark Date: 3/8/19 Page 3 of 5

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
19				13.3		7	2.5	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
♂				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
18				14.2		2.5	0.2	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
♂				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
21				12.3		12	0.5	0.5

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
♂				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
17				15.1		5.8	0.2	0.1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
♂				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
23				13.4		19	2	1

Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
♂				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

St. 52°F 36% 5-15 mph 0745 Survey # 11
END 53°F 20% 7-15 mph 0845

Fairy Shrimp Survey Data (cont'd) Surveyor: B. Lobstein Site: Alpine pk Date: 3/15/19 Page 1 of 2

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				6.9		8	3	1.5
Fairy Shrimp Species	**# ♂ Collected**	**# ♀ Collected**	**Population Est.**	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
&								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
3				7.2		14	5	3.5
Fairy Shrimp Species	**# ♂ Collected**	**# ♀ Collected**	**Population Est.**	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
&								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	**Max. Depth (cm)**	Pool length (m)	Pool width (m)
4				7.7		6.5	2.5	0.6
Fairy Shrimp Species	**# ♂ Collected**	**# ♀ Collected**	**Population Est.**	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
&								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
5				7.9		3.5	1	0.5
Fairy Shrimp Species	**# ♂ Collected**	**# ♀ Collected**	**Population Est.**	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
&								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
6				7.2		10.5	3.5	2
Fairy Shrimp Species	**# ♂ Collected**	**# ♀ Collected**	**Population Est.**	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs				
&								
Pool Type: Natural / Constructed / Road Rut	**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Dfg. 2,12

Fairy Shrimp Survey Data (cont'd) Surveyor: Site: Alamo Lake Date: 3/13/19 Page 1 of 2

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				7			6	3

Fairy Shrimp Species	# Collected	# . Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
2				7.2		10	2	2

Fairy Shrimp Species	# Collected	# . Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				8.0		3.5	1	3

Fairy Shrimp Species	# Collected	# . Collected	Population Est	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
24				9.2		5	0.1	

Fairy Shrimp Species	# Collected	# . Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydrachar ra Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda C Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
1				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
				7.7		12		0.3

Fairy Shrimp Species	# Collected	# . Collected	Population Est.	Other species present (circle): Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
2				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

DRY 20, 21, 14, 13, 15, 22, 16, 10, 11, 19, 18, 17

Start 0830 48°F CLR 0-1mph
END 0930 61° CLR 0-1mph

Survey # 12

Fairy Shrimp Survey Form (cont'd) Surveyor: BLohstroh SdO Site: Alpine pk Date: 3/22/19 Fri Page 1 of 1

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				10.3		10	2.5	2
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
1								
Pool Type: Natural / Constructed / Road Rut		**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms						
Comments: only pool wet prior to rain event								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
8						5	2	0.4
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut		**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms						
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
12						5	2.5	0.7
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut		**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms						
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
9						4	2	0.3
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut		**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms						
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
10						5	.2	0.15
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	**Other species present (circle):** Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut		**Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms						
Comments:								

7 only pool wet prior to rain Wed + Thurs night. Hydro Rep

DRY: 20, 21, 14, 15, 22, 16, 11, 24, 18, 12, 5, 4, 17, 19

tridax: 23: 0.1 × 0.05, 4cm depth
6' 1.9 × 1, 6cm²
3: 3.5 × 2, 12cm

2: 2×1, 2cm
1: 2.5 × 1.4, 15cm

Start: 0850 60°F CLR 2-1mph
END: 0930 62°F CLR 0-2mph

Survey # 13

Fairy Shrimp Survey Form (cont'd) Surveyor: R. Lohstroh Site: Alpine Plc Date: 3/29/19 Page 1 of 1

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				15.2		4	.30	.30
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
∅								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments: 1 Rut Still inundated.								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
7				17.9		1	.7	.25
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
∅								
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg. Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
Fairy Shrimp Species	# ♂ Collected	# ♀ Collected	Population Est.	Other species present (circle): Ostracods Copepods Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Gastropods Ephemeroptera Zygoptera Anisoptera PSHY / SPHA Larvae				
Pool Type: Natural / Constructed / Road Rut	Pool Condition: Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms							
Comments:								

DP: 2, 3, 4, 5, 6, 12, 8, 20, 13, 9, 14, 21, 15, 22, 16, 10, 11, 24, 23, 17, 18, 19

Fairy Shrimp / Vernal Pool Survey Data Sheet

Surveyor: BRIAN LOHSTROH Add'l Persons: — Date: 5/31/19

Project: Alpine Park Survey # 14

Start Time: 1300 T: 70 %CC: CLR Wind MPH: 0-5 General Weather Condition: clear & calm

End Time: 1345 T. 72 %CC: CLR Wind MPH: 1-5 General Weather Condition: "

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)
1				30.1		6.5	1	2

Fairy Shrimp Species	# Collected	# Collected	Population Est.	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs
0				

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max. Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# . Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp. (°C)	Water Temp. (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments

Pool or Area ID	Latitude	Longitude	Air Temp (°C)	Water Temp (°C)	Avg Depth (cm)	Max Depth (cm)	Pool length (m)	Pool width (m)

Fairy Shrimp Species	# Collected	# Collected	Population Est	**Other species present (circle):** Ostracoda Copepoda Cladocera Hydracharina Diptera Culicidae Coleoptera Notonectidae Corixidae Platyhelminthes Nematoda Collembola Chironomidae Gastropoda Ephemeroptera Zygoptera Anisoptera PSHY/SPHA Larvae/Eggs

Pool Type: Natural / Constructed / Road Rut **Pool Condition:** Undisturbed / disturbed (tire tracks trash plowing) Ungrazed / Grazed (cattle horses sheep / H M L) algal blooms

Comments:

General site Comments:

Appendix C
USFWS Dry Season Data Sheets

Appendix 2. U.S. Fish and Wildlife Service – Data Sheet for Dry Season Sample Analysis for Listed Large Branchiopods

Project Information

Project Name: COUNTY S.D. DPR. Alpine Park
USFWS Project Number:
County: San Diego
Lat: 32.820443
Long: -116.761765
Quad: Alpine
Township: 15 S
Range: 2 E
Section: 34

Biologist Information

Name of Person(2) Who Conducted the Following Tasks and Permit Number(s):

Soil Collection: Brian Lohstroh TE-063608-6
Soil Processing: Dale Ritenour TE-58888A-2.1
Soil Analysis/Cysts ID: Dale Ritenour TE-58888A-2.1
Soil Collection Date: Sept. 13 2019

Pool/ Habitat/ Basin No.	Invertebrates Present (X)															Comments
	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	Number of Large Branchiopod Cysts: *Branchinecta* sp.	*Lepidurus packardi*	*Streptocephalus woottoni*	*Linderiella occidentalis*	*Lynceus brachyurus*	*Cyzicus californicus*	Hydracarina Live	Nematoda	Collembola	Other Species	
AP-1 AP-2 AP-3						○ ○ ○		∅								
AP-4 AP-5 AP-6						○ ○ ○		∅								
AP-7 AP-8 AP-9						○ ○ ○		∅								
AP-10 AP-11 AP-12						○ ○ ○		∅								
AP-13 AP-14 AP-15						○ ○ ○		∅								
AP-16 AP-17 AP-18						○ ○ ○		∅								
AP-19 AP-20 AP-20X						○ ○ ○		∅								
AP-21 AP-21X AP-22						○ ○ ○		∅								
AP-22X AP-23 AP-23X						○ ○ ○		∅								
AP-24						○		∅								

Appendix D
Representative Photographs



Photo 1. (12/7/18) View facing northeast of Basin AP-001. The basin is a series of ruts that was regularly disturbed by vehicle traffic. This photo was taken during the first sampling visit to the Alpine site.



Photo 2. (12/7/18) View facing northeast of basin AP-003. This photo was taken during the first sampling visit to the Alpine site.



Photo 3. (1/1/19) View facing northwest of basin AP-007. This basin supported a high diversity of aquatic species, including seed shrimp (ostracods) and western spadefoot eggs. Note the recent vehicle tracks at upper left.



Photo 4. (3/18/19) View facing northeast of basin AP-007 in mid-March 2018. Dog footprints are visible at right.



Photo 5. (2/15/19) View facing west of basins AP-010 and AP-011 after a recent rain event.



Photo 6. (2/8/19) View facing west of basin AP-023, an undisturbed basin within the grassland.

Appendix C

2019 and 2020 Quino Checkerspot Butterfly Survey Reports

RESULTS OF THE 2019 QUINO CHECKERSPOT BUTTERFLY SURVEYS FOR THE ALPINE PARK PROJECT

PREPARED FOR:

Mr. Lorrie Bradley
County of San Diego, Department of Parks and Recreation
5500 Overland Avenue, Suite 410
San Diego, California 92123

PREPARED BY:

Dale Ritenour
ICF
525 B Street, Suite 1700
San Diego, California 92101

September 2019

ICF. 2019. 2019 Quino Checkerspot Butterfly Surveys for the Alpine Park Project. Prepared for the County of San Diego, Department of Parks and Recreation. San Diego, CA. September.

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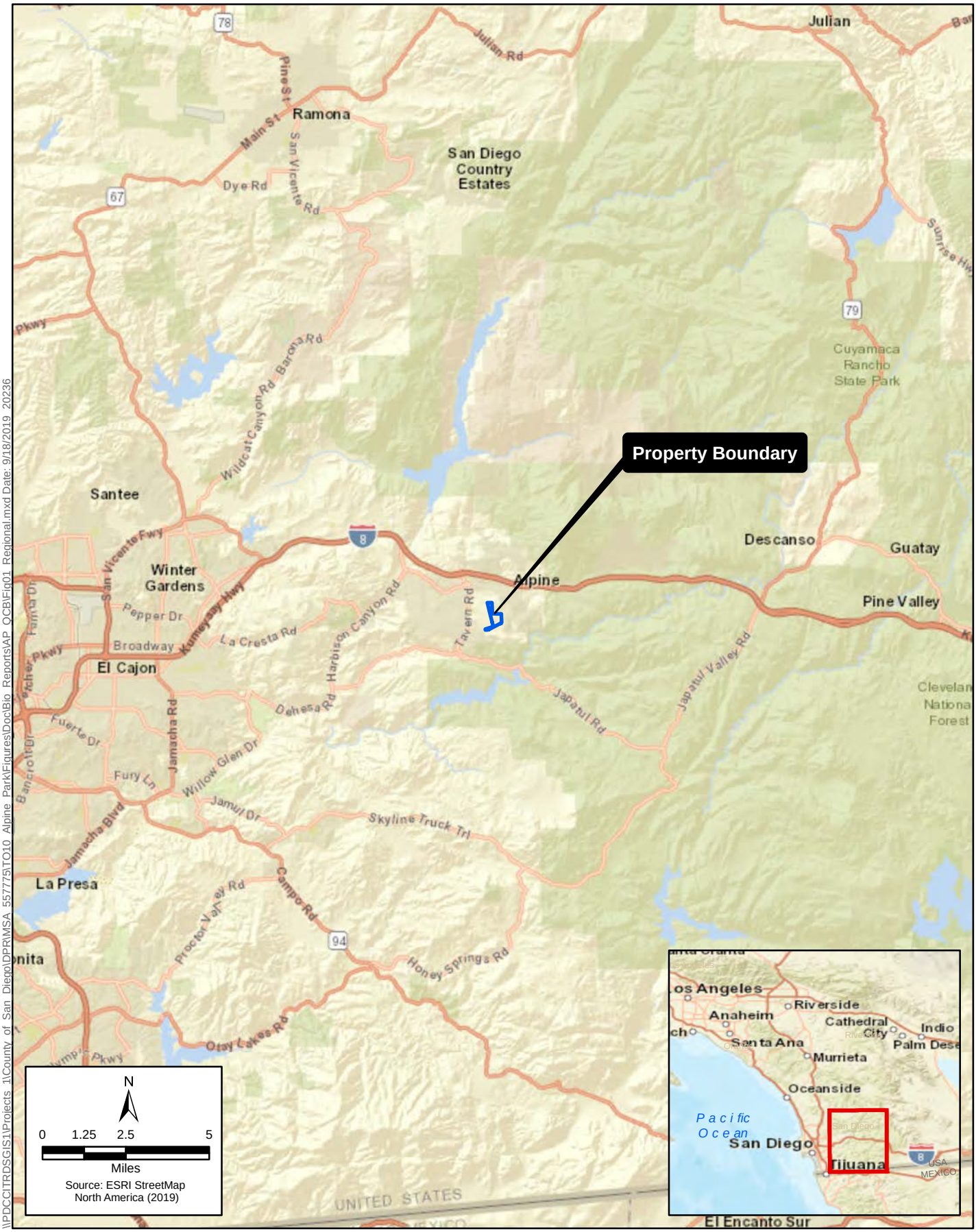
Chapter 1
Introduction

ICF was retained by the County of San Diego Department of Parks and Recreation to conduct protocol surveys for the federally-listed endangered Quino checkerspot butterfly (*Euphydryas editha quino*; QCB) in support of the Alpine Park Project.

The Alpine Park property (site) is located adjacent to Wright's Field to the southeast of the community of Alpine, in San Diego County, CA (Figure 1). The site can be found on the *Alpine* USGS 7.5-minute quadrangle map (Figure 2). The study area consists of non-excludable areas throughout the entirety of the 96.3 acre site. The site is situated within the U.S. Fish and Wildlife Service (USFWS) recommended survey area for QCB (USFWS 2014). The study area includes rolling grasslands and openings in coastal sage scrub and Engelmann oak woodlands.

The entire parcel was inspected for suitable habitat for QCB. The survey area supported approximately 76.8 acres of non-excluded areas as defined by the USFWS (USFWS 2014). This report documents the results of the 2019 QCB focused surveys conducted in the non-excluded portions of the site.



\\PDCCITRDSGIS1\Projects_1\County_of_San_Diego\DPRMSA_557775\T010_Alpine_Park\Figures\Doc\Bio_Reports\AP_OCBVFig01_RegionalLmxd Date: 9/18/2019_20236

Figure 1
Regional Location
Alpine Park Project

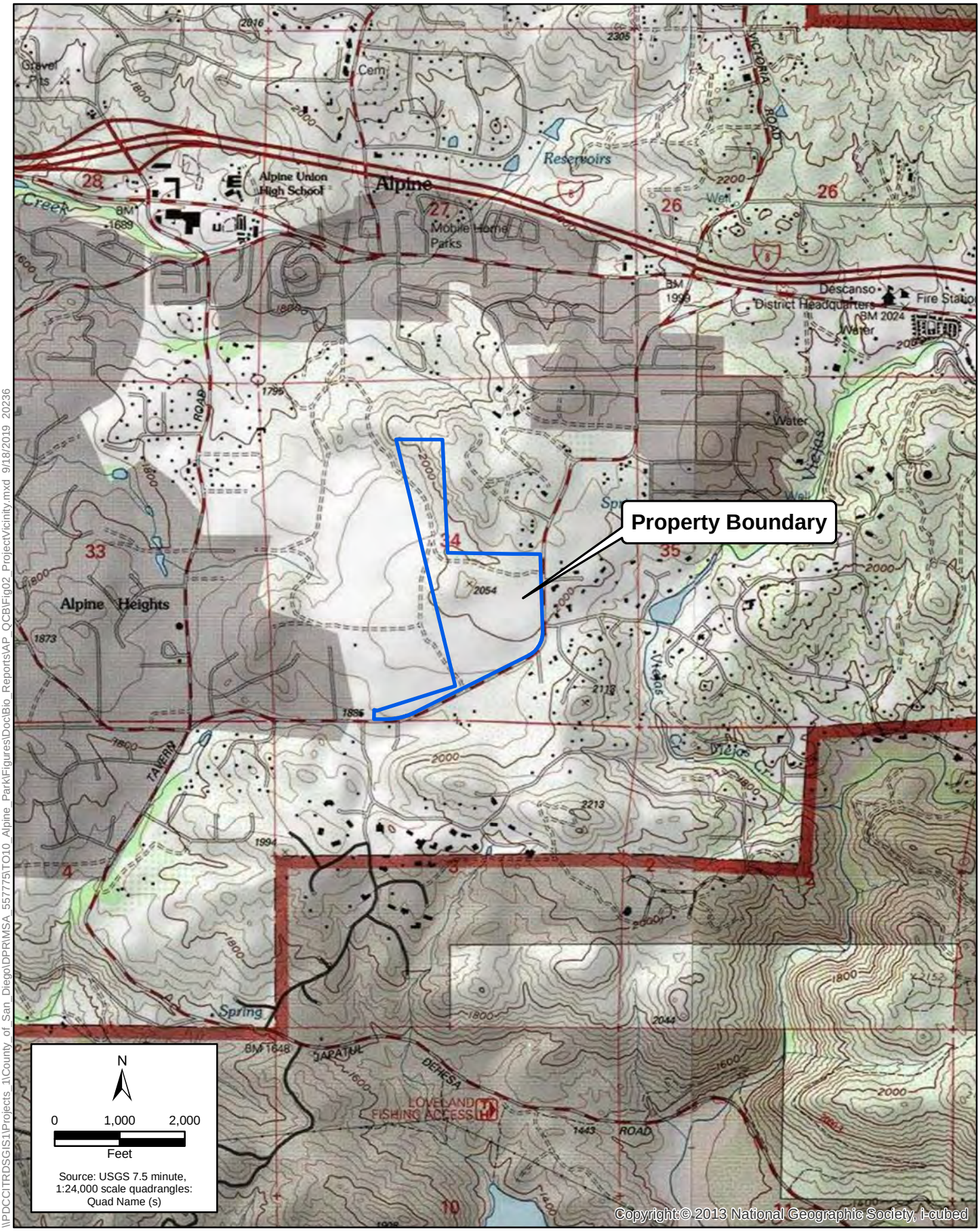


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Figure 2
Project Vicinity
Alpine Park Project

Chapter 2
Methods

Survey methodology follows the December 15, 2014 U.S. Fish and Wildlife Service (USFWS) Quino Checkerspot Butterfly Survey Guidelines (protocol; USFWS 2014). A site assessment was conducted by Brian Lohstroh on February 8, 2019, before the first QCB survey, to conduct a general field survey of the site and map excluded areas and proposed QCB survey areas.

Brian Lohstroh (TE-063608-6), James Hickman (TE-60218B-0) and Dale Ritenour (TE-58888A-2.1) conducted the surveys on a weekly basis under acceptable weather conditions as defined in the USFWS protocol (Table 1) (USFWS 2014). A total of 11 protocol surveys for adult QCB were conducted by ICF biologists between February 8 and May 3, 2019. In rainy weeks without appropriate weather conditions, two surveys were conducted in the following week with at least one day between surveys. During the last week of the survey window, no survey days met the required weather conditions. Because surveys cannot be made up after the survey window ends, no surveys were conducted in this last week. As described in Chapter 3, QCB was observed during the seventh week of surveys. Page 2 of the protocol states that surveys shall continue "until a Quino is detected". As a result, the surveys could have stopped after the seventh week, but the four additional surveys were conducted to provide additional depth and understanding of the degree to which QCB utilizes the site.

Each survey involved walking transects throughout all non-excluded portions of the survey area. A portion of the northern survey area initially included in the survey was determined, upon closer examination in the field, to be too dense to support QCB, and thus was determined to be a "closed canopy woody vegetation" stand as identified in the "Excluded Areas" definition on page 1 of the protocol. The surveys were conducted at rate of no more than 15 acres per hour. The surveyors stopped periodically to scan adjacent areas for moving butterflies. Butterflies were identified by sight with the aid of close-focus binoculars. All butterfly species observed were recorded.

Plant species flowering during the survey period were recorded and assessed as potential QCB nectar and/or larval host plants. A list of potential QCB nectar sources and larval host plants within the survey area is presented as Appendix A. Butterfly identification and nomenclature is based on Shiraiwa (2009). Vegetation communities are mapped based on Holland (1986) and Oberbauer (2008), and plant nomenclature is based on Baldwin et al. (2012).

Table 1. Survey Conditions

Survey Type	Date	Time Onsite		Temp (ºF)	Sky Cover (%)	Wind (MPH)	Personnel
Habitat Assessment	8-Feb-2019	Start	0930	54	0	0-2	B. Lohstroh
		End	1430	61	0	0-3	
Protocol Survey	27-Feb-2019	Start	0930	62	0	0-3	B. Lohstroh, J. Hickman
		End	1430	66	0	3-6	
Protocol Survey	1-Mar-2019	Start	0815	64	20	0-1	B. Lohstroh, J. Hickman
		End	1315	68	30	0-5	
Protocol Survey	5-Mar-2019	Start	0850	68	0	0-1	B. Lohstroh, J. Hickman
		End	1315	73	5	2-4	
Protocol Survey	14-Mar-2019	Start	0945	61	0	3-8	B. Lohstroh, J. Hickman
		End	1510	67	0	3-5	
Protocol Survey	18-Mar-2019	Start	0900	72	0	0-1	B. Lohstroh, J. Hickman
		End	1330	74	0	1-3	
Protocol Survey	29-Mar-2019	Start	0830	62	0	0-2	B. Lohstroh, J. Hickman
		End	1345	65	10	3-6	
Protocol Survey	8-Apr-2019	Start	1145	84	15	3-6	B. Lohstroh, D. Ritenour
		End	1730	84	10	3-6	
Protocol Survey	10-Apr-2019	Start	0915	63	0	0-2	B. Lohstroh, D. Ritenour
		End	1445	72	0	3-7	
Protocol Survey	17-Apr-2019	Start	0910	64	0	1-4	B. Lohstroh, D. Ritenour
		End	1500	81	0	2-6	
Protocol Survey	26-Apr-2019	Start	0730	67	0	2-4	B. Lohstroh, J. Hickman
		End	1330	78	0	3-6	
Protocol Survey	3-May-2019	Start	0715	63	0	2-5	B. Lohstroh, J. Hickman
		End	1300	77	0	1-5	

Chapter 3
Results

Two Adult QCB were observed within the survey area during on April 8, 2019 (Figure 3). The first QCB observed on April 8 was a female moving north and nectaring on blue dicks (*Dichelostemma capitatum*) (Appendix B; Photos 3-4). The second QCB was a male observed defending an area of nectar plants including blue dicks. No QCB host plants were observed within this area (Appendix B; Photos 5-6). These individuals were not observed during QCB surveys on April 10 or during any subsequent protocol surveys. Dale Ritenour conducted rare plant surveys on the site on April 12, revisited these locations during favorable weather conditions and did not observed these individuals.

The survey area supported a variety of potential nectar resources. While the grasslands onsite were dominated by native bunchgrasses and/or annual Mediterranean grasses, blue dick flowers were widespread and common in March and April (Appendix B; Photo 1). The site supported a variety of short-corolla popcornflowers including *Cryptanthas*, *Plagiobothrys*, and *Pectocaryas*.

Dot-seed plantain (*Plantago erecta*) and purple owl's clover (*Castilleja exserta*) were the only QCB host plants observed within the survey area. Dot-seed plantain was primarily limited to old dirt roads within the southern area of the survey area. Dot-seed plantain was largely absent from the clay soils onsite which support other clay-lens species such as Palmer's grapplinghook (*Harpagonella palmeri*).

The following 21 butterfly species were observed during the 11 protocol surveys: Acmon blue (*Plebejus acmon*), Behr's metalmark (*Apodemia mormo virgulti*), cabbage white (*Pieris rapae*), checkered skipper (*Pyrgus communis*), checkered white (*Pontia protodice*), common buckeye (*Junonia coenia grisea*), dainty sulphur (*Nathalis iole*), funereal duskywing (*Erynnis funeralis*), grayhairstreak (*Strymon melinus pudica*), Harford's sulphur (*Colias harfordii*), marine blue (*Leptotes marina*), Orange Sulphur (*Colias eurytheme*), Quino checkerspot, painted lady (*Vanessa cardui*), pale swallowtail (*Papilio eurymedon*), San Bernardino blue (*Euphilotes bernardino bernardino*), Sara orangetip (*Anthocharis sara*), southern blue (*Glaucopsyche lygdamus australis*), west coast lady (*Vanessa annabella*), western pygmy-blue (*Brephidium exila*), and western tiger blue (*Papilio rutulus*)(Table 2). Painted lady was by far the most commonly observed butterfly; up to 3,500 were observed during a single survey during migration in March. Sara's orangetip was also observed during every survey. It was also notable that no California ringlets (*Coenonympha tullia california*), a grassland species, were observed in the grasslands in the survey area.

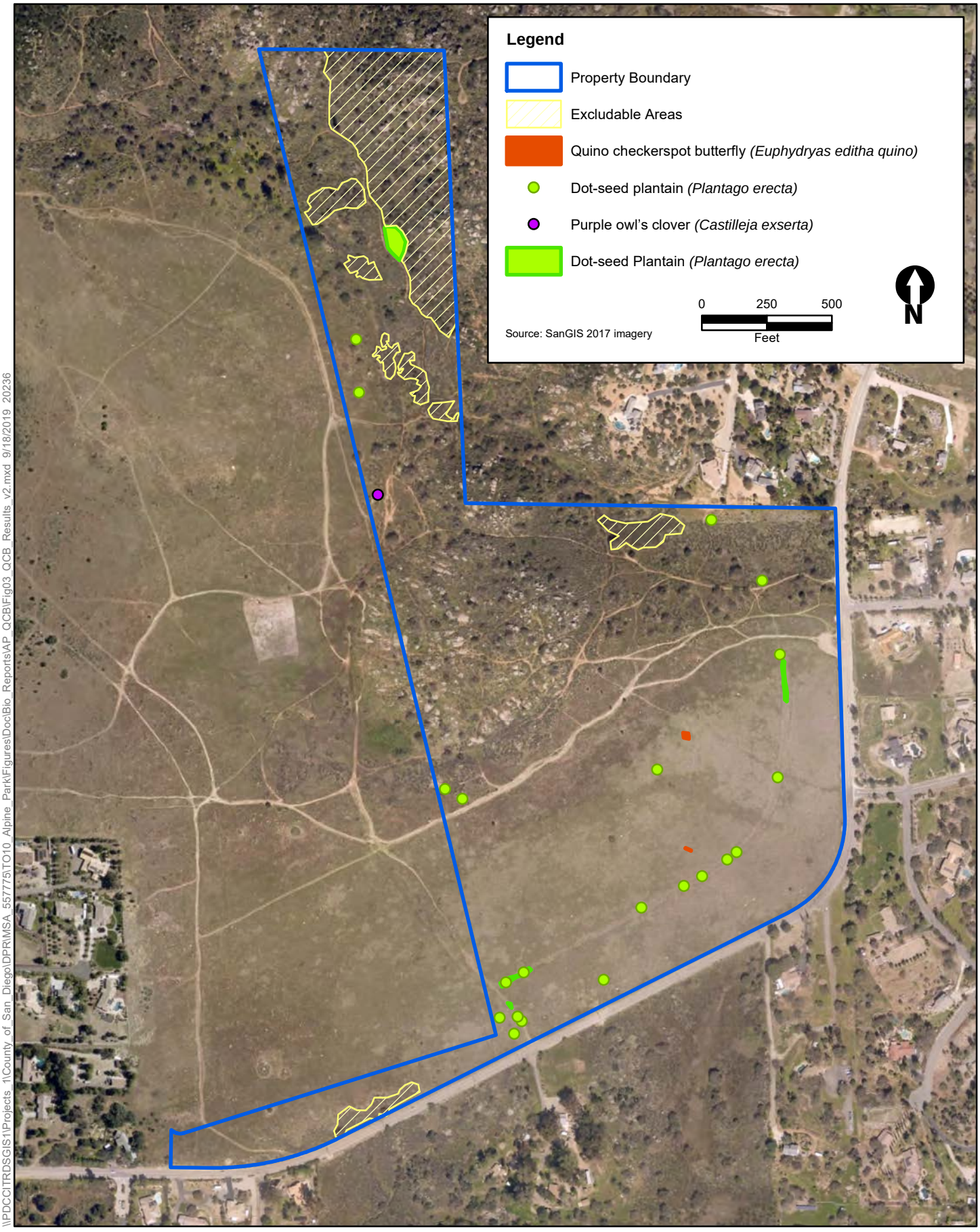

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Figure 3
QCB Survey Results
Alpine Park Project

Table 2. Butterflies Observed by Week

Common name	*Scientific name*	*2/8*	2/27	3/1	3/5	3/14	3/18	3/29	4/8	4/10	4/17	4/26	5/3	No. Surveys Observed	Max. No. Observed
FAMILY PAPILIONIDAE: Swallowtails															
Subfamily Papilioninae: True Swallowtails															
Western Tiger Swallowtail	*Papilio rutulus*						1							1	1
Pale Swallowtail	*Papilio eurymedon*					1	1			2				3	2
FAMILY PIERIDAE: Whites and Sulphurs															
Subfamily Pierinae: Whites															
Checkered White	*Pontia protodice*					1	2	3	10	3	9	33	54	8	54
Cabbage White	*Pieris rapae*								4					1	4
Subfamily Anthocharinae: Marbles & Orangetips															
Pacific Sara Orangetip	*Anthocharis sara sara*	6	14	9	7	2	5	3	14	11	36	59	30	12	59
Subfamily Coliadinae: Sulphurs															
Orange Sulphur	*Colias eurytheme*										5	1		2	5
Harford's Sulphur	*Colias harfordii*									2				1	2
Dainty Sulphur	*Nathalis iole*			1				2						2	2
FAMILY LYCAENIDAE: Gossamer-wing															
Subfamily Theclinae: Hairstreaks															
Gray Hairstreak	*Strymon melinus pudica*						1			2	1			3	2
Subfamily Polyommatinae: Blues															
Western Pygmy-blue	*Brephidium exila*								1					1	1
Marine Blue	*Leptotes marina*									1				1	1
San Bernardino Blue	*Euphilotes bernardino bernardino*											3		1	3
Southern Blue	*Glaucopsyche lygdamus australis*					1	1					3	9	4	9
Acmon Blue	*Plebejus acmon*					1	1	4		3	2		2	6	4

Common name	*Scientific name*	*2/8*	2/27	3/1	3/5	3/14	3/18	3/29	4/8	4/10	4/17	4/26	5/3	No. Surveys Observed	Max. No. Observed
FAMILY RIODINIDAE: Metalmarks															
Subfamily Riodinidae: Metalmarks															
Behr's Metalmark	*Apodemia mormo virgulti*						1	7	5	26	71	46	10	7	71
FAMILY LIBYTHEIDAE: Snouts															
Subfamily Melitaeinae: Crescents and Checkerspots															
Quino Checkerspot* (FE)	*Euphydryas editha quino*								2					1	2
Subfamily Nymphalinae: True Brushfoots															
Painted Lady	*Vanessa cardui*	*5*	20	164	79	3500	270	310	40	27	21	32	4	12	3500
West Coast Lady	*Vanessa annabella*			1				3	6	2	2			5	6
Common Buckeye	*Junonia coenia grisea*								3	6	3	4	1	5	6
FAMILY HESPERIIDAE: The Skippers															
Subfamily Pyrginae: Spread-wing Skippers															
Funereal Duskywing	*Erynnis funeralis*			1	2		23	15	12	21	4	5	1	9	23
White Checkered-Skipper	*Pyrgus albescens*						1			1				2	1
Number of Species Observed per Survey		2	2	5	3	6	11	8	10	13	10	9	8	*Total Number of Butterflies Observed*	
Total Number of Butterflies Observed per Survey		11	34	176	88	3506	307	347	97	107	154	186	111		*3758*

Chapter 4
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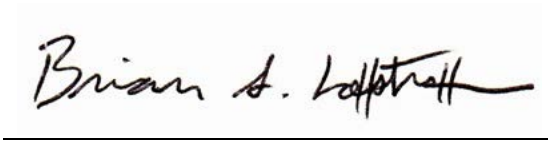
Chapter 5
Certifications

We certify that the information in this survey report and attached exhibits fully and accurately represents my work.



Brian Lohstroh
Permit No. TE-063608-6



James Hickman
Permit No TE-60218B-0



Dale Ritenour
Permit No TE-58888A-2.1

Appendix A
Potential QCB Host and Nectar Plants

Appendix A Potential QCB Host and Nectar Plants

Scientific Name	Common Name	Special Status
EUDICOTS		
Apiaceae - Carrot family		
Daucus pusillus	Rattlesnake weed	
Sanicula arguta	Sharptooth sanicle	
Sanicula bipinnata	Poison sanicle	
Asteraceae - Sunflower family		
Amblyopappus pusillus	Dwarf coastweed	
* *Centaurea melitensis*	Tocalote	
Chaenactis artemisiifolia	White pincushion	
Cirsium occidentale	Cobwebby thistle	
Corethrogyne filaginifolia	Common sand aster	
Deinandra fasciculata	Fascicled tarplant	
* *Dimorphotheca sinuata*	Cape marigold	
Eriophyllum confertiflorum	Yarrow	
Gutierrezia californica	California matchweed	
* *Hedypnois cretica*	Crete weed	
* *Hypochaeris glabra*	Smooth cat's-ear	
Lasthenia californica ssp. californica	California goldfields	
Pseudognaphalium californicum	California everlasting	
* *Senecio vulgaris*	Common ragwort	
* *Sonchus asper ssp. asper*	Prickly sow thistle	
* *Sonchus oleraceus*	Common sow thistle	
Boraginaceae - Borage family		
Amsinckia menziesii	Menzies's fiddleneck	
Cryptantha intermedia	Clearwater cryptantha	
Emmenanthe penduliflora	Whispering bells	
Eucrypta chrysanthemifolia	Spotted hideseed	
Harpagonella palmeri	Palmer's grapplinghook	CRPR 4.2
Pectocarya linearis ssp. ferocula	Narrow-toothed pectocarya	
Pectocarya peninsularis	Baja pectocarya	
Phacelia cicutaria	Caterpillar phacelia	
Phacelia parryi	Parry's phacelia	
Plagiobothrys nothofulvus	Rusty popcornflower	

Scientific Name	Common Name	Special Status
Brassicaceae - Mustard family		
* *Brassica nigra*	Black mustard	
Descurainia pinnata	Western tansymustard	
* *Hirschfeldia incana*	Shortpod mustard	
Lepidium nitidum	Shining pepper-grass	
* *Lobularia maritima*	Sweet alyssum	
* *Sisymbrium irio*	London rocket	
Cactaceae - Cactus family		
Opuntia littoralis	Coastal prickly pear	
Caryophyllaceae - Pink family		
* *Silene gallica*	Windmill catchfly	
Convolvulaceae - Morning-glory family		
Calystegia macrostegia ssp. cyclostegia	Coast morning-glory	
Crassulaceae - Stonecrop family		
Crassula connata	Pygmyweed	
Cucurbitaceae - Gourd family		
Marah macrocarpa	Wild cucumber	
Fabaceae - Legume family		
Acmispon glaber	Deerweed	
Acmispon micranthus	San Diego lotus	
Acmispon strigosus	Strigose lotus	
Lathyrus vestitus	Canyon sweet pea	
Lupinus bicolor	Miniature lupine	
Lupinus hirsutissimus	Stinging lupine	
Lupinus succulentus	Arroyo lupine	
Lupinus truncatus	Cut leaf lupine	
* *Medicago polymorpha*	California burclover	
* *Melilotus indicus*	Indian sweetclover	
Vicia hassei	Slender vetch	
Gentianaceae - Gentian family		
Zeltnera venusta	California centaury	
Geraniaceae - Geranium family		
* *Erodium botrys*	Longbeak filaree	
* *Erodium cicutarium*	Redstem filaree	

Scientific Name	Common Name	Special Status
Lamiaceae - Mint family		
* *Lamium amplexicaule*	Henbit	
* *Marrubium vulgare*	Horehound	
Salvia columbariae	Chia	
Montiaceae - Purslane family		
Calandrinia menziesii	Red maids	
Claytonia parviflora	Small flowered miner's-lettuce	
Myrsinaceae - Myrsine family		
* *Anagallis arvensis*	Scarlet pimpernel	
Nyctaginaceae - Four O'clock family		
Mirabilis laevis	Wishbone plant	
Onagraceae - Evening Primrose family		
Camissoniopsis bistorta	California sun cup	
Camissoniopsis hirtella	Hairy suncup	
Clarkia purpurea	Purple clarkia	
Epilobium canum	California fuchsia	
Oxalidaceae - Oxalis family		
* *Oxalis pes-caprae*	Bermuda buttercup	
Paeoniaceae - Peony family		
Paeonia californica	California peony	
Phrymaceae - Lopseed family		
Mimulus aurantiacus	Bush monkeyflower	
Plantaginaceae - Plantain family		
Antirrhinum kelloggii	Climbing snapdragon	
Antirrhinum nuttallianum	Nuttall's snapdragon	
Nuttallanthus texanus	Blue toadflax	
Plantago erecta	Dot seed plantain	
Polemoniaceae - Phlox family		
Gilia angelensis	Chaparral gilia	
Navarretia hamata	Skunkweed	
Polygonaceae - Buckwheat family		
Eriogonum fasciculatum	California buckwheat	
Pterostegia drymarioides	Granny's hairnet	
Primulaceae - Primrose family		
Primula clevelandii	Padre's shooting star	

Scientific Name	Common Name	Special Status
Ranunculaceae - Buttercup family		
Clematis pauciflora	Few-flowered virgin's bower	
Rosaceae - Rose family		
Drymocallis glandulosa	Sticky woodbeauty	
Scrophulariaceae - Figwort family		
Scrophularia californica	California figwort	
Solanaceae - Nightshade family		
Solanum americanum	White nightshade	
Verbenaceae - Vervain family		
Verbena lasiostachys	Western vervain	
Violaceae - Violet family		
Viola pedunculata	Johnny-jump-up	
MONOCOTS		
Alliaceae - Onion or Garlic family		
Allium praecox	Early onion	
Iridaceae - Iris family		
Sisyrinchium bellum	Lovely blue-eyed-grass	
Liliaceae - Lily family		
Calochortus splendens	Splendid mariposa lily	
Fritillaria biflora var. biflora	Chocolate Lily	
Themidaceae - Brodiaea family		
Brodiaea terrestris ssp. kernensis	Dwarf brodiaea	
Dichelostemma capitatum	Blue dicks	

Scientific Name	Common Name	Special Status

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened

State:
SE = Endangered
ST =Threatened

CRPR – California Rare Plant Rank
1A. Presumed extinct in California and elsewhere
1B. Rare or Endangered in California and elsewhere
2A. Presumed extinct in California, more common elsewhere
2B. Rare or Endangered in California, more common elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

Threat Ranks
.1 - Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Appendix B
Representative Photographs

	Photo 1. Representative Site Overview. March 29, 2019
	Photo 2. Overview - Quino checkerspot butterfly female nectaring on blue dicks (*Dichelostemma capitatum*). April 8, 2019.
	Photo 3. Quino checkerspot butterfly female nectaring on blue dicks. April 8, 2019.

	Photo 4. Quino checkerspot butterfly female nectaring on blue dicks. April 8, 2019.
	Photo 5. Overview - male Quino checkerspot butterfly territory overview. April 8, 2019.
	Photo 6. Male Quino checkerspot. April 8, 2019.

RESULTS OF THE 2020 QUINO CHECKERSPOT BUTTERFLY SURVEYS FOR THE ALPINE PARK PROJECT AND WRIGHT'S FIELD

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July 2020

ICF. 2020. 2020 Quino Checkerspot Butterfly Surveys for the Alpine Park Project and Wright's Field. Prepared for the County of San Diego, Department of Parks and Recreation. San Diego, CA. July.

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Chapter 1
Introduction

ICF was retained by the County of San Diego Department of Parks and Recreation to conduct protocol surveys for the federally-listed endangered Quino checkerspot butterfly (*Euphydryas editha quino*; QCB) in support of the Alpine Park project. As requested by the U.S. Fish and Wildlife Service (USFWS) and described in this report, surveys were conducted on the Alpine Park property, as well as on Wright's Field preserve and the County-owned parcels south of South Grade Road in 2020. These surveys represent a follow-up to the QCB surveys conducted in 2019 on just the Alpine Park property (ICF 2019), where QCB occurrences were documented.

The Alpine Park property and the adjacent Wright's Field preserve (study area) are located in the southern portion of the community of Alpine, in San Diego County, CA (Figure 1). They can be found on the *Alpine* USGS 7.5-minute quadrangle map (Figure 2). The 324.7-acre combined study area is situated within the U.S. Fish and Wildlife Service (USFWS) recommended survey area for QCB (USFWS 2014).

The study area was inspected for suitable QCB habitat during a habitat assessment conducted prior to the start of protocol surveys. The study area supports approximately 252.4 acres of non-excluded areas as defined by the USFWS (USFWS 2014). The non-excluded, suitable QCB habitat within the study area (*i.e.,* survey area) includes rolling grasslands and openings in coastal sage scrub and Engelmann oak woodlands. This report documents the results of the 2020 QCB focused surveys conducted in the non-excluded portions of the study area.

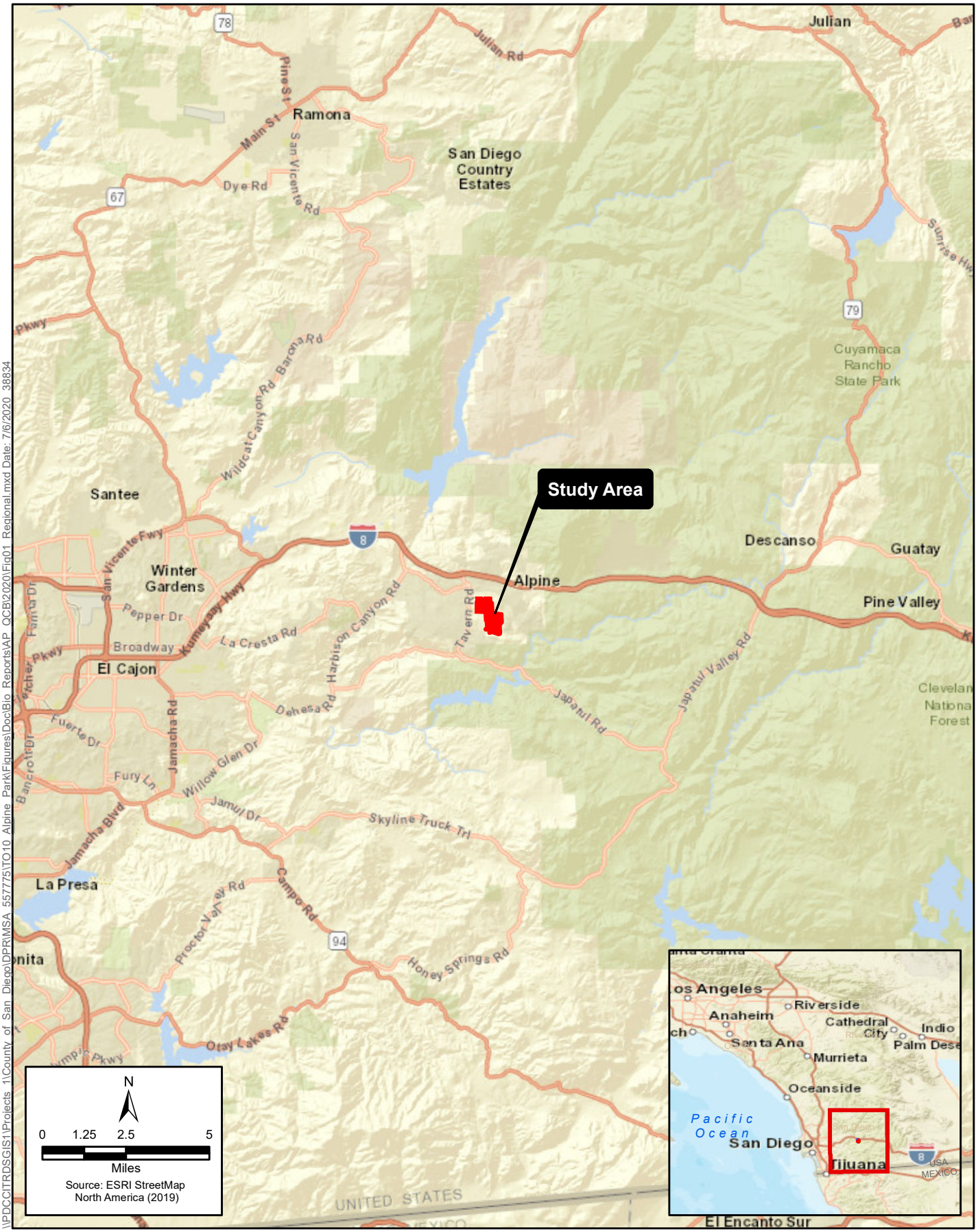

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Figure 1
Regional Location
Alpine Park and Wright's Field QCB Survey Report

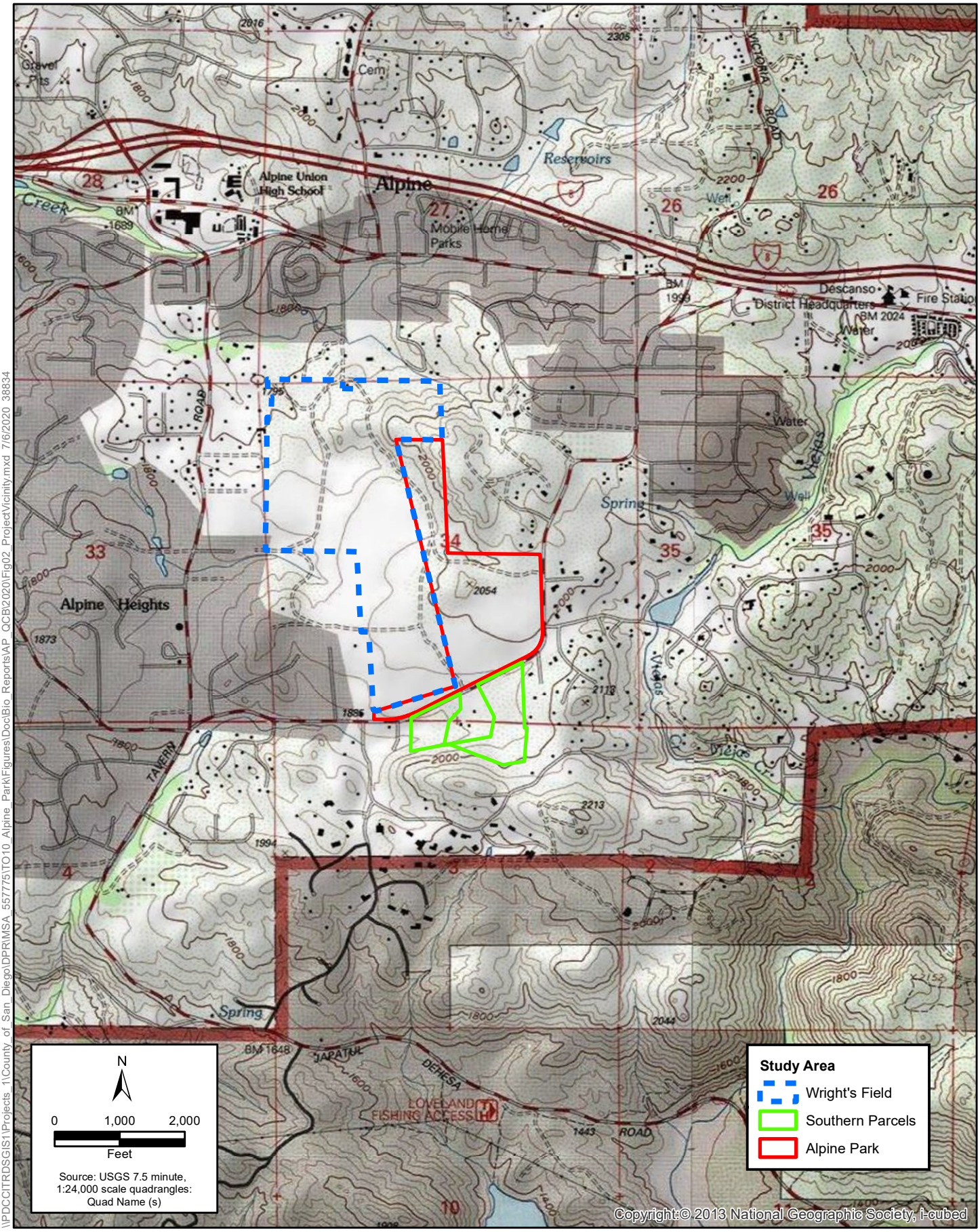

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Figure 2
Project Vicinity
Alpine Park and Wright's Field QCB Survey Report

Chapter 2
Methods

Survey methodology follows the December 15, 2014 U.S. Fish and Wildlife Service (USFWS) Quino Checkerspot Butterfly Survey Guidelines (protocol; USFWS 2014). A habitat assessment was conducted by Brian Lohstroh before the first QCB survey on February 10, 2020. The purpose of the assessment was to conduct a general field survey of the site, map excluded and non-excluded QCB survey areas. Areas mapped as excluded areas consisted primarily of closed-canopy, dense vegetation such as various forms of chaparral, oak woodlands, dense stands of California sagebrush (*Artemisia californica*) and dense stands of broom baccharis (*Baccharis sarothroides*). Additionally, fenced off populations of San Diego thorn mint (*Acanthomintha ilicifolia*) were also excluded from the QCB survey area to avoid trampling the protected plants. The 2020 habitat assessment focused on Wright's Field and the County-owned parcels south of South Grade Road, as the Alpine Park property was already assessed during the 2019 surveys.

Permitted biologists Brenda Bennett (TE-063230-5.4), Ian Hirshler (TE-063230-5.4), Korey Klutz (TE-036065-3), Brian Lohstroh (TE-063608-6), Ryan Meszaros (TE-20186A-3.1), and Melanie Rocks (TE-082908-2) conducted the surveys on a weekly basis under acceptable weather conditions as defined in the USFWS protocol (Table 1) (USFWS 2014). Protocol survey visits were made to the site by the above biologists between February 17 and April 1, 2020. ICF biologist and QCB trainee Kelsey Dix assisted with host plant mapping during the habitat assessment and during the March 31, 2020 survey.

The survey area was divided into three primary subareas to manage survey coverage, with each subarea requiring approximately two person-days to complete. The Alpine Park property (approximately 76.8 acres of survey area; eastern portion of the overall site) was considered one subarea, the northern portion of Wright's Field was the second subarea (approximately 91.3 acres of survey area), and the southern portion of Wright's Field, plus the county-owned parcels south of South Grade Road was the third subarea (approximately 81.5 acres of survey area).

Each survey involved walking transects throughout all non-excluded portions of the survey area. The surveys were conducted at rate of no more than 15 acres per hour. The surveyors stopped periodically to scan adjacent areas for moving butterflies. Butterflies were identified by sight with the aid of close-focus binoculars. All butterfly species observed were recorded.

Plant species flowering during the survey period were recorded and assessed as potential QCB nectar and/or larval host plants. A list of potential QCB nectar sources and larval host plants within the survey area is presented as Appendix A. Butterfly identification and nomenclature is based on Shiraiwa (2009) and plant nomenclature is based on Baldwin et al. (2012).

Due to continuous adverse weather conditions onsite from March 10 through March 23, 2020, it was not possible to follow the weekly survey schedule required by the QCB protocol during the 2020 surveys. In addition, the COVID-19 outbreak and subsequent shutdown of work for San Diego County Department of Parks and Recreation (DPR) projects on March 20, 2020, prevented strict adherence to the protocol survey schedule.

COVID-19 shutdown orders for this project were lifted on March 23, 2020, when the project was considered to be essential. However, after DPR's discussion with the USFWS on March 24, 2020, it was determined that surveys could be discontinued based on the positive survey results as of that date and because it was determined that peak QCB season had passed. A final survey visit was conducted during the week of March 29 to finalize host plant mapping and to determine the status of QCB on the site.

Table 1. Survey Conditions

Survey Type	Survey Area	Date	Time Onsite		Temp (°F)	Sky Cover (%)	Wind (MPH)	Personnel
Habitat Assessment	Wright's Field (Entire Property)	10-Feb-2020	Start	0800	43	100	2-5	B. Lohstroh, K. Dix
			End	1530	52	90	3-8	
Protocol Survey 1	Wright's Field (Southern Portion)	17-Feb-2020	Start	0900	65	0	0-1	B. Lohstroh
			End	1400	72	0	2-8	
Protocol Survey 1	Wright's Field (Southern Portion)	18-Feb-2020	Start	1100	67	40	0-1	B. Lohstroh
			End	1515	63	20	3-7	
Protocol Survey 1	Wright's Field (Northern Portion)	19-Feb-2020	Start	1000	62	0	1-4	Ian Hirshler, B. Bennett
			End	1430	72	0	1-4	
Protocol Survey 1	Alpine Park Property	20-Feb-2020	Start	1000	73	50	0-8	K. Klutz
			End	1600	79	50	0-8	
Protocol Survey 1	Alpine Park Property	21-Feb-2020	Start	1000	72	0	0-2	K. Klutz
			End	1230	79	25	0-2	
Protocol Survey 2	Wright's Field (Southern Portion)	24-Feb-2020	Start	0930	63	0	0-2	B. Lohstroh
			End	1500	73	0	1-2	
Protocol Survey 2	Wright's Field (Southern Portion)	25-Feb-2020	Start	0900	72	0	7-12	B. Lohstroh
			End	1330	78	0	4-7	
Protocol Survey 2	Wright's Field (Northern Portion)	26-Feb-2020	Start	1015	63	0	2-9	B. Bennett, R. Meszaros
			End	1500	71	5	3-15	
Protocol Survey 2	Alpine Park Property	27-Feb-2020	Start	0900	73	25	2-10	K. Klutz
			End	1600	77	25	2-10	
Protocol Survey 2	Alpine Park Property	28-Feb-2020	Start	0900	70	0	0-4	K. Klutz
			End	1130	79	0	0-4	
Protocol Survey 3	Wright's Field (Northern Portion)	3-Mar-2020	Start	0935	62	0	0-2	Ian Hirshler, R. Meszaros
			End	1415	73	0	3-8	
Protocol Survey 3	Wright's Field (Southern Portion)	4-Mar-2020	Start	0930	65	0	0-3	B. Lohstroh
			End	1445	76	0	0-9	
Protocol Survey 3	Wright's Field (Southern Portion)	5-Mar-2020	Start	0900	71	10	0-2	B. Lohstroh
			End	1530	80	15	0-10	
Protocol Survey 3	Alpine Park Property	5-Mar-2020	Start	1100	75	10	0-8	K. Klutz
			End	1530	81	15	0-8	
Protocol Survey 3	Alpine Park Property	6-Mar-2020	Start	0900	63	0	0-8	K. Klutz
			End	1100	70	0	0-8	
Protocol Survey 4	Wright's Field (Southern Portion)*	9-Mar-2020	Start	0930	61	30	0-1	B. Lohstroh
			End	1500	71	70	2-10	
Protocol Survey 4	Wright's Field (Northern Portion)	9-Mar-2020	Start	1025	61	30	1-4	M. Rocks, R. Meszaros
			End	1515	70	90	2-5	
Protocol Survey 4	Alpine Park Property	29-Mar-2020	Start	1200	65	0	0-7	K. Klutz
			End	1600	73	0	0-7	
Protocol Survey 5	Wright's Field (Northern Portion)*	30-Mar-2020	Start	0900	60	0	0-2	R. Meszaros
			End	1430	66	0	3-7	
Protocol Survey 5	Wright's Field (Southern Portion)	31-Mar-2020	Start	1100	70	100	0-1	B. Lohstroh, K. Dix
			End	1600	71	100	2-7	
Protocol Survey 5	Wright's Field (Southern Portion)	1-Apr-2020	Start	1100	68	20	2-5	B. Lohstroh
			End	1600	75	0	2-9	
Protocol Survey 4	Alpine Park Property	1-Apr-2020	Start	1100	67	20	0-7	K. Klutz
			End	1630	74	0	0-7	

*Partial coverage achieved due to personnel and weather constraints, resulting in a survey rate greater than 10 acres/hour/suveyor

Chapter 3
Results

Surveyors observed QCB on both the Alpine Park property and Wright's Field portions of the survey area. On March 5, 2020, one fresh and one worn adult QCB were observed on the southern portion of the Alpine Park property. The two individuals were associated with a disturbed area supporting a large population of dot-seed plantain. On the same date, two fresh QCB were also observed in the central portion of Wright's Field, approximately 2,000 feet to the northwest. These individuals were associated with a gradual ridgeline with large areas of dot-seed plantain present in the vicinity. On the following day (March 6, 2020), a single individual QCB was observed at the same disturbed site on the Alpine Park property. It is likely this individual was one of the same individuals that was observed during the previous day. Based on these observations, a range of three to five QCB were observed within the survey area during the 2020 flight season.

Dot-seed plantain (*Plantago erecta*) and purple owl's clover (*Castilleja exserta* ssp. *exserta*) were the only QCB host plants observed within the survey area. Dot-seed plantain was distributed throughout the survey area, with the largest concentrations found within the southern portion of Wright's Field Preserve. Purple owl's clover was uncommon within the survey area, becoming apparent later in the flight season.

The survey area supported a variety of potential QCB nectar resources, with a total of 92 species recorded in flower during the surveys (Appendix A). While the grasslands onsite were dominated by native bunchgrasses and/or annual Mediterranean grasses, blue dicks flowers were common in March. The site supported a variety of short-corolla popcorn flowers including *Cryptanthas*, *Plagiobothrys*, and *Pectocaryas*.

Site photographs are provided in Appendix B, which show typical habitat onsite as well as the QCB observations in early March.

A total of 25 butterfly species were observed during all the survey visits to entire survey area, as shown in Table 2. Commonly observed species included painted lady (*Vanessa cardui*), funereal duskywing skipper (*Erynnis funeralis*), gray buckeye (*Junonia coenia grisea*), Sara orangetip (*Anthocharis sara sara*), Behr's metalmark (*Apodemia virgulti virgulti*), and Acmon blue (*Plebejus acmon*). Butterfly activity peaked during Survey 3, with 254 individuals observed across 17 species.

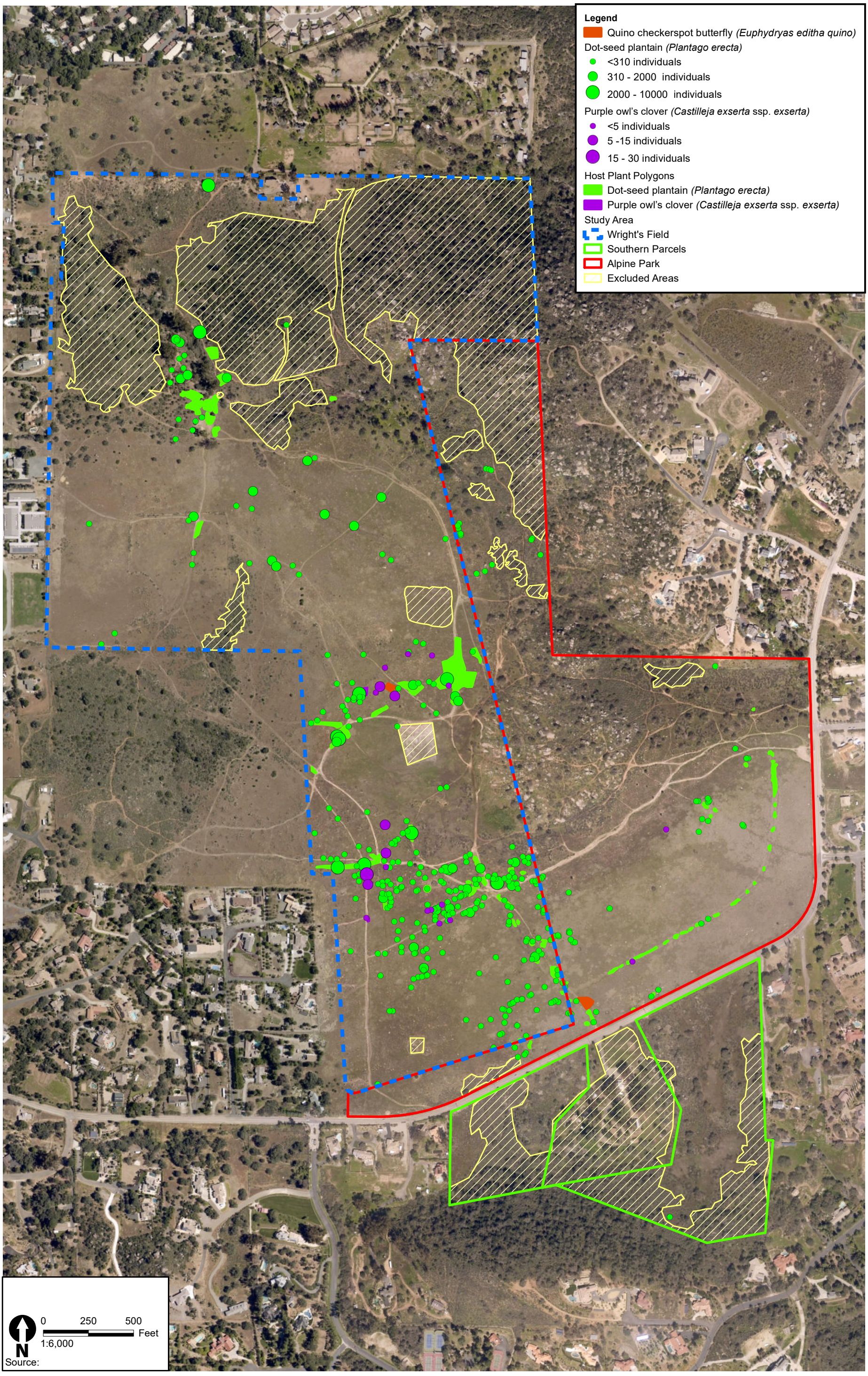

Figure 3
QCB Survey Results
Alpine Park and Wright's Field QCB Survey Report

Table 2. Butterflies Observed by Survey

Common Name	*Scientific Name*	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	No. Surveys Observed	Max No. Observed
FAMILY PAPILIONIDAE: Swallowtails								
Anise Swallowtail	*Papilio zelicaon*	2					**1**	**2**
Western Tiger Swallowtail	*Papilio rutulus*				1		**1**	**1**
Pale Swallowtail	*Papilio eurymedon*			2	1		**2**	**2**
FAMILY PIERIDAE: Whites and Sulphurs								
Subfamily Anthocharinae: Marbles & Orangetips								
Sara Orangetip	*Anthocharis sara sara*	15	12	26	14	2	**5**	**26**
Subfamily Coliadinae: Sulphurs								
Orange Sulphur	*Colias eurytheme*			2			**1**	**2**
Harford's Sulphur	*Colias harfordii*		1				**1**	**1**
Southwestern Cloudless Sulphur	*Phoebus sennae marcellina*		1			2	**2**	**2**
Unidentified Sulphur		1		1			**2**	**1**
FAMILY LYCAENIDAE: Gossamer-wing								
Subfamily Theclinae: Hairstreaks								
Immaculate Bramble Hairstreak	*Callophrys perplexa perplexa*			1			**1**	**1**
Western Elfin	*Callophrys augustinus iroides*	3					**1**	**3**
Subfamily Polyommatinae: Blues								
Southern Silvery Blue	*Glaucopsyche lygdamus australis*	2		1			**2**	**2**
Acmon Blue	*Plebejus acmon*	7	7	7	2	6	**5**	**7**
Unidentified Blue				5	1		**2**	**5**
Clemence's Blue	*Plebejus lupini monticola*			6	22	5	**3**	**22**
FAMILY RIODINIDAE: Metalmarks								
Behr's Metalmark	*Apodemia virgulti virgulti*	5	4	22	19	4	**5**	**22**
FAMILY NYMPHALIDAE: Brushfoots								
Subfamily Melitaeinae: Crescents and Checkerspots								
Quino Checkerspot* (FE)	*Euphydryas editha quino*			5			**1**	**5**
Subfamily Nymphalinae: True Brushfoots								
Mourning Cloak	*Nymphalis antiopa antiopa*	2	3				**2**	**3**
Painted Lady	*Vanessa cardui*	52	29	100	38	113	**5**	**113**
West Coast Lady	*Vanessa annabella*					2	**1**	**2**
American Red Admiral	*Vanessa atalanta rubria*			10			**1**	**10**
Unidentified Lady	*Vanessa* sp.	1	2	10	2		**4**	**10**
Gray Buckeye	*Junonia coenia grisea*	31	24	23	10	12	**5**	**31**
FAMILY HESPERIIDAE: The Skippers								
Subfamily Pyrginae: Spread-wing Skippers								
Propertius Duskywing	*Erynnis propertius*				1		**1**	**1**
Funereal Duskywing	*Erynnis funeralis*	2	4	32	15	18	**5**	**32**
Subfamily Herperiinae: Grass Skippers								
Fiery Skipper	*Hylephila phyleus phyleus*			1	1		**2**	**1**
Number of Species Observed Per Survey		**12**	**10**	**17**	**13**	**9**	**Total Number of Species**	
Total Number of Butterflies Observed Per Survey		**123**	**87**	**254**	**127**	**164**	**Observed:**	**25**

Chapter 4
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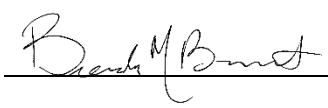
Chapter 5
Certifications

We certify that the information in this survey report and attached exhibits fully and accurately represents our work.



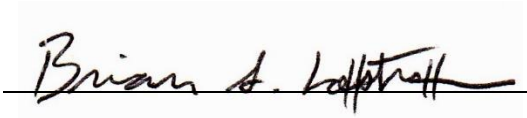
Brenda Bennett
Permit No. TE-063230-5.6



Ian Hirshler
Permit No. TE-063230-5.6



Korey Klutz
Permit No. TE-036065-3



Brian Lohstroh
Permit No. TE-063608-6



Ryan Meszaros
Permit No. TE-20186A-3.1



Melanie Rocks
Permit No. TE-082908-2

Appendix A
QCB Host Plants and Potential Nectar Sources

Scientific Name	Common Name	Status
Adoxaceae - Adoxa Family		
Sambucus nigra subsp. caerulea	Blue Elderberry	
Agavaceae - Century Plant Family		
Hesperoyucca whipplei	Chaparral Candle	
Alliaceae - Onion Family		
Allium praecox	Early Onion	
Anacardiaceae - Sumac Family		
Rhus ovata	Sugar Bush	
Apiaceae - Carrot Family		
Daucus pusillus	Rattlesnake Weed	
Lomatium dasycarpum subsp. dasycarpum	Woolly-Fruit Lomatium	
Sanicula arguta	Sharp-Tooth Sanicle	
Sanicula bipinnatifida	Purple Sanicle	
Asteraceae - Sunflower Family		
Chaenactis artemisiifolia	White Pincushion	
Cirsium occidentale var. californicum	California Thistle	
Deinandra fasciculata	Fascicled Tarweed	
*Dimorphotheca sinuata**	Blue-Eye Cape-Marigold	
Eriophyllum confertiflorum var. confertiflorum	Long-Stem Golden-Yarrow	
Gutierrezia californica	California Matchweed	
*Hedypnois cretica**	Crete Hedypnois	
Heterotheca grandiflora	Telegraph Weed	
*Hypochaeris glabra**	Smooth Cat's Ear	
Lasthenia gracilis	Common Goldfields	
Matricaria discoidea	Pineapple-Weed	
Pseudognaphalium californicum	California Everlasting	
*Senecio vulgaris**	Common Groundsel	
*Sonchus asper subsp. asper**	Prickly Sow-Thistle	
*Sonchus oleraceus**	Common Sow-Thistle	
Boraginaceae - Borage Family		
Amsinckia intermedia	Rancher's Fiddleneck	
Cryptantha intermedia var. intermedia	Nievitas Cryptantha	
Harpagonella palmeri	Palmer's Grappling-Hook	CRPR 4.2
Pectocarya linearis subsp. ferocula	Slender Combseed	
Plagiobothrys nothofulvus	Rusty Popcornflower	
Brassicaceae - Mustard Family		
*Brassica nigra**	Black Mustard	
Descurainia pinnata	Western Tansy-Mustard	
*Hirschfeldia incana**	Short-Pod Mustard	
Lepidium nitidum	Shining Peppergrass	
*Lobularia maritima**	Sweet Alyssum	
*Sisymbrium irio**	London Rocket	
Cactaceae - Cactus Family		
Opuntia littoralis	Coast Prickly-Pear	
Caryophyllaceae - Pink Family		
*Silene gallica**	Common Catchfly	
Convolvulaceae - Morning Glory Family		
Calystegia macrostegia subsp. cyclostegia	Coast Morning-Glory	
Cucurbitaceae - Gourd Family		
Marah macrocarpa	Manroot, Wild-Cucumber	
Ericaceae - Heath Family		
Xylococcus bicolor	Mission Manzanita	

Scientific Name	Common Name	Status
Fabaceae - Legume Family		
Acmispon micranthus	Grab Lotus	
Acmispon strigosus	Bishop's/Strigose Lotus	
*Genista monspessulana**	French Broom	
Lathyrus vestitus	San Diego Sweet Pea	
Lupinus bicolor	Miniature Lupine	
Lupinus hirsutissimus	Stinging Lupine	
Lupinus succulentus	Arroyo Lupine	
Lupinus truncatus	Collar Lupine	
*Medicago polymorpha**	Burclover	
*Melilotus indicus**	Indian Sweetclover	
*Trifolium hirtum**	Rose Clover	
Vicia hassei	Slender Vetch	
Gentianaceae - Gentian Family		
Zeltnera venusta	Canchalagua	
Geraniaceae - Geranium Family		
*Erodium botrys**	Long-Beak Filaree/Storksbill	
*Erodium cicutarium**	Red-Stem Filaree/Storksbill	
Hydrophyllaceae - Waterleaf Family		
Emmenanthe penduliflora var. penduliflora	Whispering Bells	
Eucrypta chrysanthemifolia var. chrysanthemifolia	Common Eucrypta	
Phacelia cicutaria var. hispida	Caterpillar Phacelia	
Phacelia parryi	Parry's Phacelia	
Iridaceae - Iris Family		
Sisyrinchium bellum	Blue-Eyed-Grass	
Lamiaceae - Mint Family		
*Lamium amplexicaule**	Henbit	
*Marrubium vulgare**	Horehound	
Salvia columbariae	Chia	
Liliaceae - Lily Family		
Calochortus splendens	Splendid Mariposa Lily	
Fritillaria biflora var. biflora	Chocolate Lily	
Montiaceae - Purslane Family		
Calandrinia menziesii	Red Maids	
Claytonia perfoliata subsp. perfoliata	Miner's-Lettuce	
Myrsinaceae - Myrsine Family		
*Lysimachia arvensis**	Scarlet Pimpernel	
Nyctaginaceae - Four O'Clock Family		
Mirabilis laevis var. crassifolia	Coastal Wishbone Plant	
Onagraceae - Evening Primrose Family		
Camissoniopsis bistorta	California Sun Cup	
Camissoniopsis hirtella	Field Sun Cup	
Clarkia purpurea	Four-Spot Clarkia	
Orobanchaceae - Broomrape Family		
Castilleja exserta subsp. exserta+	Purple Owl's-Clover	
Castilleja foliolosa	Woolly Indian Paintbrush	
Oxalidaceae - Oxalis Family		
Oxalis pes-caprae	Bermuda-Buttercup	
Paeoniaceae - Peony Family		
Paeonia californica	California Peony	
Phrymaceae - Lopseed Family		
Diplacus puniceus	Coast Monkey Flower	

Scientific Name	Common Name	Status
Plantaginaceae - Plantain Family		
Antirrhinum kelloggii	Climbing Snapdragon	
Nuttallanthus texanus	Large Blue Toadflax	
Plantago erecta+	Dot-seed Plantain	
Polemoniaceae - Phlox Family		
Gilia angelensis	Grassland Gilia	
Navarretia hamata subsp. hamata	Hooked Skunkweed	
Linanthus dianthiflorus	Farinose Ground Pink	
Polygonaceae - Buckwheat Family		
Eriogonum fasciculatum var. foliolosum	Inland California Buckwheat	
Primulaceae - Primrose Family		
Primula clevelandii subsp. clevelandii	Padre's Shooting Star	
Ranunculaceae - Buttercup Family		
Clematis pauciflora	Ropevine Clematis	
Rhamnaceae - Buckthorn Family		
Rhamnus crocea	Spiny Redberry	
Rosaceae - Rose Family		
Drymocallis glandulosa var. wrangelliana	Wrangel Cinquefoil	
Scrophulariaceae - Figwort Family		
Scrophularia californica	California Bee Plant	
Themidaceae - Brodiaea Family		
Brodiaea terrestris subsp. kernensis	Dwarf Brodiaea	
Dichelostemma capitatum subsp. capitatum	Blue Dicks, School Bells	
Verbenaceae - Verbena Family		
Verbena lasiostachys var. lasiostachys	Western Vervain	
Violaceae - Violet Family		
Viola pedunculata	Johnny Jump-Up	

CRPR: California Rare Plant Rank

4. Plants of limited distribution - Watch list; .2 – Fairly endangered in California

*non-native species

+QCB hostplant

Appendix B
Representative Photographs



Photo 1: (4/1/2020) View facing east from the central portion of Wright's Field. A large patch of dot-seed plantain is visible in the foreground. The hillside at left and center is a portion of Alpine Park Property.



Photo 2: (3/4/2020) View facing north from the southern portion of Wright's Field. Dot-seed plantain was commonly observed growing along the road/trail visible in the foreground and at right.



Photo 3: (3/5/2020) View facing north from the central portion of Wright's Field. This shows the location where QCB was observed onsite.



Photo 4: (3/5/2020) Adult QCB observed on Wright's Field.



Photo 5: (2/27/2019) View facing east from the southern portion of the Alpine Park property. QCB was observed at this location, which also supported a large patch of dot-seed plantain.



Photo 6: (3/5/2020) Worn adult QCB observed on the Alpine Park property.



Photo 7: (2/25/2020) View facing north from the southeastern boundary of the southern parcels. The Alpine Park property is visible in the background at left.



Photo 8: (3/9/2020) View facing south from the northwestern boundary of the southern parcels. Brush management recently occurred within this area.



Photo 9: (2/21/2020) View facing north of the north-central portion of Wright's Field. This area supports native grassland.



Photo 10: (2/19/2020) View facing northeast from the northern portion of Wright's Field. A large patch of dot-seed plantain is present in the foreground with dense, excluded chaparral habitat visible in the background at left.

Appendix D

2019 and 2020 Hermes Copper Butterfly Survey Reports

RESULTS OF THE 2019 HERMES COPPER BUTTERFLY SURVEYS FOR THE ALPINE PARK PROJECT

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DRAFT

September 2019





DRAFT

ICF. 2019. Results of the 2019 Hermes Copper Butterfly Surveys for the Alpine Park Project. Prepared for the County of San Diego, Department of Parks and Recreation. San Diego, CA. September.

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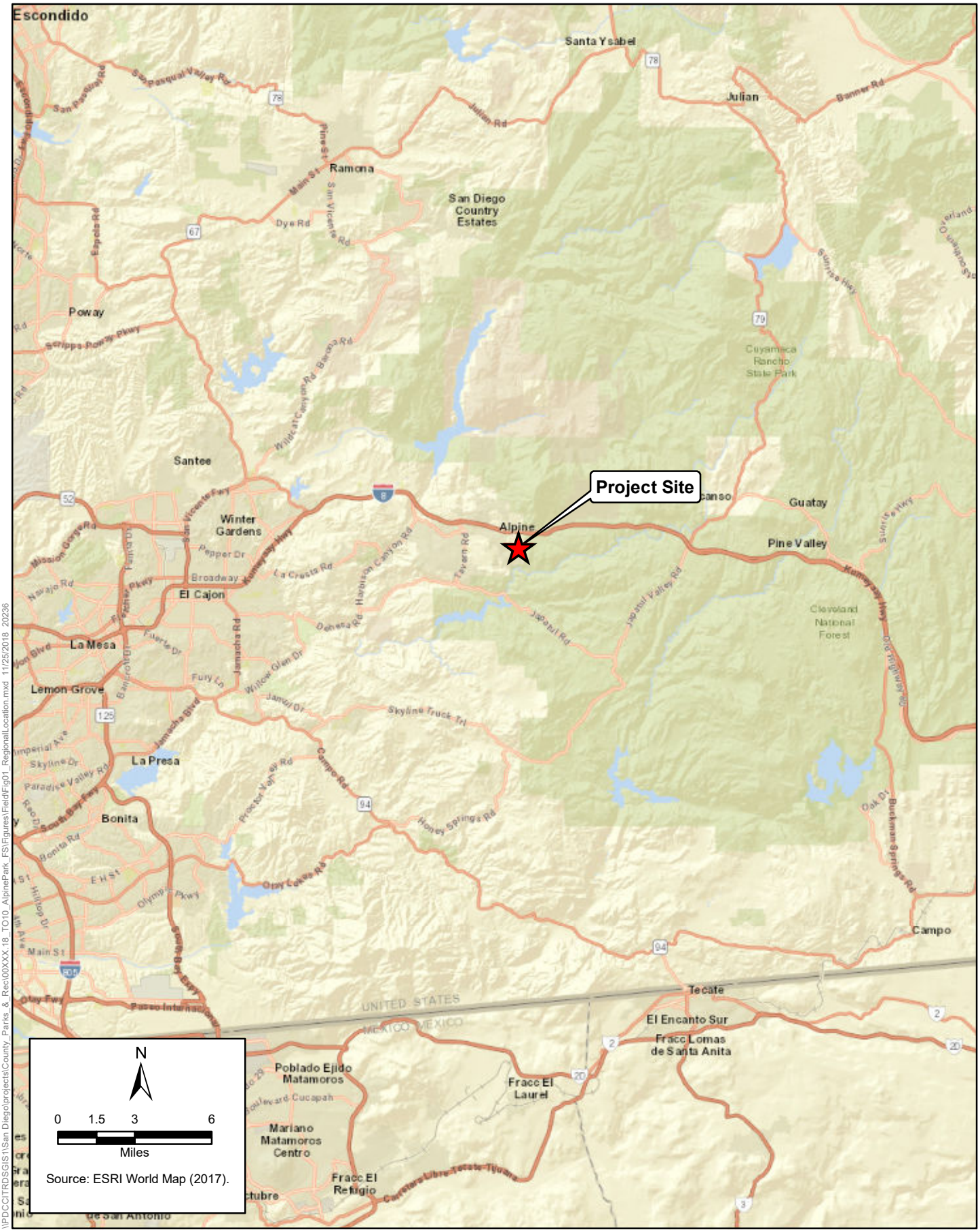
Chapter 1
Introduction

ICF was retained by the County of San Diego to conduct protocol surveys for the Hermes Copper butterfly (*Lycaena hermes*; HCB) in support of their Alpine Park Project. This report documents the results of the 2019 HCB focused surveys conducted at the site.

HCB is listed as a Candidate species for Threatened or Endangered status by the United States Fish and Wildlife Service (USFWS), but it does not have a federal survey protocol. Therefore, these HCB surveys followed a modified version of the County of San Diego Survey Guidelines to Hermes Copper (2010) combined with relevant portions of the USFWS Quino Checkerspot Butterfly (*Euphydryas editha quino*, QCB) Survey Guidelines (2014).

The Alpine Park property (site) is located adjacent to Wright's Field to the southeast of the community of Alpine, in San Diego County, CA (Figure 1). The site can be found on the USGS 7.5-minute quad map Alpine (Figure 2) and ranges in elevation from approximately 1900 feet at the southwestern edge of the site to approximately 2100 feet above mean sea level at the extreme northeastern corner.

The northern portion of study area consists of a mix of dense Diegan coastal sage scrub (CSS), open Engelmann oak woodland and mixed chaparral that supports occasional patches and solitary individuals of the HCB larval host, spiny redberry (*Rhamnus crocea*) (Figure 3). The central portion of the study area primarily consists of a large patchwork of native and non-native grassland and this area generally lacked HCB host plant. Lastly, an area of coastal sage-chaparral transition along the southern edge of the site supported several individuals of HCB host plant. No HCB were observed during the surveys onsite.



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ICF

Figure 1
Regional Location
Alpine Park Surveys

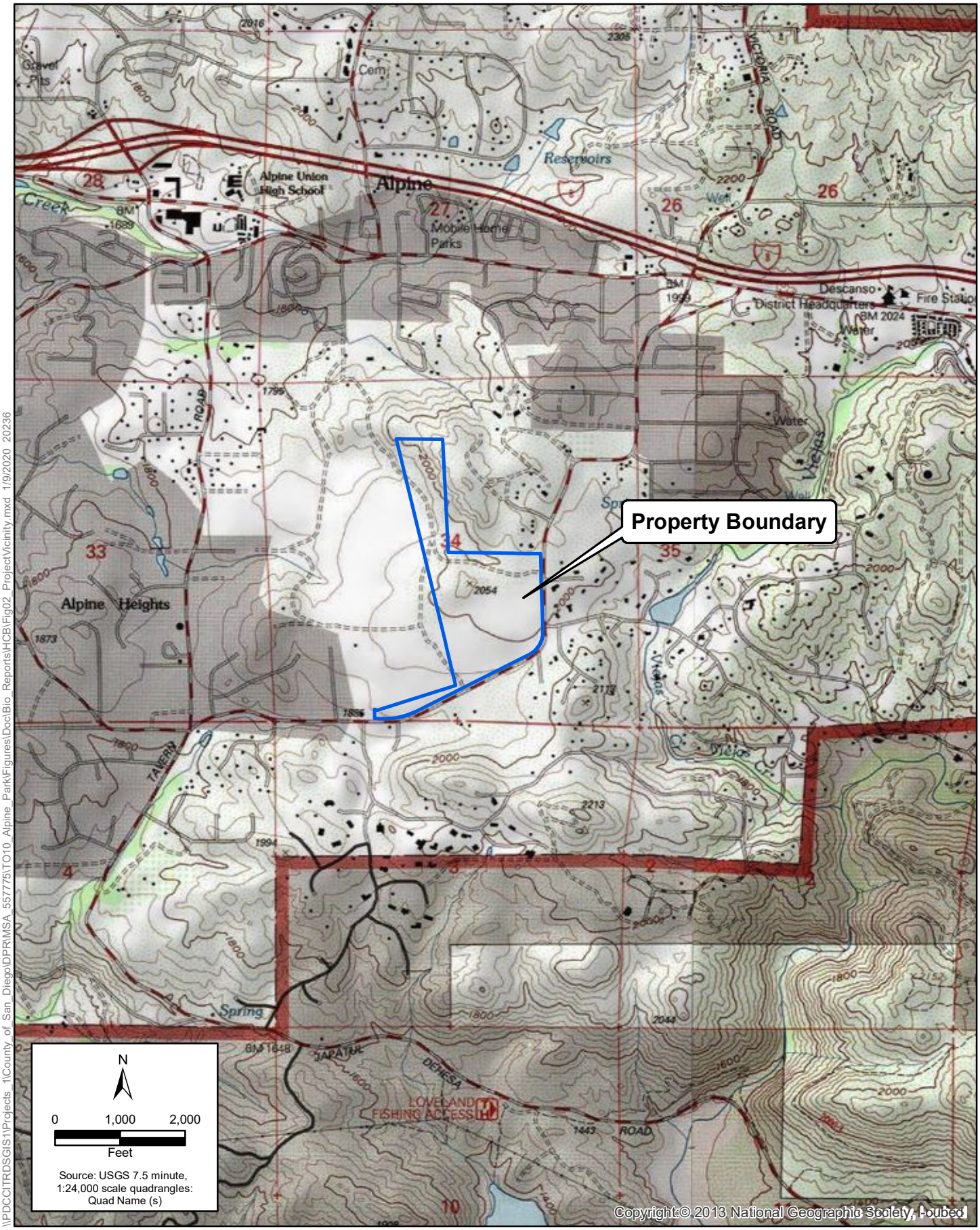

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Figure 2
Project Vicinity
Alpine Park Project

Chapter 2
Methods

Based on recent updates to the biology of the species and consensus of HCB surveyors, focused surveys for HCB followed a modified version of the guidelines prepared by the County of San Diego for evaluating the potential impacts within their jurisdiction (2010), combined with relevant portions of the USFWS QCB Survey Guidelines (2014). The County guidelines indicate that surveys for HCB need only be conducted in areas where their larval host plant, spiny redberry (*Rhamnus crocea*), occurs in close proximity (within 15 feet) to California buckwheat (*Eriogonum fasciculatum*), their primary nectar plant (*i.e.,* suitable habitat). It should be noted that HCB has been observed using various other species as a nectar source (Klein & Faulkner 2012), therefore, suitable habitat for HCB has been modified to include areas where the HCB's host plant occurs, regardless of whether it is found in proximity to California buckwheat.

The HCB surveys were conducted by QCB-permitted biologists because of their familiarity with the QCB survey protocol, as well as the local butterfly species. The HCB surveys followed the same survey frequency and weather requirements as the USFWS 2014 survey guidelines for QCB (*e.g.,* weekly surveys, air temperature at least 60ºF on clear days and 70ºF on cloudy days, winds below 15 mph).

Surveys were conducted during the HCB flight season, which spans from the third full week of May and with the last survey being during the first full week of July. A total of eight surveys for HCB were conducted by ICF biologists Brian Lohstroh (QCB permit #TE-063608-6), and James Hickman (QCB permit #TE-60218B-0) (Table 1). An additional eighth survey was conducted at the site with approval of the project proponent due to an observed extension of suitable phenological conditions and the relatively late emergence of HCB at reference sites (G. Huffman, personal communication).

HCB surveys were conducted on foot with the aid of close-focus binoculars. A list of plant species flowering within the survey area during the surveys (*i.e.,* potential nectar sources) is provided in Appendix A. Butterfly identification and nomenclature is based on Shiraiwa (2009). Vegetation communities are mapped based on Holland (1986) and Oberbauer (2008), and plant nomenclature is based on Baldwin et al. (2012).

Table 1. Survey Dates and Conditions

Date	Time Onsite		Temp (ºF)	Sky Cover (%)	Wind (MPH)	Personnel
24-May-2019	Start	1200	66	0	1-5	B. Lohstroh
	End	1430	71	0	2-6	
29-May-2019	Start	1100	70	10	1-5	B. Lohstroh
	End	1335	77	10	2-6	
5-Jun-2019	Start	1145	77	0	1-3	B. Lohstroh
	End	1445	82	0	2-5	
12-Jun-2019	Start	1220	86	0	2-6	B. Lohstroh
	End	1530	90	0	2-7	
18-Jun-2019	Start	0900	65	30	0-3	J. Hickman
	End	1230	74	30	0-3	
24-Jun-2019	Start	1030	73	0	0-2	B. Lohstroh
	End	1400	80	0	1-4	
3-Jul-2019	Start	1220	81	10	3-5	B. Lohstroh
	End	1445	81	10	2-6	
10-Jul-2019	Start	1000	72	0	1-4	B. Lohstroh
	End	1300	82	0	2-6	

Chapter 3
Results

No HCB were detected within the project site boundary during the surveys in 2019. Spiny redberry, the larval host plant of HCB is distributed in several discrete patches throughout the scrub habitat the project site (Figure 3), and many of these redberry patches were also in close proximity to patches of California buckwheat.

A total of 21 butterfly species were observed during the surveys, with checkered white (*Pontia protodice*), San Bernardino Blue (*Euphilotes bernardino bernardino*) Behr's Metalmark (*Apodemia mormo virgulti*), Marine Blue (*Leptotes marina*), and Orange Sulphur (*Colias eurytheme*) being among the most common during the HCB flight period (Table 2).

Suitable habitat for HCB is dependent on the locations of its host plant and generally occurs in the northern portion of the site, with a relatively smaller area of suitable habitat in the southwestern corner. The suitable habitat within the study area consists primarily of dense Diegan coastal sage scrub (CSS) and areas of coastal sage-chaparral transition (Figure 3). The CSS onsite is dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and white sage (*Salvia apiana*), with occasional and sugar bush (*Rhus ovata*), spiny redberry (*Rhamnus crocea*) and poison oak (*Toxicodendron diversilobum*). The coastal sage-chaparral transition habitat is dominated by chamise (*Adenostema fasciculatum*), broom baccharis (*Baccharis sarothroides*) California buckwheat, California sagebrush, spiny redberry and white sage. The understory throughout these habitat types is dominated by tocalote (*Centaurea melitensis*), short-pod mustard (*Hirschfeldia incana*), bromes (*Bromus* spp.), and navarretia (*Navarretia hamata* ssp*. hamata, N. h.* ssp*. leptantha*).

54 plants were observed in flower, including the HCB's primary nectar plant, California buckwheat, as well as other potential nectar sources such as chamise, golden yarrow (*Eriophyllum confertiflorum*), and short-pod mustard (*Hirshfeldia incana*). (Appendix A).

Site photographs are provided in Appendix B.

Table 2. Butterflies Observed by Week

Common Name	*Scientific Name*	Survey Date								No. Surveys Observed	Max No. Observed
		24-May-2019	29-May-2019	5-Jun-2019	12-Jun-2019	18-Jun-2019	24-Jun-2019	3-Jul-2019	10-Jul-2019		
FAMILY PIERIDAE: Whites and Sulphurs											
Subfamily Pierinae: Whites											
Checkered White	*Pontia protodice*	7	13	13	21	15	27	43	56	8	56
Subfamily Anthocharinae: Marbles & Orangetips											
Pacific Sara Orangetip	*Anthocharis sara sara*	1								1	1
Subfamily Coliadinae: Sulphurs											
Orange Sulphur	*Colias eurytheme*	1	3	4	4	2	3	10	10	8	10
Dainty Sulphur	*Nathalis iole*	3		1	2		2	1	1	6	3
FAMILY LYCAENIDAE: Gossamer-wing											
Subfamily Theclinae: Hairstreaks											
Brown Elfin	*Callophrys augustinus*	3								1	3
Subfamily Polyommatinae: Blues											
Western Pygmy-Blue	*Brephidium exila*				1					1	1
Marine Blue	*Leptotes marina*	3		11	16	5	15		15	6	16
Edward's Blue	*Hemiargus ceraunus gyas*				1					1	1
San Bernardino Blue	*Euphilotes bernardino bernardino*	2	1	1	26		23	27	2	7	27
Acmon Blue	*Plebejus acmon*		5	3	1	3	11	11	2	7	11
Clemence's Blue	*Plebejus lupini monticola*						1		2	2	2
FAMILY RIODINIDAE: Metalmarks											
Behr's Metalmark	*Apodemia mormo virgulti*	4	12	23	23	18	5	8	4	8	23
FAMILY NYMPHALIDAE: Brushfoots											
Subfamily Argynninae: Argynnis											
Variegated Fritillary	*Euptoieta claudia*		1							1	1
Subfamily Nymphalinae: True Brushfoots											
Mourning Cloak	*Nymphalis antiopa*		2							1	2
Painted Lady	*Vanessa cardui*	1	3						1	3	3
West Coast Lady	*Vanessa annabella*						1			1	1
Gray Buckeye	*Junonia coenia grisea*	4	5	1		1	1	2	1	7	5
Subfamily Danainae: Milkweed Butterflies											
Monarch	*Danaus plexippus*			1						1	1
FAMILY HESPERIIDAE: The Skippers											
Subfamily Pyrginae: Spread-wing Skippers											
Funereal Duskywing	*Erynnis funeralis*	1				2	5	5	5	5	5
White Checkered-Skipper	*Pyrgus albescens*		1							1	1
Fiery Skipper	*Hylephila phyleus muertovalle*							1		1	1
Number of Species Observed Per Survey		11	10	9	9	7	11	9	11	Total Number of Species	
Total Number of Butterflies Observed Per Survey		30	46	58	95	46	94	108	99	Observed:	21

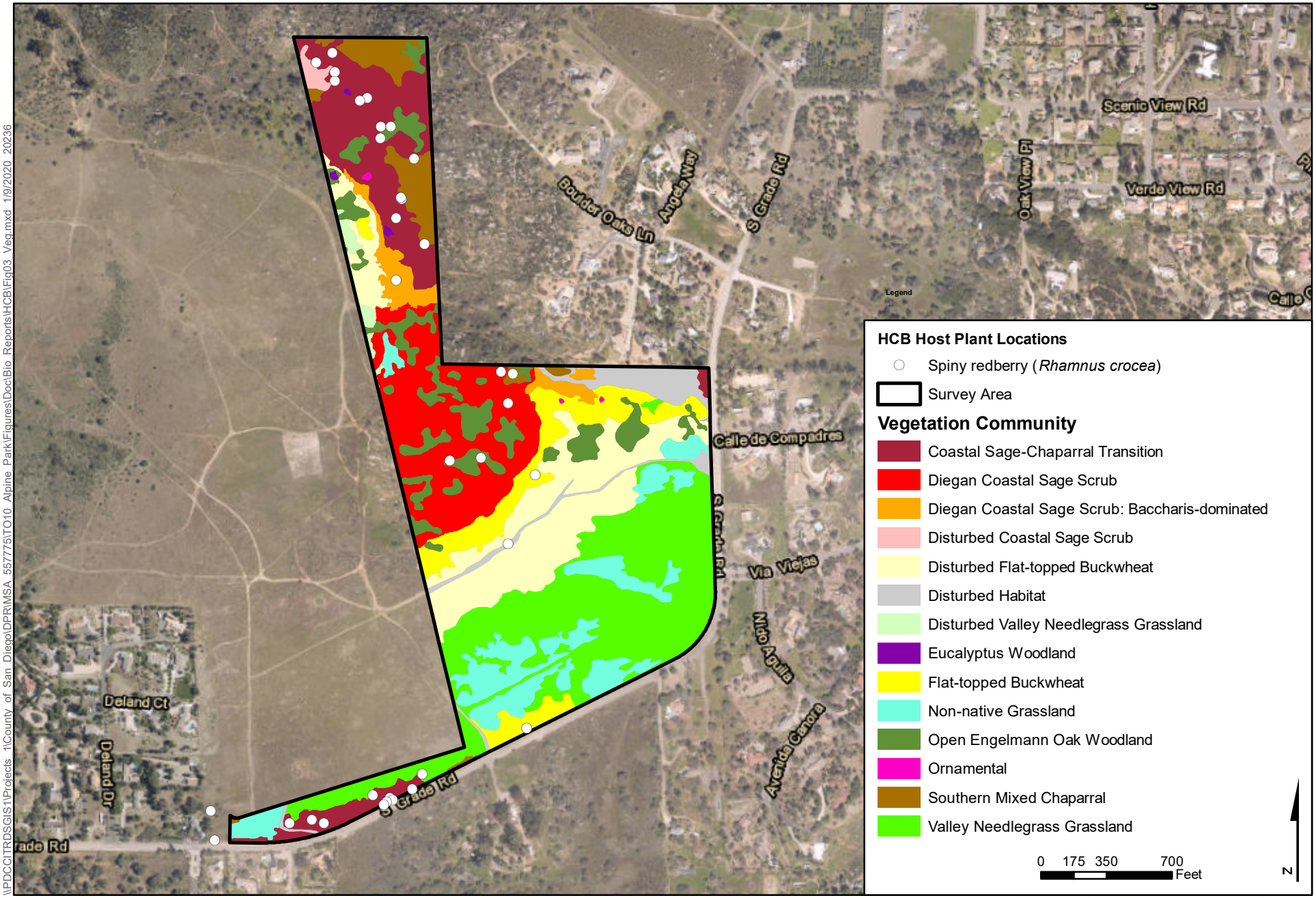

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Figure 3
Vegetation Communities
Alpine Park

Chapter 4
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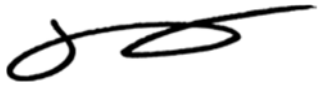
Chapter 5
Certifications

We certify that the information in this survey report and attached exhibits fully and accurately represents my work.



Brian Lohstroh
USFWS Permit No. TE-063608-6



James Hickman
USFWS Permit No. TE-60218B-0

Appendix A
Plant Species in Flower During HCB Surveys

Family	*Scientific Name*	Common Name	CRPR
Dicots			
Adoxaceae			
	Sambucus nigra subsp. caerulea	Blue Elderberry	
Anacardiaceae			
	Malosma laurina	Laurel Sumac	
Asteraceae			
	Bahiopsis laciniata	San Diego Sunflower	4.2
	Centaurea melitensis	Tocalote	
	Cirsium vulgare	Bull Thistle	
	Deinandra fasciculata	Fascicled Tarweed	
	Erigeron foliosus var. foliosus	Leafy Daisy	
	Eriophyllum confertiflorum var. confertiflorum	Long-Stem Golden-Yarrow	
	Grindelia camporum	Gumplant	
	Hedypnois cretica	Crete Hedypnois	
	Helianthus annuus	Western Sunflower	
	Osmadenia tenella	Osmadenia	
	Stephanomeria exigua subsp. exigua	Small Wreath-Plant	
Boraginaceae			
	Cryptantha intermedia var. intermedia	Nievitas Cryptantha	
Brassicaceae			
	Hirschfeldia incana	Short-Pod Mustard	
Cactaceae			
	Opuntia littoralis	Coast Prickly-Pear	
Convolvulaceae			
	Calystegia macrostegia	Coast Morning-Glory	
Crassulaceae			
	Dudleya pulverulenta	Chalk Dudleya	
Fabaceae			
	Acmispon americanus var. americanus	Spanish-Clover	
	Acmispon glaber var. brevialatus	Short-Wing Deerweed	
	Acmispon micranthus	Grab Lotus	
Gentianaceae			
	Zeltnera venusta	Canchalagua	
	Erodium botrys	Long-Beak Filaree/Storksbill	
	Erodium cicutarium	Red-Stem Filaree/Storksbill	
Hydrophyllaceae			
	Emmenanthe penduliflora var. penduliflora	Whispering Bells	
	Eucrypta chrysanthemifolia var. chrysanthemifolia	Common Eucrypta	
	Phacelia cicutaria var. hispida	Caterpillar Phacelia	
Iridaceae			
	Sisyrinchium bellum	Blue-Eyed-Grass	
Lamiaceae			
	Salvia apiana	White Sage	
	Salvia columbariae	Chia	
	Trichostema lanceolatum	Vinegar Weed	
Liliaceae			
	Calochortus splendens	Splendid Mariposa Lily	
	Calochortus weedii var. weedii	Weed's Mariposa Lily	
Myrsinaceae			
	Anagallis arvensis	Scarlet Pimpernel	
Onagraceae			
	Camissoniopsis hirtella	Field Sun Cup	
	Clarkia delicata	Delicate Clarkia	1B.2
	Clarkia purpurea subsp. quadrivulnera	Four-Spot Clarkia	
Phrymaceae			
	Diplacus longiflorus	Bush Monkey Flower	
Plantaginaceae			
	Antirrhinum nuttallianum subsp. nuttallianum	Nuttall's Snapdragon	
	Nuttallanthus texanus	Large Blue Toadflax	
Polemoniaceae			
	Eriastrum sapphirinum subsp. sapphirinum	Sapphire Woolly-Star	
	Navarretia hamata subsp. hamata	Hooked Skunkweed	
	Navarretia hamata subsp. leptantha	Hooked Pincushion Plant	
Polygonaceae			
	Chorizanthe fimbriata var. fimbriata	Fringed Spineflower	
	Chorizanthe procumbens	Prostrate Spineflower	
	Eriogonum fasciculatum var. foliolosum	Inland California Buckwheat	
Ranunculaceae			
	Delphinium parryi subsp. parryi	Parry's Larkspur	
Rosaceae			
	Adenostoma fasciculatum var. fasciculatum	Chamise	
	Drymocallis glandulosa var. glandulosa	Sticky Cinquefoil	
	Heteromeles arbutifolia	Toyon, Christmas Berry	
Scrophulariaceae			
	Scrophularia californica	California Bee Plant/Figwort	
Verbenaceae			
	Verbena lasiostachys var. lasiostachys	Western Vervain	
Monocots			
Agavaceae			
	Chlorogalum parviflorum	Small-Flower Soap-Plant/Amole	
Themidaceae			
	Brodiaea terrestris subsp. kernensis	Dwarf Brodiaea	

CRPR: California Rare Plant Rank

Appendix B
Representative Photographs



Photo 1: View facing west from the central portion of the site with coastal sage scrub and Engelmann oaks in the foreground and grassland in the background.



Photo 2: View facing southwest across the site near the edge of the grassland, with buckwheat at right and fascicled tarplant in the foreground and at left.



Photo 3. View facing east from along the southern edge of the site. A spiny redberry is visible at left, with coastal sage-chaparral transition habitat visible.



Photo 4. View facing north from the southern edge of the site. A patch of several spiny redberry individuals is visible in the background at left.

RESULTS OF THE 2020 HERMES COPPER BUTTERFLY SURVEYS FOR THE ALPINE PARK PROJECT AND WRIGHT'S FIELD

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August 2020

ICF. 2020. 2020 Hermes Copper Butterfly Surveys for the Alpine Park Project and Wright's Field. Prepared for the County of San Diego, Department of Parks and Recreation. San Diego, CA. August.

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Chapter 1
Introduction

ICF was retained by the County of San Diego Department of Parks and Recreation to conduct protocol surveys for the federally-proposed threatened Hermes copper butterfly (*Lycaena hermes*; HCB) in support of the Alpine Park project. As requested by the U.S. Fish and Wildlife Service (USFWS) and described in this report, surveys were conducted on the Alpine Park property as well as on Wright's Field preserve in 2020. These surveys represent a follow-up to the HCB surveys conducted in 2019 on just the Alpine Park property (ICF 2019) where no HCB was observed.

As of the start date of these surveys, HCB does not have a federal survey protocol. Therefore, these HCB surveys followed a modified version of the County of San Diego Survey Guidelines to Hermes Copper (2010) combined with relevant portions of the USFWS Quino Checkerspot Butterfly (*Euphydryas editha quino*, QCB) Survey Guidelines (2014).

The study area, which consists of the Alpine Park property, and Wright's Field preserve in 2020, is located in the southern portion of the community of Alpine, in San Diego County, CA (Figure 1). The study area can be found on the *Alpine* USGS 7.5-minute quadrangle map (Figure 2) and ranges in elevation from approximately 1800 feet above mean sea level at the northwestern corner of Wright's Field to approximately 2100 feet at the northeastern corner of the Alpine Park property.

Situated within the range of the species, historic HCB observations have been documented within the 324.7-acre combined study area and nearly the entire study area is proposed as critical habitat (CNDDB 2020, Deutschman *et. al.* 2011, USFWS 2020, Figure 3). A large portion of the northern and eastern regions of study area consists of a mix of dense Diegan coastal sage scrub (CSS), open Engelmann oak woodland and mixed chaparral that supports numerous individuals of the HCB larval host plant, spiny redberry (*Rhamnus crocea*) (Figure 3). The central portion of the study area primarily consists of a large patchwork of native and non-native grassland and this area generally lacked HCB host plant. Spiny redberry is also abundant within the CSS, Engelmann oak woodland and mixed chaparral found on the southern portion of Wright's Field south of South Grade Road.

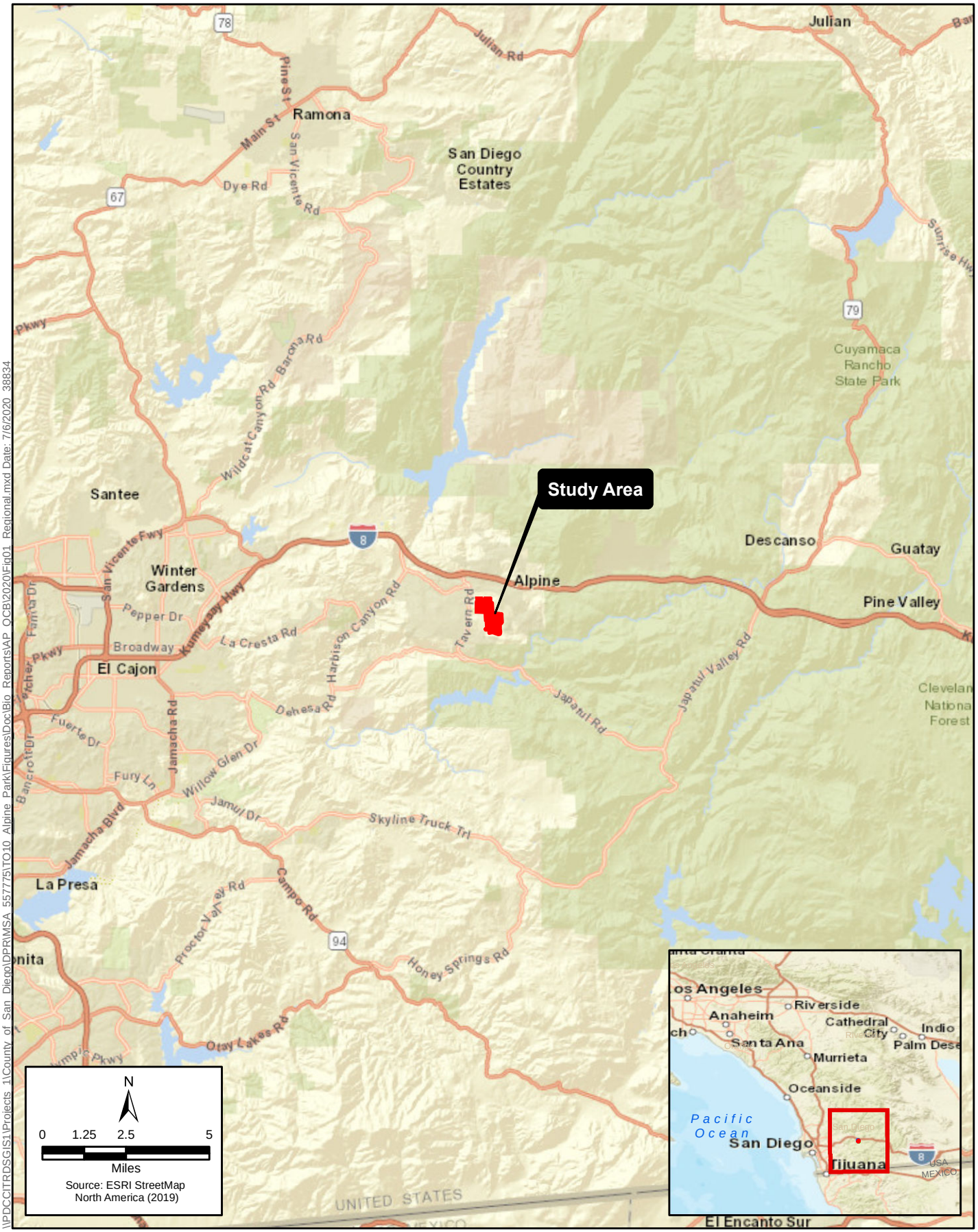

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Figure 1
Regional Location
Alpine Park and Wright's Field HCB Survey Report

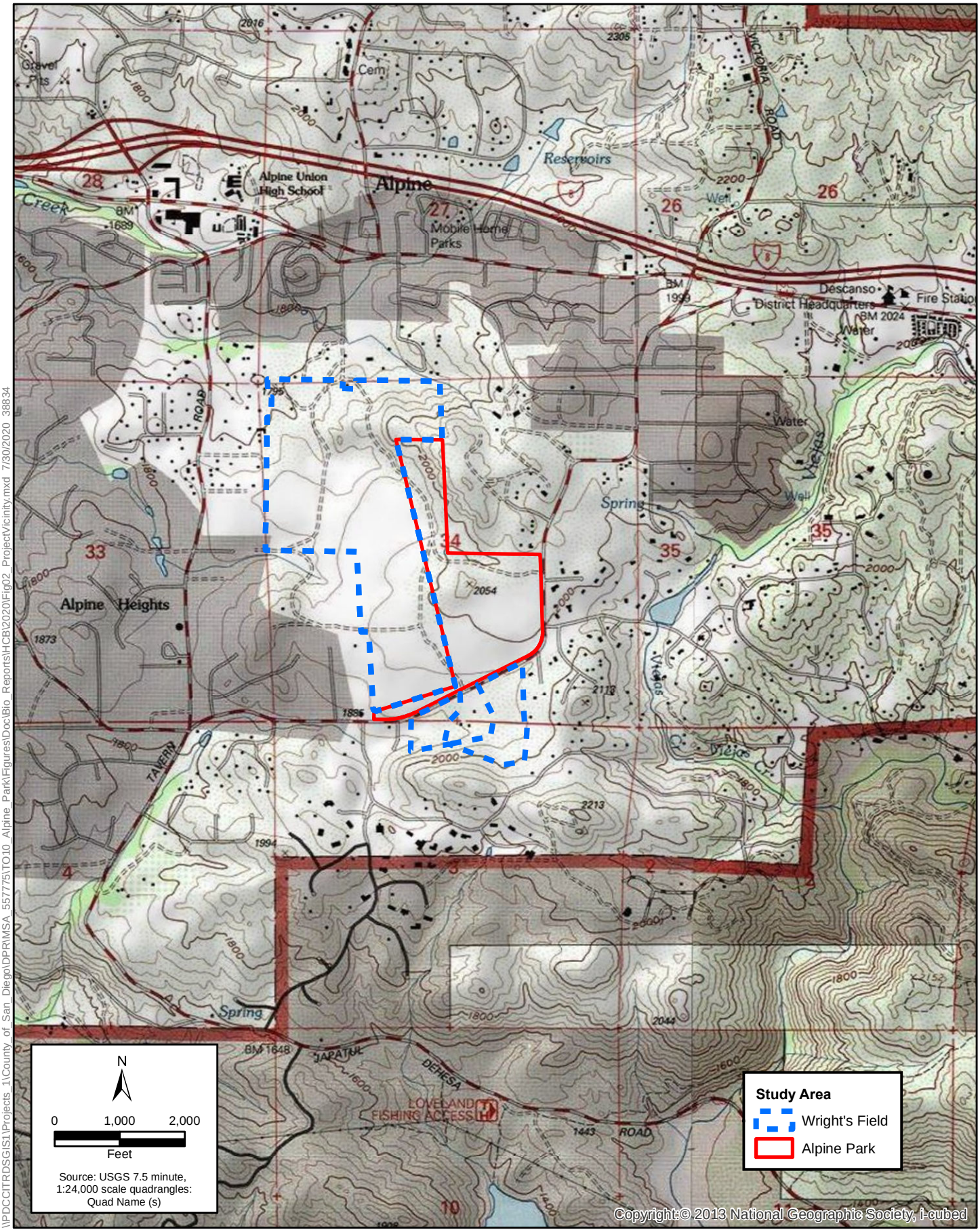

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Figure 2
Project Vicinity
Alpine Park and Wright's Field HCB Survey Report

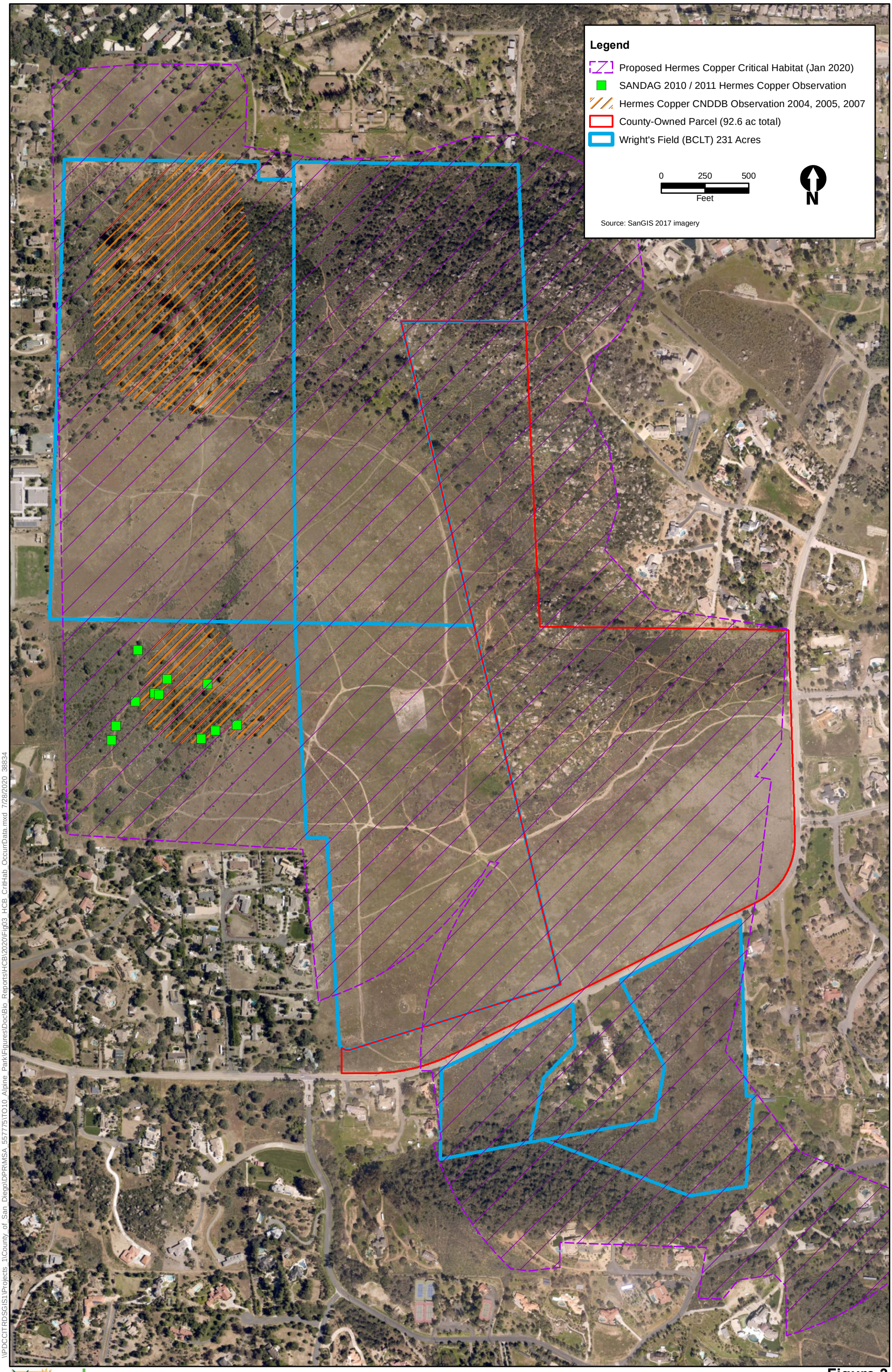

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Figure 3
Hermes Copper Proposed Critical Habitat and Known Occurrence Data
Alpine Park and Wright's Field HCB Survey Report

Chapter 2
Methods

Based on recent updates to the biology of the species and consensus of HCB surveyors, focused surveys for HCB followed a modified version of the guidelines prepared by the County of San Diego for evaluating the potential impacts within their jurisdiction (2010), combined with relevant portions of the USFWS Quino Checkerspot Butterfly Survey Guidelines (2014). The County guidelines indicate that surveys for HCB need only be conducted in areas where their larval host plant, spiny redberry (*Rhamnus crocea*), occurs in close proximity (within 15 feet) to California buckwheat (*Eriogonum fasciculatum*), their primary nectar plant (*i.e.,* suitable habitat). It should be noted that HCB has been observed using various other species as a nectar source (Klein & Faulkner 2012), therefore, suitable habitat for HCB has been modified to include areas where the HCB's host plant occurs, regardless of whether it is found in proximity to California buckwheat.

The HCB surveys were conducted by Quino Checkerspot Butterfly (QCB)-permitted biologists because of their familiarity with the QCB survey protocol, as well as the local butterfly species. The HCB surveys followed the same survey frequency and weather requirements as the USFWS 2014 survey guidelines for QCB (*e.g.,* weekly surveys, air temperature at least 60ºF on clear days and 70ºF on cloudy days, winds below 15 mph).

Surveys were conducted during the HCB flight season, which spans from the third full week of May and with the last survey being during the first full week of July. A total of eight surveys for HCB were conducted over the course of eleven visits by ICF biologists Brian Lohstroh (QCB permit #TE-063608-6), and Antonette Guteirrez (QCB permit #TE-50992B-1) (Table 1). Each survey took two person/days to complete.

HCB surveys were conducted on foot with the aid of close-focus binoculars. A list of plant species flowering within the survey area during the surveys (*i.e.,* potential nectar sources) is provided in Appendix A. Butterfly identification and nomenclature is based on Shiraiwa (2009) and plant nomenclature is based on Baldwin *et al.* (2012).

An HCB reference population near Descanso (approximately eight miles to the east of the study area) was visited by the surveyors during the peak flight period in early June. This reference population visit provided the surveyors with an opportunity to observe HCB behavior and develop a good search image for detecting the species. Numerous HCB individuals were observed during this reference site visit.

Table 1. Survey Conditions

Survey No.	Date	Time Onsite		Temp (ºF)	Sky Cover (%)	Wind (MPH)	Personnel
1A	20-May-2020	Start	0900	61	0	2-4	B. Lohstroh
		End	1515	75	0	2-7	
1B	21-May-2020	Start	0900	66	0	0-3	B. Lohstroh
		End	1715	77	0	3-10	
2A	26-May-2020	Start	0930	77	0	0-3	B. Lohstroh
		End	1600	91	0	2-11	
2B	28-May-2020	Start	0830	71	0	0-2	B. Lohstroh,
		End	1600	85	0	0-3	A. Gutierrez
3	3-Jun-2020	Start	0800	72	0	0-3	B. Lohstroh,
		End	1545	91	0	3-13	A. Gutierrez
4	8-Jun-2020	Start	0800	67	0	0-1	B. Lohstroh,
		End	1645	88	0	2-10	A. Gutierrez
5	17-Jun-2020	Start	0900	61	50	0-4	B. Lohstroh,
		End	1615	82	0	2-7	A. Gutierrez
6	22-Jun-2020	Start	0830	66	0	0-2	B. Lohstroh,
		End	1500	88	0	3-9	A. Gutierrez
7A	30-Jun-2020	Start	0945	70	0	1-7	B. Lohstroh
		End	1545	81	0	3-10	
7B	2-Jul-2020	Start	0800	63	10	0-1	A. Gutierrez
		End	1500	82	0	2-3	
8	6-Jul-2020	Start	0730	70	0	0-2	B. Lohstroh,
		End	1430	96	0	3-11	A. Gutierrez

Chapter 3
Results

No HCB were detected within the project site boundary during the surveys in 2020. Spiny redberry, the larval host plant of HCB, is distributed throughout the scrub, chaparral and oak woodland habitat (Figure 3), and many of these redberry patches were also in close proximity to patches of California buckwheat, a primary HCB nectar source.

A total of 35 butterfly species were observed during the surveys, with checkered white (*Pontia protodice*), San Bernardino blue (*Euphilotes bernardino bernardino*), Acmon blue (*Plebejus acmon*), Behr's metalmark (*Apodemia mormo virgulti*), gray buckeye (*Junonia coenia grisea*), and funereal duskywing (*Erynnis funeralis*) being among the most common during the HCB flight period (Table 2).

Suitable habitat for HCB is dependent on the locations of its host plant and generally occurs in the northern and southern regions of the study area. The suitable habitat within the study area consists primarily of CSS, chaparral and Engelmann oak woodland (Figure 3). The CSS onsite is dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and white sage (*Salvia apiana*), with occasional sugar bush (*Rhus ovata*), spiny redberry (*Rhamnus crocea*) and poison oak (*Toxicodendron diversilobum*). The chaparral habitat is dominated by chamise (*Adenostema fasciculatum*), Mission manzanita (*Xylococcus bicolor*), toyon (*Heteromeles arbutifolia*), California buckwheat, spiny redberry and white sage. The Engelmann oak woodland is dominated by Engelmann oaks (*Quercus engelmannii*), California buckwheat, spiny redberry, poison oak and white sage. The understory throughout these habitat types is dominated by tocalote (*Centaurea melitensis*), short-pod mustard (*Hirschfeldia incana*), bromes (*Bromus* spp.), and navarretia (*Navarretia hamata* ssp. *hamata*, *N. h.* ssp. *leptantha*).

74 plant species were observed in flower, including California buckwheat, as well as other potential nectar sources such as chamise, golden yarrow (*Eriophyllum confertiflorum*), and short-pod mustard (*Hirshfeldia incana*). (Appendix A).

Site photographs are provided in Appendix B.

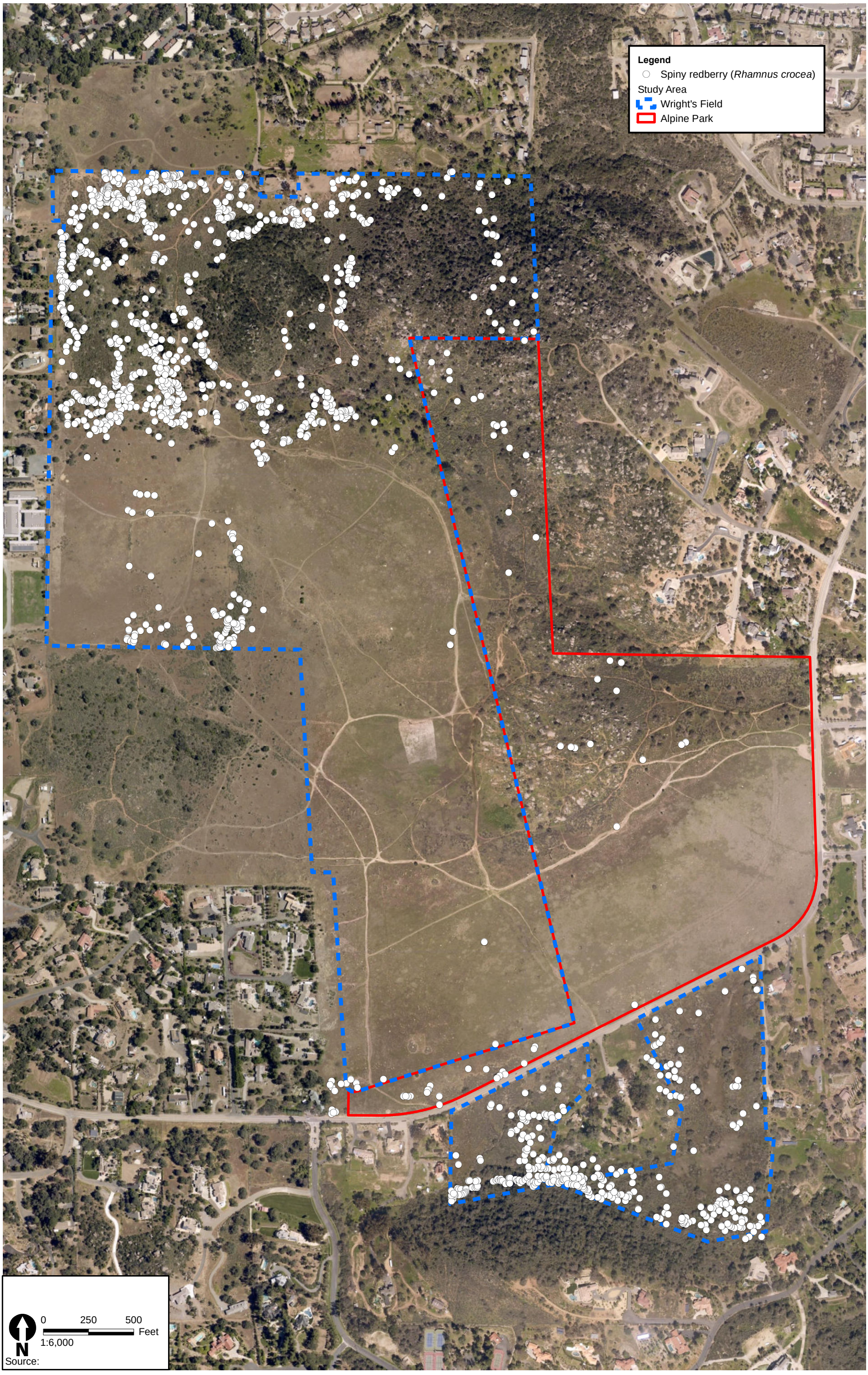

Figure 4
HCB Survey Results
Alpine Park and Wright's Field HCB Survey Report

Table 2. Butterflies Observed by Survey Date

Common name	*Scientific name*	Survey Date											No. Surveys Observed	Max No. Observed
		20-May-2020	21-May-2020	26-May-2020	28-May-2020	3-Jun-2020	8-Jun-2020	17-Jun-2020	22-Jun-2020	30-Jun-2020	2-Jul-2020	6-Jul-2020		
FAMILY PAPILIONIDAE: Swallowtails														
Subfamily Papilioninae: True Swallowtails														
Western Tiger Swallowtail	*Papilio rutulus*		2		1	2							3	2
Pale Swallowtail	*Papilio eurymedon*	1	2			3			2				4	3
FAMILY PIERIDAE: Whites and Sulphurs														
Subfamily Pierinae: Whites														
Spring White	*Pontia sisymbrii sisymbrii*					2							1	2
Checkered White	*Pontia protodice*	3	8	8	17	46	14	8	27	18	5	26	11	46
Cabbage White	*Pieris rapae rapae*				2	8	5	7	6		2	7	7	8
Unidentified White					7	5	5						3	7
Subfamily Coliadinae: Sulphurs														
Orange Sulphur	*Colias eurytheme*	2	2	3	4	3		7	8		1	6	9	8
Harford's Sulphur	*Colias harfordii*					1	1	1	3	3	1		6	3
California Dogface	*Zerene eurydice*						1		1			2	3	2
Southwestern Cloudless Sulphur	*Phoebus sennae marcellina*					4			4		1		3	4
Dainty Sulphur	*Nathalis iole*				1		1	1					3	1
Unidentified Sulphur					4	5	4						3	5
FAMILY LYCAENIDAE: Gossamer-wing														
Subfamily Theclinae: Hairstreaks														
Nut Brown Hairstreak	*Satyrium auretorum spadix*			2			3	1					3	3
Gray Hairstreak	*Strymon melinus pudica*					2		2			2	1	4	2
Bronzed Hedgerow Hairstreak	*Satyrium saepium chalcis*								1				1	1
Subfamily Polyommatinae: Blues														
Marine Blue	*Leptotes marina*						5		3		2	4	4	5
Edward's Blue	*Hemiargus ceraunus gyas*							3	4			8	3	8
Western Tailed-Blue	*Cupido amyntula amyntula*					1		1					2	1
San Bernardino Blue	*Euphilotes bernardino bernardino*	4	8	14	12	71	22	64	80	6	26	33	11	80
Acmon Blue	*Plebejus acmon*				25	16	17	28	39	33	4	30	8	39
Clemence's Blue	*Plebejus lupini monticola*		18	21	18	3		2					5	21
Unidentified Blue							10					12	2	12
FAMILY RIODINIDAE: Metalmarks														
Behr's Metalmark	*Apodemia virgulti virgulti*	15	14	17	14	53	46	30	25	16	5	5	11	53
FAMILY NYMPHALIDAE: Brushfoots														
Subfamily Melitaeinae: Crescents and Checkerspots														
California Patch	*Chlosyne californica*					1							1	1
Gabb's Checkerspot	*Chlosyne gabbii gabbii*					3	1						2	3
Subfamily Nymphalinae: True Brushfoots														
Mourning Cloak	*Nymphalis antiopa antiopa*	2	1			4					1	1	5	4
American Lady	*Vanessa virginiensis*									2	8		2	8
Painted Lady	*Vanessa cardui*	2	3	3	4		3	4	2				7	4
West Coast Lady	*Vanessa annabella*		1										1	1
Unidentified Lady	*Vanessa sp.*				6								1	6
Gray Buckeye	*Junonia coenia grisea*	13	14	15	34	38	38	19	25	11	15	18	11	38
Subfamily Limenitidinae: Admirals and Relatives														
Powell's Admiral	*Limenitis lorquini powelli*									1		1	2	1
California Sister	*Adelpha californica*				1	1		1					3	1
Subfamily Satyrinae: Satyrs														
California Ringlet	*Coenonympha tullia california*				3	3							2	3
Subfamily Danainae: Milkweed Butterflies														
Monarch	*Danaus plexippus plexippus*				1						1	1	3	1
FAMILY HESPERIIDAE: The Skippers														
Subfamily Pyrginae: Spread-wing Skippers														
Mournful Duskywing	*Erynnis tristis tristis*				2								1	2
Funereal Duskywing	*Erynnis funeralis*		4	2	9	5	4	3	2	3	2	1	10	9
White Checkered-Skipper	*Pyrgus albescens*						1				1	1	3	1
Subfamily Herperiinae: Grass Skippers														
Fiery Skipper	*Hylephila phyleus phyleus*							2	2				2	2
Number of Species Observed Per Survey*		8	12	9	16	21	15	18	17	9	16	16	Total Number of Species	
Total Number of Butterflies Observed Per Survey		42	77	85	165	280	181	184	234	93	77	157	Observed*:	35

Chapter 4
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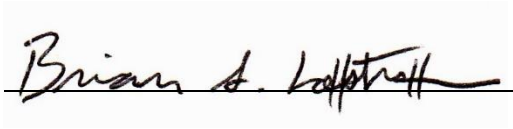
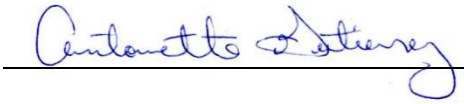
Chapter 5
Certifications

We certify that the information in this survey report and attached exhibits fully and accurately represents our work.



Brian Lohstroh
Permit No. TE-063608-6



Antonette Gutierrez
Permit No. TE-50992B-1

Appendix A
Plants in Flower During 2020 HCB Surveys

Appendix A: Plants in Flower During 2020 HCB Surveys

Family	*Scientific Name*	Common Name	CRPR
Dicots			
Adoxaceae			
	Sambucus nigra ssp. caerulea	Blue Elderberry	
Anacardiaceae			
	Malosma laurina	Laurel Sumac	
	Rhus ovata	Sugar Bush	
	Toxicodendron diversilobum	Poison Oak	
Apiaceae			
	Apiastrum angustifolium	Mock Parsley	
	Daucus pusillus	American wild carrot	
Asteraceae			
	Achillea millefolium	Common Yarrow	
	Acourtia microcephala	Sacapellote	
	Bahiopsis laciniata	San Diego Sunflower	4.2
	*Carduus pycnocephalus**	Italian Thistle	
	*Centaurea melitensis**	Tocalote	
	*Cirsium vulgare**	Bull Thistle	
	Cirsium occidentale	Cobweb Thistle	
	Deinandra fasciculata	Fascicled Tarweed	
	Erigeron foliosus var. foliosus	Leafy Daisy	
	Eriophyllum confertiflorum var. confertifl	Long-Stem Golden-Yarrow	
	Grindelia camporum	Gumplant	
	Gutierrezia californica	Match Weed	
	*Hedypnois cretica**	Crete Hedypnois	
	Helianthus annuus	Western Sunflower	
	*Hypochaeris glabra**	Smooth Cats Ear	
	Isocoma menziesii var. decumbens	Decumbent goldenbush	
	Osmadenia tenella	Osmadenia	
	Pseudognaphalium californicum	Ladies Tobacco	
	*Sonchus oleraceus**	Sow Thistle	
	Stephanomeria exigua ssp. exigua	Small Wreath-Plant	
	Wyethia ovata	Southern Mule Ears	
Brassicaceae			
	*Hirschfeldia incana**	Short-Pod Mustard	
Cactaceae			
	Opuntia littoralis	Coast Prickly-Pear	
Caprifoliaceae			
	Lonicera subspicata	Southern honeysuckle	
Cistaceae			
	Crocanthemum scoparium	Peak Rush-rose	
Convolvulaceae			
	Calystegia macrostegia	Coast Morning-Glory	
Crassulaceae			
	Dudleya pulverulenta	Chalk Dudleya	
Euphorbiaceae			
	Crotonus setiger	Turkey-mullein	
Fabaceae			
	Acmispon americanus var. americanus	Spanish-Clover	
	Acmispon glaber var. brevialatus	Short-Wing Deerweed	
	Acmispon micranthus	Grab Lotus	
	Trifolium willdenovii	Tomcat Clover	

Appendix A: Plants in Flower During 2020 HCB Surveys

Family	*Scientific Name*	Common Name	CRPR
Gentianaceae			
	Zeltnera venusta	Charming Centaury	
Geraniaceae			
	*Erodium botrys**	Long-Beak Filaree/Storksbill	
	*Erodium cicutarium **	Red-Stem Filaree/Storksbill	
Hydrophyllaceae			
	Phacelia cicutaria var. hispida	Caterpillar Phacelia	
Iridaceae			
	Sisyrinchium bellum	Blue-Eyed-Grass	
Lamiaceae			
	*Marrubium vulgare**	Horehound	
	Salvia apiana	White Sage	
	Salvia columbariae	Chia	
	Trichostema lanceolatum	Vinegar Weed	
Malvaceae			
	Sidalcea sparsifolia	Southern Checkerbloom	
Montiaceae			
	Calandrinia menziesii	Red Maids	
Myrsinaceae			
	*Lysimachia arvensis**	Scarlet Pimpernel	
Onagraceae			
	Camissoniopsis hirtella	Field Sun Cup	
	Clarkia delicata	Delicate Clarkia	1B.2
	Clarkia purpurea subsp. quadrivulnera	Four-Spot Clarkia	
Orobanchaceae			
	Cordylanthus rigidus	Rigid Bird's Beak	
Phrymaceae			
	Diplacus longiflorus	Bush Monkey Flower	
Plantaginaceae			
	Antirrhinum nuttallianum ssp. nuttallianu	Nuttall's Snapdragon	
Polemoniaceae			
	Eriastrum sapphirinum ssp. sapphirinum	Sapphire Woolly-Star	
	Navarretia atractyloides	Holly-leaf Navarretia	
	Navarretia hamata ssp. hamata	Hooked Skunkweed	
	Navarretia hamata ssp. leptantha	Hooked Pincushion Plant	
Polygonaceae			
	Chorizanthe fimbriata var. fimbriata	Fringed Spineflower	
	Chorizanthe procumbens	Prostrate Spineflower	
	Eriogonum fasciculatum var. foliolosum	Inland California Buckwheat	
Ranunculaceae			
	Delphinium parryi ssp. parryi	Parry's Larkspur	
Rosaceae			
	Adenostoma fasciculatum var. fasciculatu	Chamise	
	Drymocallis glandulosa var. glandulosa	Sticky Cinquefoil	
	Heteromeles arbutifolia	Toyon, Christmas Berry	
Scrophulariaceae			
	Scrophularia californica	California Bee Plant/Figwort	
	Verbascum virgatum	Wand Mullien	
Verbenaceae			
	Verbena lasiostachys var. lasiostachys	Western Vervain	
<u>Monocots</u>			
Agavaceae			
	Chlorogalum parviflorum	Small-Flower Soap-Plant/Amole	
Liliaceae			
	Calochortus splendens	Splendid Mariposa Lily	
	Calochortus weedii var. weedii	Weed's Mariposa Lily	
Themidaceae			
	Brodiaea terrestris ssp. kernensis	Dwarf Brodiaea	

*Non-native; CRPR: California Rare Plant Rank

Appendix B
Representative Photographs



Photo 1: (7/6/2020) View facing North from the central portion of Wright's Field. Spiny red berry and California Buckwheat in bloom is visible in the foreground.



Photo 2: (5/26/2020) View facing south from the northern portion of Wright's Field with a spiny redberry in fruit in the foreground. Fascicled tarplant (yellow) is in the background.



Photo 3: (5/26/2020) A nut-brown hairstreak nectaring on California buckwheat in the northern portion of Wright's Field. Charming centaury is visible in the background (pink).



Photo 4: (6/30/2020) View facing north from the southern Wright's Field Parcels. Oak woodlands are visible in the background with the Alpine Park property visible in the background.

Appendix E

Western Spadefoot Survey Report

WESTERN SPADEFOOT SURVEY REPORT FOR THE ALPINE PARK PROJECT

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May 2022



ICF. 2022. Western Spadefoot Survey Report for the Alpine Park Project. 103622.0.018. May.

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Figure 3 Western Spadefoot Survey Results 4

1.0 Introduction

The County of San Diego Department of Parks and Recreation retained ICF to conduct focused surveys for the western spadefoot (*Spea hammondii*) within an approximately 94-acre parcel located in Alpine, California within the Alpine U.S. Geological Survey 7.5-minute topographic map (Figures 1 and 2) in San Diego County, California.

The surveys were conducted within the County-owned property, with an emphasis on areas with appropriate topography and clay soils to allow for development of ponded areas. Surveys were also conducted within known breeding pools on the Wright's Field Preserve, adjacent to the County-owned parcel, to provide a frame of reference for local western spadefoot breeding activity. The goal of this survey was to determine if the seasonally inundated depressions within the study area represent viable breeding habitat for western spadefoot (Figure 3). In 2019, western spadefoot eggs were observed once in one ponded area (AP-7) along the existing access road within the County's property. This observation was made during protocol surveys conducted for listed large branchiopods (ICF 2019).

No evidence of western spadefoot breeding was observed in 2022 during surveys of seasonally inundated basins within the County-owned parcel. No western spadefoot individuals were observed within the proposed approximately 25-acre Alpine Park Project (proposed project) development footprint, proposed for the eastern portion of the County's parcel. Approximately 48 ponded areas were surveyed within or adjacent to dirt access roads, of which approximately 35 were mapped within the County's parcel and 13 were mapped on Wright's Field. Breeding activities were observed within the core population of western spadefoot on the Wright's Field Preserve, but no successful recruitment was observed. Adult western spadefoots were observed within the Wright's Field Preserve and within the western portion of the County's property, outside of the proposed development footprint.

2.0 Methods

2.1 Hydrology Checks and Basin Surveys

ICF conducted focused surveys within 35 seasonally-inundated basins observed within the study area (Figure 3) in 2022 during January to May, which is during the western spadefoot's typical breeding season (Jennings and Hayes 1994). Prior to surveying the basins, ICF biologist Brian Lohstroh conducted a hydrology check (*i.e.,* verification of basin inundation) and GPS survey of the entire 94-acre County parcel to determine the boundaries of any inundated basins with at least 3 centimeter (cm) of water within 24-hours of a rainfall event. Basins mapped during the previous vernal pool branchiopod surveys in 2018-2019 were also included in the survey, with their boundaries updated and/or modified as needed.

Rainfall events were tracked to ascertain when basins became inundated using National Weather Service forecasts and observations (NWS 2022), along with observations from nearby Weather Underground personal weather stations (WU 2022). On February 23, 2022, sufficient rainfall fell in the Alpine area that many of the seasonally-inundated basins (primarily within road ruts) supported water.

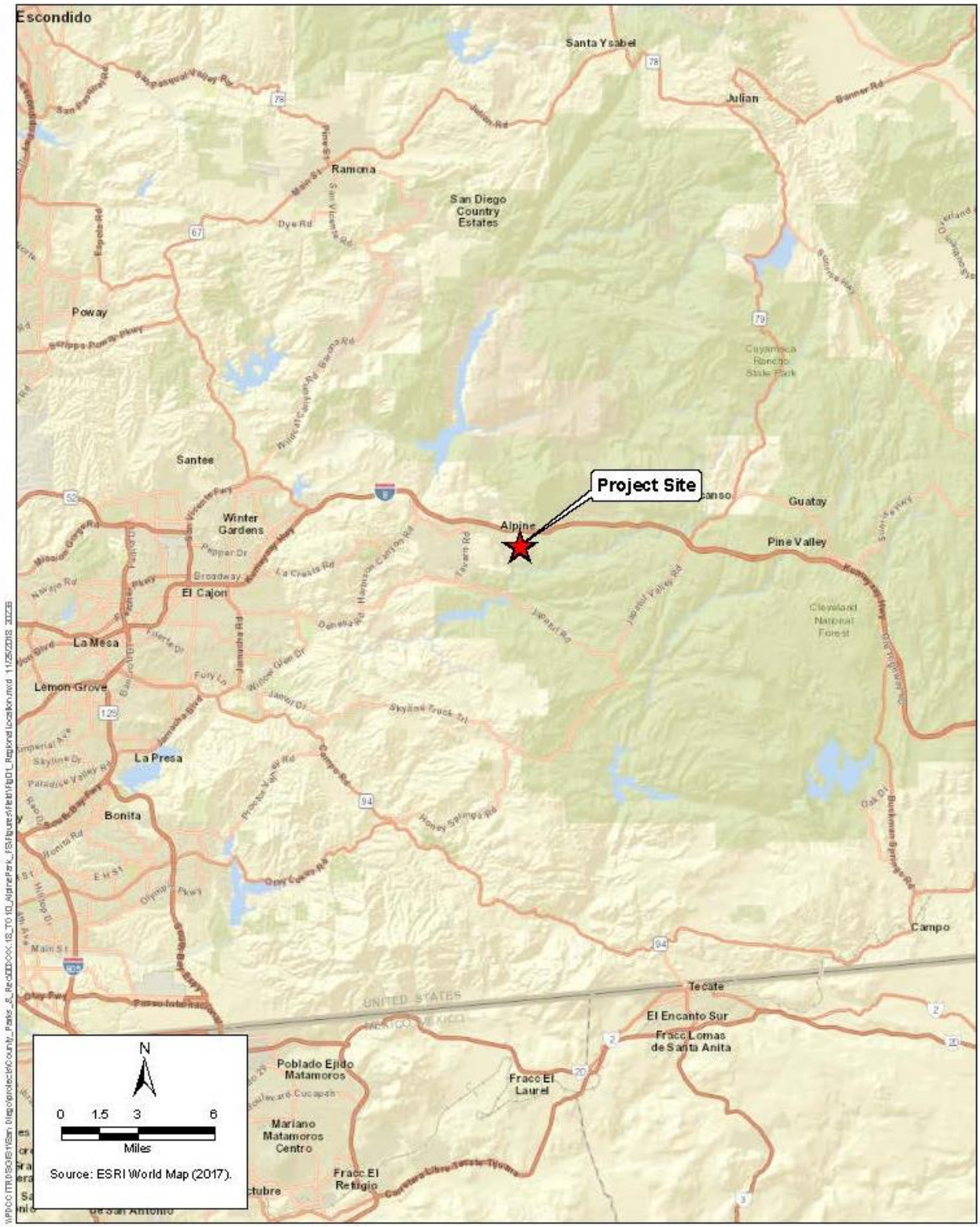

Figure 1
Regional Location
Alpine Park Wet Season Branchiopod Surveys

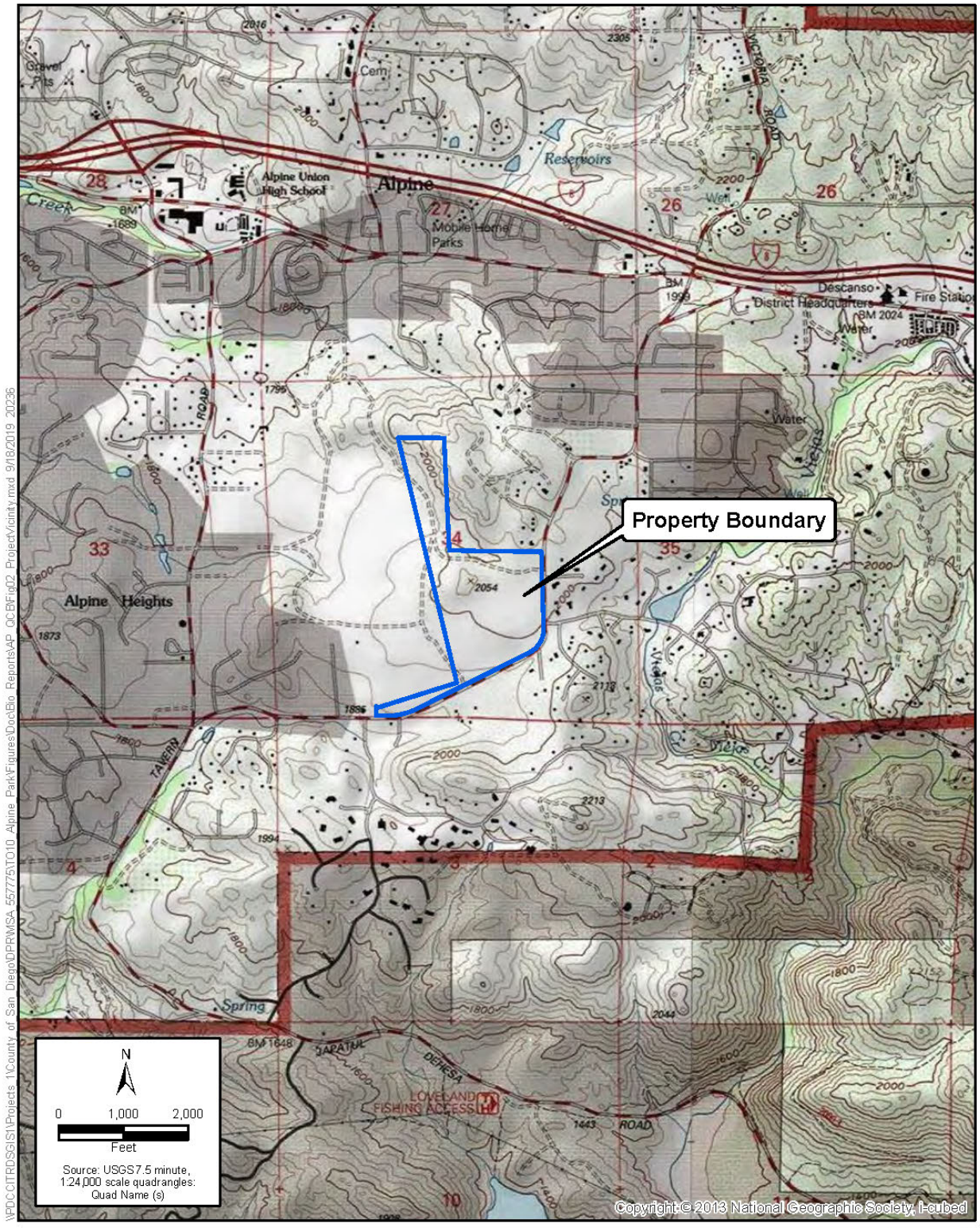

Figure 2
Project Vicinity
Alpine Park Project

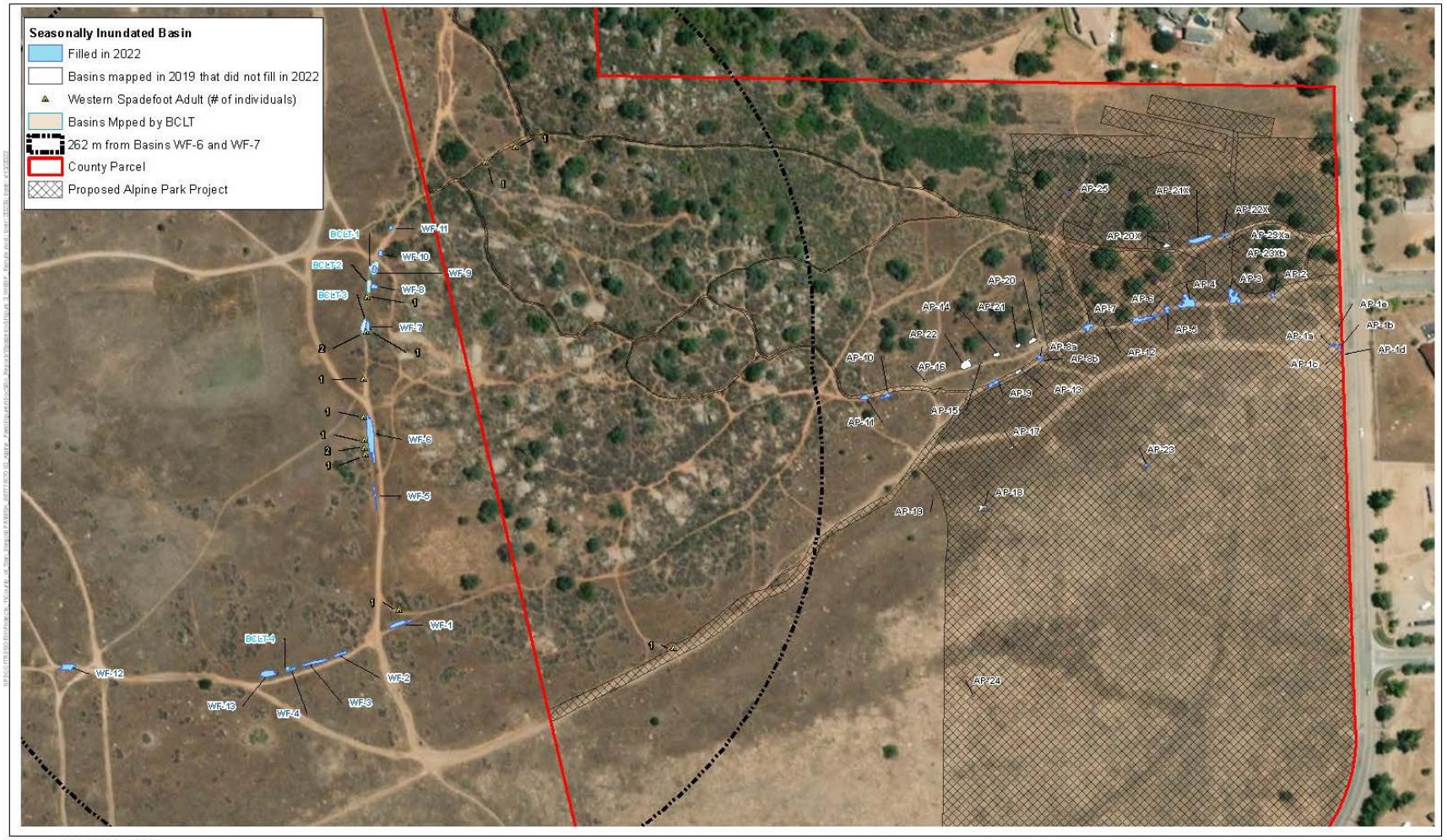

Figure 3
Western Spadefoot Survey Results
Alpine Park Project

Within 24 hours of this rainfall event, on February 24, 2022, the biologist mapped the basin perimeters or confirmed the 2019 mapping of the basins using an Arrow submeter Bluetooth GPS combined with the ArcGIS Field Maps mobile application. Additional data recorded included maximum depth for each inundated basin and representative photographs. The biologist returned to the site on a more or less weekly basis to visually search for egg masses or larvae (*i.e.,* direct evidence of spadefoot breeding) until all the basins became dry. Subsequent hydrology checks were performed when a significant rainfall event occurred (0.3" of rainfall of more), refilling basins, upon which the weekly survey visit schedule was reinitiated. Site visits conducted in 2022 are provided in Table 1, below.

Table 1. Western Spadefoot Sampling Dates and Types

Date	Personnel	Survey Type
1/10/2022	BL	Hydrology check (dry)
2/16/2022	BL	Hydrology check (dry)
2/24/2022	BL	Hydrology check, basin mapping and survey
2/28/22	BL	Hydrology check and basin surveys
3/4/2022	BL	Nocturnal adult survey during rain event
3/10/22	BL	Hydrology check and basin surveys
3/17/2022	BL	Hydrology check and basin surveys
3/21/2022	BL	Hydrology check and basin surveys
3/29/2022	BL	Hydrology check and basin surveys
4/1/22	BL	Hydrology check and basin surveys
4/8/22	BL	Hydrology check and basin surveys
4/14/22	BL	Hydrology check (dry)
4/26/22	BL	Hydrology check (dry)

2.2 Reference Population Surveys

A known breeding population of western spadefoot occurs on the adjacent Wright's Field Preserve. In January 2022, the Back Country Land Trust (BCLT), which manages the Wright's Field Preserve, provided some documented breeding pond location data to the County for this known population. During each of the surveys summarized in Table 1, above, the biologist visually surveyed the Wright's Field Preserve basins for signs of western spadefoot eggs, larvae, or adults.

2.3 Nocturnal Adult Breeding Season Survey

A nocturnal survey focused on detecting foraging and breeding western spadefoot adults was conducted on March 4, 2022 during a rain event. ICF biologist Brian Lohstroh surveyed portions of both the 94-acre County parcel and the adjacent Wright's Field Preserve, focusing on areas in the vicinity of the potential breeding basins and open areas amenable to spadefoot movement and foraging. The survey was conducted between the hours of 1930 to 2245 and the temperature ranged from 50ºF to 48ºF with occasional rain showers. The survey was conducted on foot, using a headlamp to facilitate detection of spadefoot eyeshine. The headlamp was used in a limited manner near known breeding basins on Wright's Field to minimize disturbance to actively breeding or amplexing spadefoot adults.

3.0 Results and Discussion

3.1 Site Conditions and Survey Summary

The study area can be characterized as a gradually sloped grassland with scrub vegetation associated with the slightly higher terrain that exists along the northern portion of the site. There is also a network of hiking trails in the northern portion of the study area, along with some evidence of off-road vehicle activity. Dominant vegetation communities present within the study area include native grassland, non-native grassland and buckwheat scrub. Occasional Engelmann oaks (*Quercus engelmannii*) are also present in the northern portion of the study area.

The basins within the County's parcel are primarily associated with the hiking trails that exist along the northern perimeter of the study area. Two of the basins were located within the native grassland and did not appear to be affected by disturbance. However, they were relatively small basins that were associated with rock outcrops.

No western spadefoot adults, larvae or eggs were observed during surveys of seasonally inundated basins within the County's parcels in 2022. Three adults were observed within the County's parcel but outside of the proposed development footprint during the nocturnal survey on March 4, 2022. All three were on the western side of the County's parcel within approximately 70 to 150 meters of the basins on Wright's Field and over 250 meters away from the closest inundation areas on the County's parcel.

A summary of the survey results by date follows:

- On January 10, 2022, all the basins on the County property were dry.
- On February 16, 2022, all the basins on the County's parcel were dry except for basin AP-1d, a road rut right at the entrance to the parking area off South Grade Road. It was evident that vehicles had recently driven through the basin and do so on a regular basis.
- On February 24, 2022, 18 distinct basins holding greater than 3 cm of water were documented. No evidence of any spadefoot eggs or larvae were observed. The basins onsite were mapped with a submeter GPS, resulting in a total of 35 basins tracked onsite.
- On February 28, 2022, all the basins on the County's parcel were dry except for AP-1b (2 cm max depth), AP-7 (5 cm max depth), and AP-21x (7 cm max depth). No evidence of any spadefoot eggs or larvae were observed.
- On March 4, 2022, three adult western spadefoots were observed foraging onsite during a nocturnal adult survey (See mapped observations on Figure 3). No evidence of active breeding observed onsite. One barred tiger salamander (Ambystoma mavortium) was also observed on the County property. This introduced species is known from the Alpine area and is believed to be associated with the use of their larval stage as fishing bait (SDNHM 2022).
- On March 10, 2022, all the basins on the County's parcel were dry except for AP-1a, AP-1b, AP-1c and AP-7. It is evident that the AP-1 basin complex, located at the eastern edge of the County parcel within an area used for parking, is being driven through on a regular basis. No evidence of any spadefoot eggs or larvae were found.
- On March 17, 2022, all the basins on the County's parcel were dry with no evidence of attempted spadefoot breeding.

- On March 21, 2022, after a quarter-inch of rain fell in Alpine, all the basins on the County's parcel were dry except for AP-1e at the entrance to the parking area off South Grade Rd.
- On March 29, 2022, after approximately one inch of rain fell in Alpine, 21 of the basins on the County parcel re-filled. No evidence of attempted spadefoot breeding was observed.
- On April 1, 2022, six basins were still inundated onsite due to some recent cool, cloudy weather. These included the deeper basins AP-7 and AP-21X, but no evidence of spadefoot breeding was observed.
- On April 8, 2022, all the basins on the County's parcel were dry with no evidence of attempted spadefoot breeding.
- On April 14, 2022 all the basins on the County's parcel were dry with no evidence of attempted spadefoot breeding.
- On April 26, 2022, despite 0.51" of recorded rainfall on 4/22/22, all the basins on the County's parcel were dry with no evidence of attempted spadefoot breeding.

A tracking table showing maximum depths for the inundated basins during the 2022 survey is included as Appendix A. Representative photographs are presented in Appendix B, and rainfall data (WRCC 2022) is presented in Appendix C. It is important to note that 14 of the basins held over from the vernal pool branchiopod surveys in 2018/2019 never filled in 2022. These included AP-12, AP-14 through AP-22, AP-20X, AP-23Xa, AP23Xb and AP-24. Therefore, a total of 21 basins onsite supported inundation for at least 24 hours after a rain event in 2022.

3.2 Reference Population Surveys

Thirteen basins were observed within the Wright's Field Preserve in the vicinity of where the BCLT mentioned western spadefoots had been observed in the past. A summary of observations within this area is as follows:

- On Monday, January 10, 2022, all the basins on Wright's Field were dry, including WF-6.
- On February 16, 2022, all the basins on Wright's Field were dry, including WF-6.
- On February 24, 2022, twelve basins holding greater than 3 cm of water were mapped in the vicinity of known western spadefoot occurrences following a rain event. One amplexing pair of western spadefoots was observed in basin WF-7 (See Appendix B for photo). Warmer daytime temperatures may have been the motivating factor for amplexing to occur during daytime.
- On February 28, 2022 most of the basins on Wright's Field were dry, except the largest basin, WF-6, which held a maximum depth of 6 cm. Spadefoot eggs masses were noted in WF-6, with an estimated count of 24 egg masses. WF-7, where the spadefoot pair was noted amplexing on February 24, was dry.
- On March 4, 2022, during the nocturnal adult survey, eight adult spadefoots were observed in or around the larger basins (WF-6 and WF-7) on Wright's Field during the nocturnal survey on March 4, 2022. Three of these individuals were observed within the water. No obvious breeding behaviors such as calling or amplexing were observed. All twelve of the reference basins were inundated at the time of the survey, with a rain event actively filling them.
- On March 10, 2022 most of the basins on Wright's Field were dry, except for WF-6 and WF-12. Both basins were inundated at the time of the survey. Spadefoot larvae were observed in WF-6,

and were approximately 6 mm in body length, not including the tail. No evidence of spadefoot breeding was observed in WF-12 or any other of the dry basins during this survey.

- On March 17, 2022 all of the basins on Wright's Field were dry except for WF-12, which held less than 1 cm of water within a footprint. The spadefoot larvae observed in WF-6 on March 10 did not survive; desiccated masses of dead larvae were visible within a few low points in basin WF-6.
- On March 21, 2022, after a quarter-inch of rain fell in Alpine, all of the basins on Wright's Field were still dry.
- On March 29, 2022, after approximately one inch of rain fell in Alpine, most of the basins on Wright's Field re-filled. No evidence of attempted spadefoot breeding was observed.
- On April 1, 2022, three basins on Wright's Field were still inundated, with an estimated 45 spadefoot egg masses observed in WF-6. No evidence of breeding was observed in the other basins (WF-1 and WF-12).
- On April 8, 2022, WF-6 and WF-12 were the only basins that were still inundated. WF6 was nearly dry with just 2 cm of water in low lying areas of the basin and these remaining ponded areas teemed with spadefoot larvae. Desiccated spadefoot larvae were observed in some dry portions of the basin.
- On April 14, 2022, WF-6 and WF-12 were dry, despite trace amounts of rainfall 2-3 days prior. Desiccated spadefoot larvae were observed in WF-6, throughout the lowest portions of the basin.
- On April 26, 2022, all basins were dry, despite 0.51" of recorded rainfall on 4/22/22. No recently desiccated egg masses or larvae were observed in any of the reference basins on Wright's Field.

See the tracking table in Appendix A for the maximum depth observed by survey date for each of the Wright's Field basins. Evidence of western spadefoot breeding was only observed in two basins: WF-6 and WF-7. However, no successful western spadefoot recruitment was observed during the 2022 survey period.

4.0 Discussion

Based on the surveys conducted in 2022, it is clear that WF-6 is the primary breeding pool for western spadefoot within the survey area, although successful western spadefoot recruitment was not observed in 2022. Basins within the County's parcel are too shallow and/or do not hold water long enough to support western spadefoot breeding activities during all but the wettest rain years. Western spadefoot larval development is completed in approximately 58 days, but can range from 30 to 79 days, closely tied to duration of inundation (USFWS 2004, Morey 1998). According to the survey visit schedule, the maximum inundation duration for any basin onsite in 2022 was between 15 days and 22 days (Appendix A: AP-7). However, it is likely the duration was much shorter (6 to 8 days) because the basin likely dried up after 2/28/22 and before the rain event on 3/4/22.

The winter of 2018-19 was an exceptionally wet winter for coastal San Diego County (10.41" in February 2019 alone [WRCC 2022]) and during fairy shrimp surveys in 2019, a western spadefoot egg mass was observed in basin AP-7. These eggs were discovered on February 8, 2019, and the basin was inundated through March 29, 2019, a total of seven weeks. It was dry after this date. No

evidence of western spadefoot breeding was observed in any other basins onsite during the surveys. Larvae were never observed in basin AP-7 during weekly checks from February 8 through March 29, 2019. The single attempted breeding within AP-7 during February 2019 was likely opportunistic in nature, and indicative of the exceptionally wet winter. The basins on the County parcel appear to be too small and ephemeral in nature to allow for complete larval development during all but perhaps record rainfall years and more often act as reproductive sinks for the species.

It appears that the County's parcel does provide upland habitat for western spadefoot, but only in the far western portions of the parcel. In Baumberger *et al.* (2019), researchers found that the mean distance of burrows from breeding pools was 40 meters with a range from 1 to 262 meters. The maximum distance spadefoot individuals were found from the pools ranged from 16 to 262 meters, with a mean maximum distance of 69 meters. The researchers also noted that travel distances (but not burrow distances) increased during wetter rain years.

Figure 3 shows a 262-meter buffer from basins WF-6 and WF-7, where breeding activities were documented during the 2022 survey. All adults observed during the nocturnal survey in March 2022 were observed within this 262-meter buffer. As a result, it is unlikely that areas within the proposed Alpine County Park development site support estivating western spadefoot individuals. As mentioned previously, during very high rainfall years, it is possible that small numbers of western spadefoots may travel into areas within the proposed Alpine County Park site to forage and opportunistically attempt to breed, but because this area does not support breeding ponds where successful recruitment has been documented recently, it is not expected that these individuals burrow and/or aestivate anywhere within the proposed development footprint.

5.0 References

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Appendix A
Survey Basin Table

Basin	Max Depth (cm)												
Date>>>	**1/10/22**	**2/16/22**	**2/24/22**	**2/28/22**	**3/4/22****	**3/10/22**	**3/17/22**	**3/21/22**	**3/29/22**	**4/1/22**	**4/8/22**	**4/14/22**	**4/26/22**
AP-1a	dry	dry	7	dry	inundated	6	dry	dry	9	6	dry	dry	dry
AP-1b	dry	dry	11	2	inundated	5	dry	dry	10	6	dry	dry	dry
AP-1c	dry	dry	5	dry	inundated	2	dry	dry	6	dry	dry	dry	dry
AP-1d	dry	dry	4.5	dry	inundated	dry	dry	dry	6	dry	dry	dry	dry
AP-1e	dry	6	7	dry	inundated	dry	dry	6	8	2.5	dry	dry	dry
AP-2	dry	dry	dry	dry	inundated	dry	dry	dry	1	dry	dry	dry	dry
AP-3	dry	dry	8	dry	inundated	dry	dry	dry	6	dry	dry	dry	dry
AP-4	dry	dry	5.5	dry	inundated	dry	dry	dry	4	dry	dry	dry	dry
AP-5	dry	dry	6	dry	inundated	dry	dry	dry	4	dry	dry	dry	dry
AP-6	dry	dry	8	dry	inundated	dry	dry	dry	6	dry	dry	dry	dry
AP-7	dry	dry	13	5	inundated	10	dry	dry	13	12	dry	dry	dry
AP-8a	dry	dry	10	dry	inundated	dry	dry	dry	7	dry	dry	dry	dry
AP-8b	dry	dry	7	dry	inundated	dry	dry	dry	11	dry	dry	dry	dry
AP-9	dry	dry	4	dry	inundated	dry	dry	dry	5	dry	dry	dry	dry
AP-10	dry	dry	dry	dry	inundated	dry	dry	dry	8	dry	dry	dry	dry
AP-11	dry	dry	3	dry	inundated	dry	dry	dry	8	dry	dry	dry	dry
AP-12	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-13	dry	dry	4	dry	inundated	dry	dry	dry	3	dry	dry	dry	dry
AP-14	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-15	dry	dry	dry	dry	dry	dry	dry	dry	3	dry	dry	dry	dry
AP-16	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-17	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-18	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-19	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-20	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-20x	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-21	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-21x	dry	dry	12	7	inundated	dry	dry	dry	16	12	dry	dry	dry
AP-22	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-22x	dry	dry	dry	dry	inundated	dry	dry	dry	4.5	dry	dry	dry	dry
AP-23	dry	dry	4	dry	inundated	dry	dry	dry	dry	dry	dry	dry	dry
AP-23xa	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-23xb	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-24	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
AP-25	dry	dry	12	dry	inundated	dry	dry	dry	13	4	dry	dry	dry
Wright's Field (WF) Reference Basins:													
WF1	dry	dry	11	dry	inundated	1	dry	dry	12	6	dry	dry	dry
WF2	dry	dry	6	dry	inundated	dry	dry	dry	7	dry	dry	dry	dry
WF3	dry	dry	8	dry	inundated	dry	dry	dry	9	dry	dry	dry	dry
WF4	dry	dry	9	dry	inundated	dry	dry	dry	6	dry	dry	dry	dry
WF5	dry	dry	11	dry	inundated	dry	dry	dry	9.5	dry	dry	dry	dry
WF6*	dry	dry	20	9*	inundated*	11*	dry	dry	15	14*	2*	dry	dry
WF7*	dry	dry	7*	dry	inundated	dry	dry	dry	9	dry	dry	dry	dry
WF8	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry	dry
WF9	dry	dry	9	dry	inundated	dry	dry	dry	11	dry	dry	dry	dry
WF10	dry	dry	6	dry	inundated	dry	dry	dry	8	dry	dry	dry	dry
WF11	dry	dry	6	dry	inundated	dry	dry	dry	8	dry	dry	dry	dry
WF12	ND	ND	ND	11	inundated	12	1	dry	22	14	5	dry	dry
WF13	ND	ND	ND	dry	inundated	dry	dry	dry	9.5	dry	dry	dry	dry

**Night survey for adults during active rain event

*Spadefoot breeding

ND: No data/not a part of reference basins

Appendix B
Representative Photographs



Photo 1. (2/24/22) View facing south of basin AP-1e, with basins AP-1a in background (AP1b-d obscured). This basin is a series of ruts that was regularly disturbed by vehicle traffic, transitioning this area to park onsite at right.



Photo 2. (2/24/22) View facing west of basin AP-7 early in the survey period, after filling from a recent rain event. Spadefoot egg masses were observed in this basin in 2019.



Photo 3. (4/1/22) View facing northeast of basin AP-7 late in the survey period, with increased vegetation growth.



Photo 4. (2/24/22) View facing west of basin AP-8a and AP-8b. This is another example of the typical basins onsite, road ruts initially formed by vehicular traffic. These basins were dry four days later on 2/28/22.



Photo 5. (3/29/22) View facing west of basins AP-10 and AP-11 after a recent rain event. These basins were dry three days later on 4/1/22, after another minor rain event.



Photo 6. (3/29/22) View facing west of basin AP-21X, a large basin that captures runoff from the trail and slope at left. This basin was still inundated 3 days later, but there was no evidence of spadefoot breeding observed.



Photo 7. (3/10/22) View facing south of basin WF-6, a large basin on Wright's Field apparently created by a vehicle. Spadefoot breeding was regularly observed within this reference basin, which supported spadefoot larvae when this photo was taken.



Photo 8. (3/17/22) View facing south of basin WF-6 seven days later, when it was no longer inundated. Dead and desiccated spadefoot larvae were visible within the low spots of this basin.



Photo 9. (4/1/22) Western spadefoot egg masses within basin WF-6. This represents a second breeding attempt within this basin during the 2022 wet season.



Photo 10. (2/24/22) An amplexing western spadefoot pair within basin WF-7. This was an unusual diurnal observation of spadefoot breeding early in the season. This basin was dry four days later on 2/28/22.



Photo 11. (3/4/22) Foraging adult western spadefoot observed on the County parcel during on the nocturnal adult survey. This individual was observed in the southwestern portion of the site.



Photo 12. (3/4/22) A second foraging adult western spadefoot observed on the County parcel during the nocturnal adult survey. This individual was observed in the northwestern portion of the site near the breeding ponds on Wright's Field.

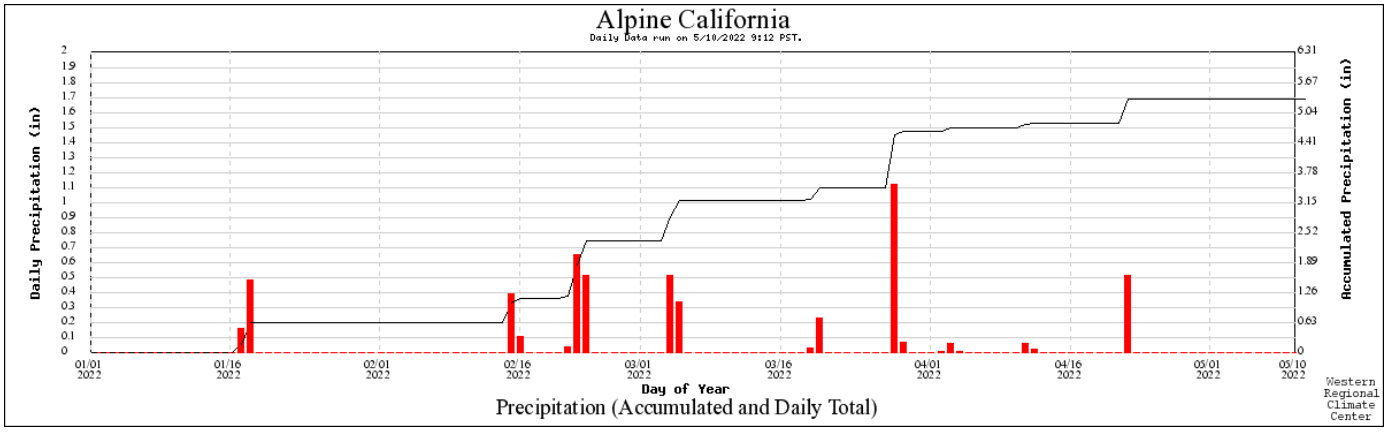


Photo 13. (3/4/22) Introduced barred tiger salamander observed within the County property during the nocturnal survey.



Photo 14. (4/8/22) Western spadefoot larvae within the last remaining ponded areas in WF-6.

Appendix C
2022 Alpine Rainfall Data (Alpine, CA RAWS)



Daily Precipitation Jan 1- May 10, 2022
Alpine, CA RAWS

Date	Year	Day of Year	Precipitation (inches)
1/1/2022	2022	1	0
1/2/2022	2022	2	0
1/3/2022	2022	3	0
1/4/2022	2022	4	0
1/5/2022	2022	5	0
1/6/2022	2022	6	0
1/7/2022	2022	7	0
1/8/2022	2022	8	0
1/9/2022	2022	9	0
1/10/2022	2022	10	0
1/11/2022	2022	11	0
1/12/2022	2022	12	0
1/13/2022	2022	13	0
1/14/2022	2022	14	0
1/15/2022	2022	15	0
1/16/2022	2022	16	0
1/17/2022	2022	17	0.16
1/18/2022	2022	18	0.48
1/19/2022	2022	19	0
1/20/2022	2022	20	0
1/21/2022	2022	21	0
1/22/2022	2022	22	0
1/23/2022	2022	23	0
1/24/2022	2022	24	0
1/25/2022	2022	25	0
1/26/2022	2022	26	0
1/27/2022	2022	27	0
1/28/2022	2022	28	0

Date	Year	Day of Year	Precipitation (inches)
1/29/2022	2022	29	0
1/30/2022	2022	30	0
1/31/2022	2022	31	0
2/1/2022	2022	32	0
2/2/2022	2022	33	0
2/3/2022	2022	34	0
2/4/2022	2022	35	0
2/5/2022	2022	36	0
2/6/2022	2022	37	0
2/7/2022	2022	38	0
2/8/2022	2022	39	0
2/9/2022	2022	40	0
2/10/2022	2022	41	0
2/11/2022	2022	42	0
2/12/2022	2022	43	0
2/13/2022	2022	44	0
2/14/2022	2022	45	0
2/15/2022	2022	46	0.39
2/16/2022	2022	47	0.11
2/17/2022	2022	48	0
2/18/2022	2022	49	0
2/19/2022	2022	50	0
2/20/2022	2022	51	0
2/21/2022	2022	52	0.04
2/22/2022	2022	53	0.65
2/23/2022	2022	54	0.51
2/24/2022	2022	55	0
2/25/2022	2022	56	0
2/26/2022	2022	57	0
2/27/2022	2022	58	0
2/28/2022	2022	59	0
3/1/2022	2022	60	0
3/2/2022	2022	61	0
3/3/2022	2022	62	0
3/4/2022	2022	63	0.51
3/5/2022	2022	64	0.34
3/6/2022	2022	65	0
3/7/2022	2022	66	0
3/8/2022	2022	67	0
3/9/2022	2022	68	0
3/10/2022	2022	69	0
3/11/2022	2022	70	0
3/12/2022	2022	71	0

Date	Year	Day of Year	Precipitation (inches)
3/13/2022	2022	72	0
3/14/2022	2022	73	0
3/15/2022	2022	74	0
3/16/2022	2022	75	0
3/17/2022	2022	76	0
3/18/2022	2022	77	0
3/19/2022	2022	78	0.03
3/20/2022	2022	79	0.23
3/21/2022	2022	80	0
3/22/2022	2022	81	0
3/23/2022	2022	82	0
3/24/2022	2022	83	0
3/25/2022	2022	84	0
3/26/2022	2022	85	0
3/27/2022	2022	86	0
3/28/2022	2022	87	1.12
3/29/2022	2022	88	0.07
3/30/2022	2022	89	0
3/31/2022	2022	90	0
4/1/2022	2022	91	0
4/2/2022	2022	92	0.01
4/3/2022	2022	93	0.06
4/4/2022	2022	94	0.01
4/5/2022	2022	95	0
4/6/2022	2022	96	0
4/7/2022	2022	97	0
4/8/2022	2022	98	0
4/9/2022	2022	99	0
4/10/2022	2022	100	0
4/11/2022	2022	101	0.06
4/12/2022	2022	102	0.02
4/13/2022	2022	103	0
4/14/2022	2022	104	0
4/15/2022	2022	105	0
4/16/2022	2022	106	0
4/17/2022	2022	107	0
4/18/2022	2022	108	0
4/19/2022	2022	109	0
4/20/2022	2022	110	0
4/21/2022	2022	111	0
4/22/2022	2022	112	0.51
4/23/2022	2022	113	0
4/24/2022	2022	114	0

Date	Year	Day of Year	Precipitation (inches)
4/25/2022	2022	115	0
4/26/2022	2022	116	0
4/27/2022	2022	117	0
4/28/2022	2022	118	0
4/29/2022	2022	119	0
4/30/2022	2022	120	0
5/1/2022	2022	121	0
5/2/2022	2022	122	0
5/3/2022	2022	123	0
5/4/2022	2022	124	0
5/5/2022	2022	125	0
5/6/2022	2022	126	0
5/7/2022	2022	127	0
5/8/2022	2022	128	0
5/9/2022	2022	129	0
5/10/2022	2022	130	0
Total	5.31		

Appendix F

Coastal California Gnatcatcher Report

August 20, 2019

Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

Subject: **Coastal California Gnatcatcher 45-Day Summary Report for the Alpine Park Project in Alpine, San Diego County, California. Permit #TE-063608-6**

Dear Ms. Love:

This report documents the results of the U.S. Fish and Wildlife Service (USFWS) protocol presence/absence surveys for coastal California gnatcatcher (*Polioptila californica californica*; CAGN) conducted by ICF in 2019 for the Alpine Park Project (Project) in the unincorporated community of Alpine, San Diego County, California.

Project Location and Description

The approximately 98-acre project site is located adjacent to Wright's Field and South Grade Road, south of the community center of Alpine (Figures 1 and 2). The proposed project includes APN 404-171-12 and a portion of APN 404-170-61. The proposed Project exists within the Alpine U.S. Geological Survey (USGS) 7.5 Minute Quadrangle, and ranges in elevation from approximately 1900 feet at the southwestern edge of the site to approximately 2100 feet above mean sea level at the extreme northeastern corner. There are approximately 34.2 acres of suitable CAGN habitat onsite.

Habitat Description

Suitable habitat for CAGN generally occurs in the northern portion of the site, with some smaller areas of suitable habitat in the southwestern corner. The suitable habitat within the study area consists primarily of dense Diegan coastal sage scrub (CSS) and areas of coastal sage-chaparral transition (Figure 3). The CSS onsite is dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and white sage (*Salvia apiana*), with occasional and sugar bush (*Rhus ovata*), spiny redberry (*Rhamnus crocea*) and poison oak (*Toxicodendron diversilobum*). The coastal sage-chaparral transition habitat is dominated by chamise (*Adenostema fasciculatum*), broom baccharis (*Baccharis sarothroides*) California buckwheat, California sagebrush and white sage. The understory throughout these habitat types is dominated by tocalote (*Centaurea melitensis*), short-pod mustard (*Hirschfeldia incana*), bromes (*Bromus* spp.), and navarretia (*Navarretia hamata* ssp*. hamata, N. h.* ssp*. leptantha*).

Methods

The Project study area exists within the County of San Diego's approved Multiple Species Conservation Plan - South County Subarea Plan (MSCP); thus, in accordance with USFWS (USFWS 1997) survey protocol, three surveys were conducted for the project. The presence/absence focused survey for CAGN was conducted for the project between July 10 and 24, 2019 under the authorization of permit holder Brian Lohstroh (TE-063608-6). Recorded CAGN vocalizations were broadcast only to initially locate CAGN, and the surveys were conducted on foot with the aid of binoculars. The survey was conducted according to the schedule provided below in Table 1.

Table 1. Survey Dates and Conditions

Date	7/10/2019	7/17/2019	7/24/2019
Time on site	0700-1000	0645-1000	0700-1030
Temp (ºF)	64-72	63-77	77-85
Sky Cover (%)	0	0	20-10
Wind Speed (MPH)	0-3	1-4	0-1
Personnel	B. Lohstroh	B. Lohstroh	B. Lohstroh

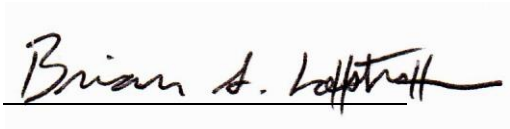
Results

No CAGN were detected during the protocol surveys at the project site, and no CAGN were incidentally detected during various other biological surveys of the site (butterfly surveys, rare plant surveys). A list of avian species detected and representative site photos are attached. This site is close to the edge of the known range of CAGN, and although suitable habitat is present onsite, the elevation and related weather extremes that can occur in the area may preclude occupation by CAGN.

Certification

I certify that the information in this survey report fully and accurately represents my work. Please do not hesitate to contact me at (858) 750-9300 or brian@lohstrohbio.com with any questions.

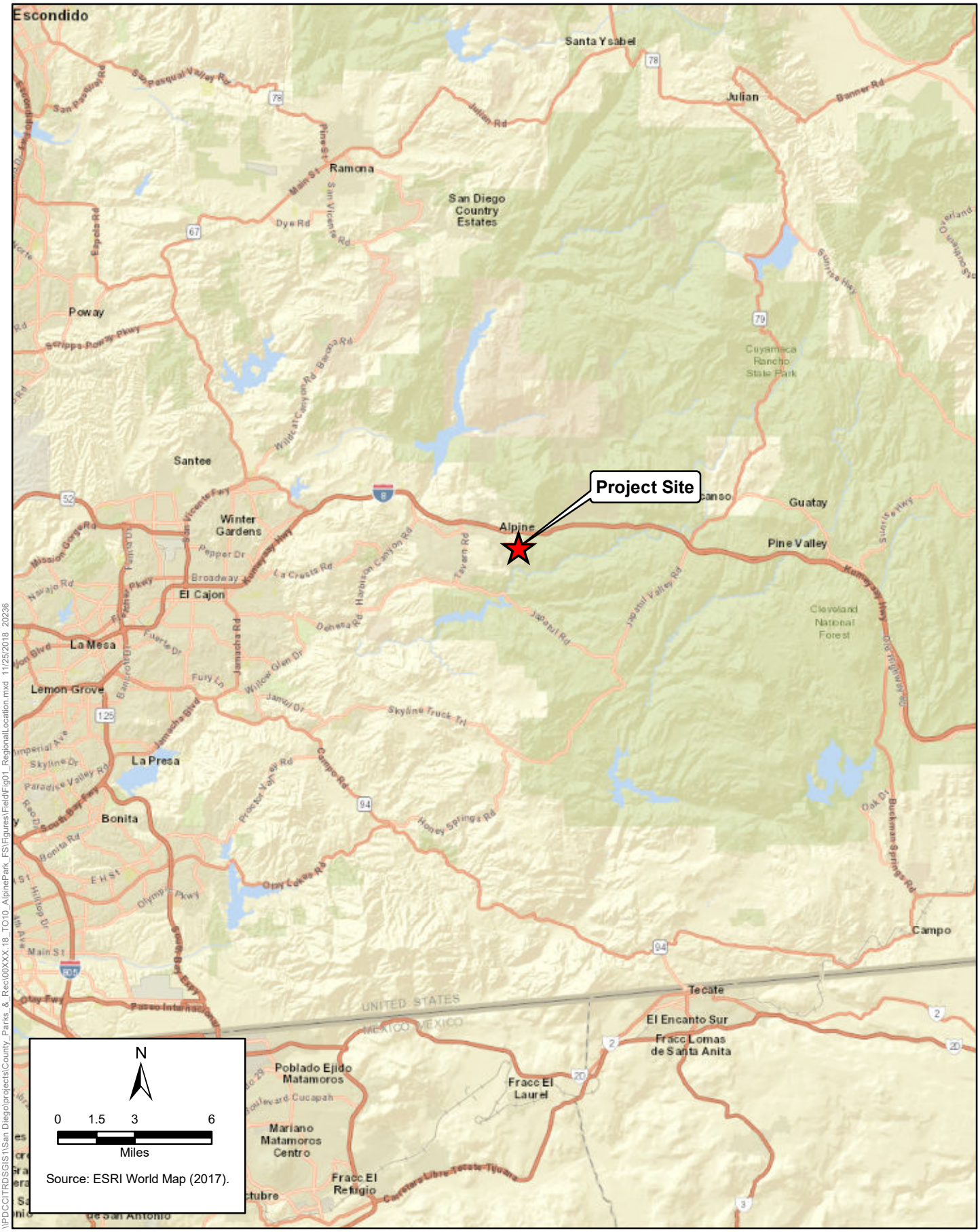
Sincerely,



Brian Lohstroh
Senior Biologist
TE-063608-6

References Cited

USFWS. 1997. Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Protocol. July 28, 1997.



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ICF

Figure 1
Regional Location
Alpine Park Surveys

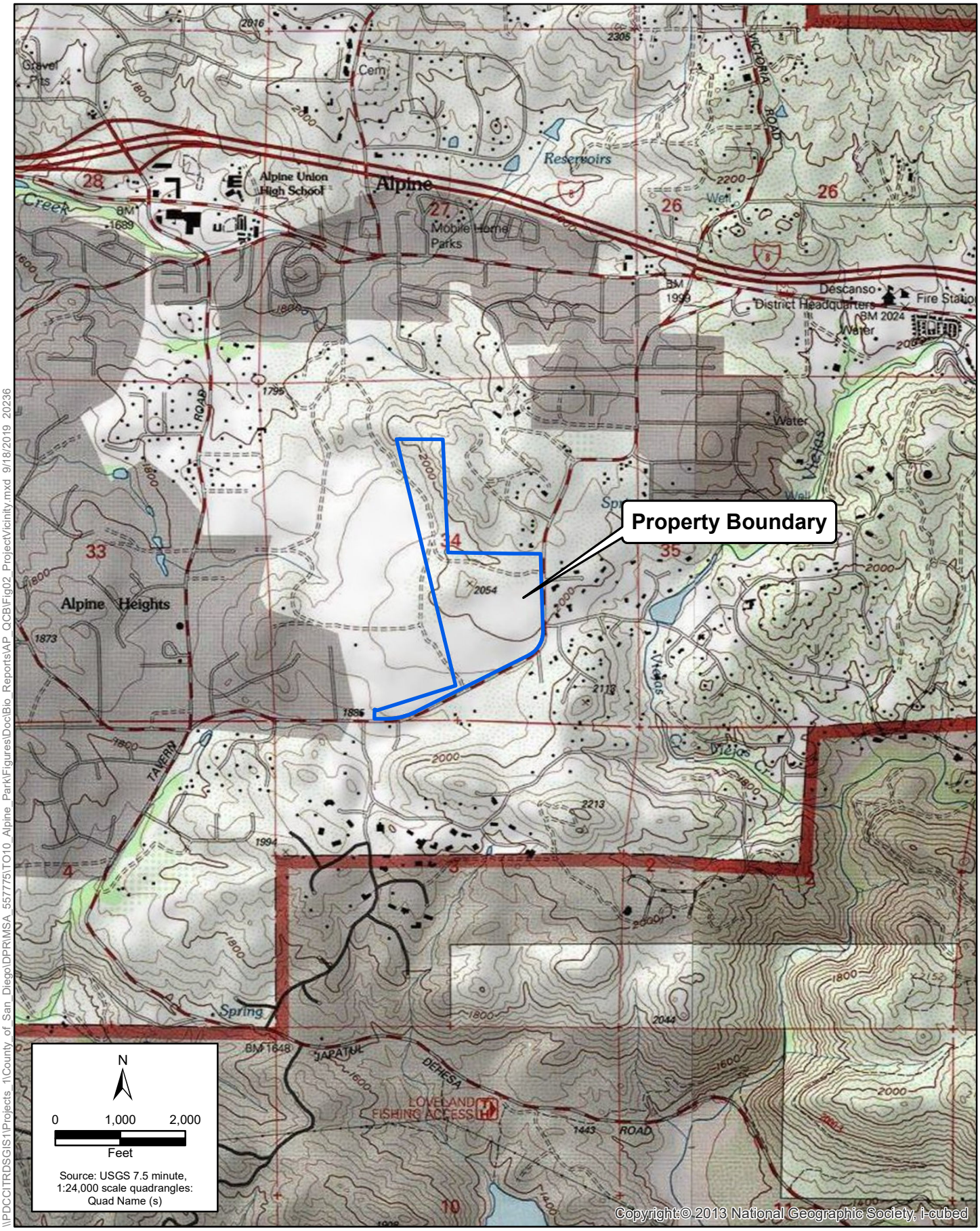

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Figure 2
Project Vicinity
Alpine Park Project

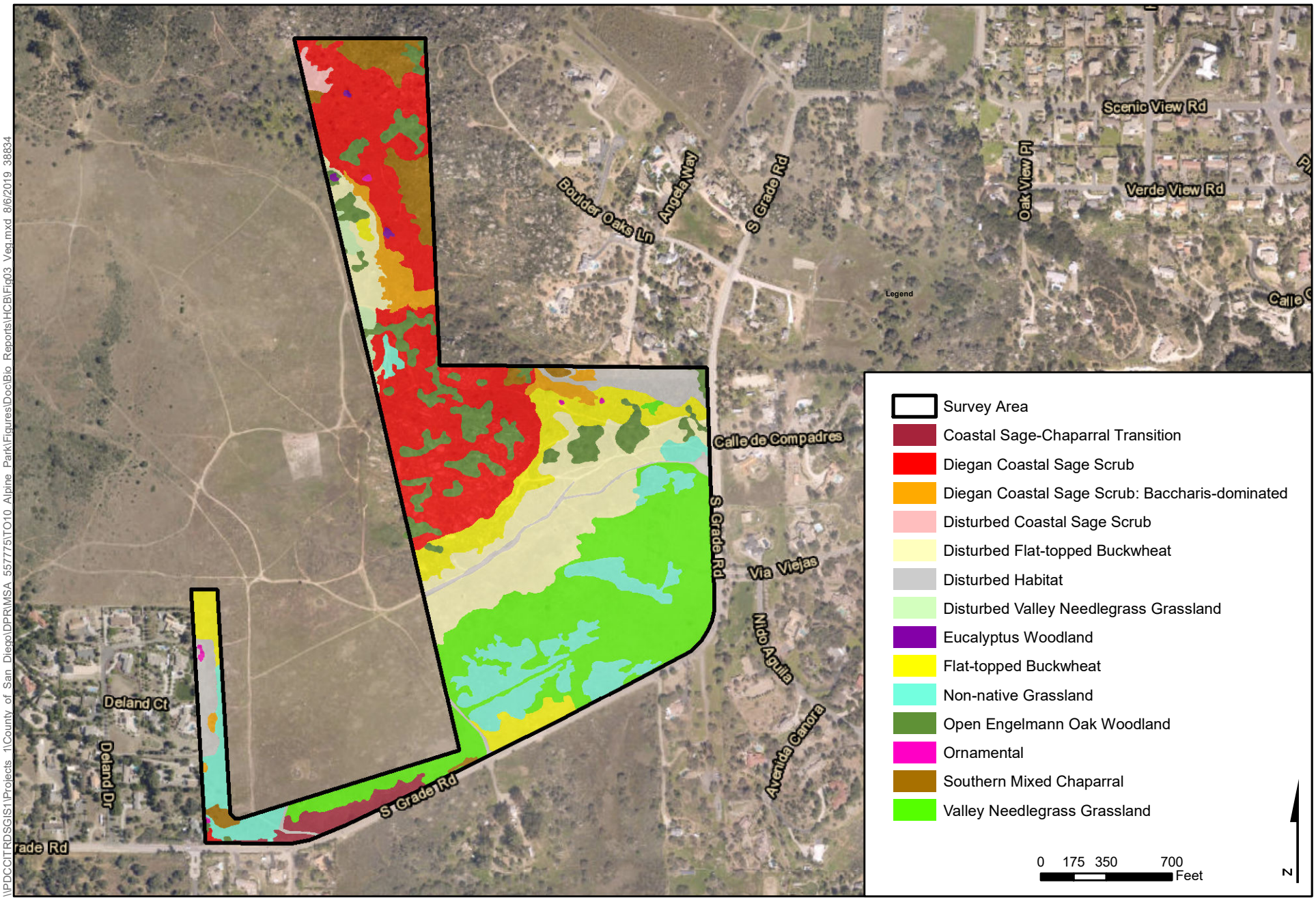

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Figure 3
Vegetation Communities
Alpine Park

Site Photographs



Photo 1. View facing east from the hill in the north-central portion of the survey area. The CSS habitat visible in the foreground is dominated by California sagebrush.



Photo 2. View facing south from the hill in the north-central portion of the site. The CSS habitat visible in the foreground is dominated by California sagebrush and California buckwheat.

Site Photographs



Photo 3. View facing south from the extreme northern boundary of the site. The CSS habitat visible at center is dominated by California sagebrush, with Engelmann oaks and Eucalyptus also visible.



Photo 4. View facing east from near the southwestern corner of the site. The habitat visible is coastal sage-chaparral transition, with near equal coverage of chamise and California sagebrush.

Avian Species List

Common Name	***Scientific Name***	**Status**
California Quail	*Callipepla californica*	
Eurasian Collared-Dove	*Streptopelia decaocto*	Introduced
Mourning Dove	*Zenaida macroura*	
Anna's Hummingbird	*Calypte anna*	
Costa's Hummingbird	*Calypte costae*	
Cooper's Hawk	*Accipiter cooperii*	CA-WL
Red-tailed Hawk	*Buteo jamaicensis*	
Nuttall's Woodpecker	*Picoides nuttallii*	
Ash-throated Flycatcher	*Myiarchus cinerascens*	
Cassin's Kingbird	*Tyrannus vociferans*	
California Scrub-Jay	*Aphelocoma californica*	
American Crow	*Corvus brachyrhynchos*	
Common Raven	*Corvus corax*	
Cliff Swallow	*Petrochelidon pyrrhonota*	
Bushtit	*Psaltriparus minimus*	
White-breasted Nuthatch	*Sitta carolinensis*	
Bewick's Wren	*Thryomanes bewickii*	
Blue-gray Gnatcatcher	*Polioptila caerulea*	
Wrentit	*Chamaea fasciata*	
Western Bluebird	*Sialia mexicana*	
California Thrasher	*Toxostoma redivivum*	
Northern Mockingbird	*Mimus polyglottos*	
European Starling	*Sturnus vulgaris*	Introduced
Phainopepla	*Phainopepla nitens*	
House Sparrow	*Passer domesticus*	Introduced
House Finch	*Haemorhous mexicanus*	
Lesser Goldfinch	*Spinus psaltria*	
Lawrence's Goldfinch	*Spinus lawrencei*	
Spotted Towhee	*Pipilo maculatus*	
California Towhee	*Melozone crissalis*	
Western Meadowlark	*Sturnella neglecta*	
Hooded Oriole	*Icterus cucullatus*	
CA-WL: California Watch List Species		

Appendix G

Bat Survey Reports from 2019

Alpine Park Bat Surveys, 2019

Prepared by the San Diego Natural History Museum

Drew Stokes, San Diego Natural History Museum biologist, conducted active and passive bat surveys within a 92.6-acre parcel (survey area) owned by the County of San Diego. This report documents the methods and findings of the survey.

Methods

Passive and active bat surveys were conducted using Titley Electronics Anabat bat detectors, the unaided ear, and visual techniques including use of a handheld spotlight:

Passive Anabats

Four 'Passive Express' Anabat bat detectors were deployed at suitable and representative habitat locations within the survey area (Table 1). The detectors were placed to maximize detections of the entire community of bat species expected in the area. The detectors were run in the summer (July 8-10, 2019) and again in the fall (September 3-5, 2019) in an attempt to document both resident and migratory bats in the survey area. The detectors ran for three consecutive nights during each of the two sampling periods. The detectors automatically turned on 30 minutes before sunset and turned off 30 minutes after sunrise. During each nightly monitoring period, bat calls were automatically recorded to an SD Card. The calls were then downloaded and analyzed in the laboratory after the field surveys. The calls were identified to the species level in as many cases as possible, by making comparisons to known bat calls. All bat call identification was carried out manually by Drew Stokes, who has over 23 years of bat call identification and vetting experience in the southern California and Baja region.

Active Anabats

Active Anabat surveys were carried out using a Titley Electronics Anabat 'walkabout' bat detector allowing for real time bat call observation and identification. The bat calls were also recorded and manually identified in the laboratory after the field surveys were conducted. One active survey was conducted on August 5, 2019 by starting at a point in the northern portion of the survey area and an elliptical-shaped transect was hiked counterclockwise covering the northern half of the survey area and ending at the start point after a 2-hour monitoring period (Table 1). The unaided ears were also used to listen for audible bat echolocation calls such as those produced by the western mastiff bat (*Eumops perotis*). The second active survey was conducted on August 6, 2019 by starting at a point in the southern portion of the survey area. An elliptical shaped transect was hiked counterclockwise covering the southern rocky/scrubby portion of the survey area and ended at the start point after a 2-hour monitoring period. When possible, visual observations of bats and other nocturnal wildlife were made using a handheld spotlight.

Results

Passive surveys

Fifteen bat species of the 22 known from San Diego County were detected using the passive Anabats (Table 2). The bats detected included seven California species of special concern: the pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhnus townsendii*), western red bat (*Lasiurus blossevillii*), western yellow bat (*Lasiurus xanthinus*), western mastiff bat, pocketed free-tailed bat (*Nyctinomops femorosaccus*), and big free-tailed bat (*Nyctinomops macrotis*). Three migratory bats were detected during the fall (September) monitoring period: the hoary bat (*Lasiurus cinereus*), and the western yellow bat and big free-tailed bat mentioned above.

During the summer monitoring period, bat activity was reduced (232 calls identified representing 11 species), possibly due to high heat conditions. There were also numerous insects calling at night that may have interfered with recorded bat activity levels. The Yuma myotis was the most active species accounting for over 32% of recorded bat calls. The big brown bat (*Eptesicus fuscus*) was fairly active and accounted for over 15% of calls. During the fall period, recorded bat activity was much higher with 702 calls recorded and identified representing 13 species. The Mexican free-tailed bat (*Tadarida brasiliensis*) was the most active species during this period, accounting for over 43% of recorded and identified calls. The pocketed free-tailed bat was also active during this period, accounting for over 23% of calls. Both are found year-round in San Diego County but have migratory tendencies (Stokes 2017).

Active surveys

The active surveys resulted in detections of nine of the 15 bat species found on the property. During the active surveys, visual attention was focused on rocky outcrops that might serve as roost sites around the survey area, but no bats were observed exiting any outcrops such that a roost was obvious. There were a number of canyon bats (*Parastrellus hesperus*) observed flying around early in the evenings of the active surveys, a species known to roost mostly solitarily in crevices and fractures of rocky outcrops (Krutzsch 1948, Stokes 2017).

Most notable during the active surveys: on the first active survey night (Aug 5), a number of western mastiff bats were heard coming to the survey area from the south. These bats spent a considerable amount of time foraging over the oaks and grassland interface located near the north west edge of the preserve. The western mastiff bat produces an audible echolocation call that is easily heard by experienced biologists. These audible bats were also heard actively producing 'feeding buzzes' as they intently foraged just above the canopy level in this northwest section immediately adjacent to Wright's Field. Because western mastiff bats typically fly high and beyond the range of bat detectors, they are often grossly underrepresented by passive bat detector surveys as evidenced by the few calls recorded with passive anabats compared to the active anabat and audible survey techniques. Only six passively recorded calls were made during the six full nights compared to 11 calls that were recorded plus numerous audible calls heard during the two 2-hour active survey periods.

Discussion and management recommendations

The survey area appears to support a high diversity of bats with near 70% of San Diego County's bat species found there. Most notable were detections of local and state species of concern: the pallid bat and Townsend's big-eared bat. Both were recorded in low frequency (5 and 1 calls respectively)

suggesting they are not necessarily very active on the preserve. In fact, all the pallid bat calls were recorded late in the night (after midnight), only during September, and mostly in the northern portion of the preserve. There is a known pallid bat population in the area with historical detections from the nearby Palo Verde area of Alpine, and more recent detections near Viejas Casino (Stokes 2017). Western mastiff bats were also notably active on the preserve, particularly in the northern portion of the preserve based on these surveys. The considerable amount of time multiple bats spent feeding over the oak woodland and grassland interface in the north part of the preserve indicates strong usage patterns.

The oak woodland and grassland habitats found on the Alpine Park preserve are likely serving as high quality foraging (and perhaps roosting) habitats for a high diversity of bats including several California species of special concern. Particularly valuable might be the Engelmann oaks and grasslands located near the northwest part of the preserve based on the bats documented actively foraging there. It is strongly recommended that impacts and disturbance to the oak woodland and grassland habitats on the Alpine Preserve, especially at the northwest end, are kept to a minimum and that these habitats should be maintained and protected. There are also numerous rocky outcrops on the preserve that could serve as roosting habitat and refugia from wildfires and should be protected. The only thing lacking on the preserve are any obvious open water sources from which bats could drink. There are a few open water sources nearby on private land. However, since habitats found on private land are not predictably maintained and conserved, and they potentially attract bats and other wildlife away from preserves to private lands resulting in human-wildlife conflicts, it is recommended that an open water source be created on the preserve that could serve as a reliable drinking source for bats and other wildlife.

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Notable incidental wildlife

Barn owl (*Tyto alba*)

Common poorwill (*Phalaenoptilus nuttallii*)

Southern pacific rattlesnake (*Crotalus oreganus*)

Granite spiny lizard (*Sceloperus orcuttii*)

Western whiptail (*Aspidoscelus tigris*)

Coyote (*Canis latrans*)

Table 1. Anabat locations and survey dates.

Anabat station	Latitude (wgs84)	Longitude (wgs84)	Survey dates (2019)
SDNHM1_East Oaks	32.82208	-116.75903	July 8-10 & Sep 3-5, 2019
SDNHM2_North Oaks	32.82735	-116.76481	July 8-10 & Sep 3-5, 2019
SDNHM4_West Oaks	32.8174	-116.76242	July 8-10 & Sep 3-5, 2019
SDNHM6_South Oaks	32.82091	-116.76308	July 8-10 & Sep 3-5, 2019
	Eliptical transect start/end		
Active Anabat_North	32.82508	-116.76374	August 5, 2019
Active Anabat_South	32.82138	-116.76223	August 6, 2019

Table 2. Passive and active anabat survey results from Alpine Park, 2019.

		Passive surveys				*Active surveys*
		July 8-10, 2019		September 3-5, 2019		August 5-6, 2019
Common name	Species	No. of passes	Relative activity (%)	No. of passes	Relative activity (%)	No. of passes**
Big brown bat	*Eptesicus fuscus*	36	15.5	32	4.6	1
Big free-tailed bat*	*Nyctinomops macrotis**	--	--	1	0.1	--
California myotis	*Myotis californicus*	29	12.5	4	0.6	1
Canyon bat	*Parastrellus hesperus*	17	7.3	88	12.5	12
Hoary bat	*Lasiurus cinereus*	--	--	2	0.3	--
Mexican free-tailed bat	*Tadarida brasiliensis*	32	13.8	307	43.7	--
Pallid bat*	*Antrozous pallidus**	--	--	5	0.7	--
Pocketed free-tailed bat*	*Nyctinomops femorosaccus**	18	7.8	163	23.2	11
Townsend's big-eared bat*	*Corynorhinus townsendii**	1	0.4	--	--	--
Western long-eared myotis	*Myotis evotis*	5	2.2	4	0.6	--
Western mastiff bat*	*Eumops perotis**	1	0.4	5	0.7	11
Western red bat*	*Lasiurus blossevillii**	14	6.0	--	--	1
Western small-footed myotis	*Myotis ciliolabrum*	3	1.3	9	1.3	1
Western yellow bat*	*Lasiurus xanthinus**	--	--	6	0.9	1
Yuma myotis	*Myotis yumanensis*	76	32.8	76	10.8	2
	Total =	*232*	*Total =*	*702*		

** Bat species designated as California species of special concern*

*** Number of passes during 2-hour active survey periods during nights of August 5 & 6, 2019*

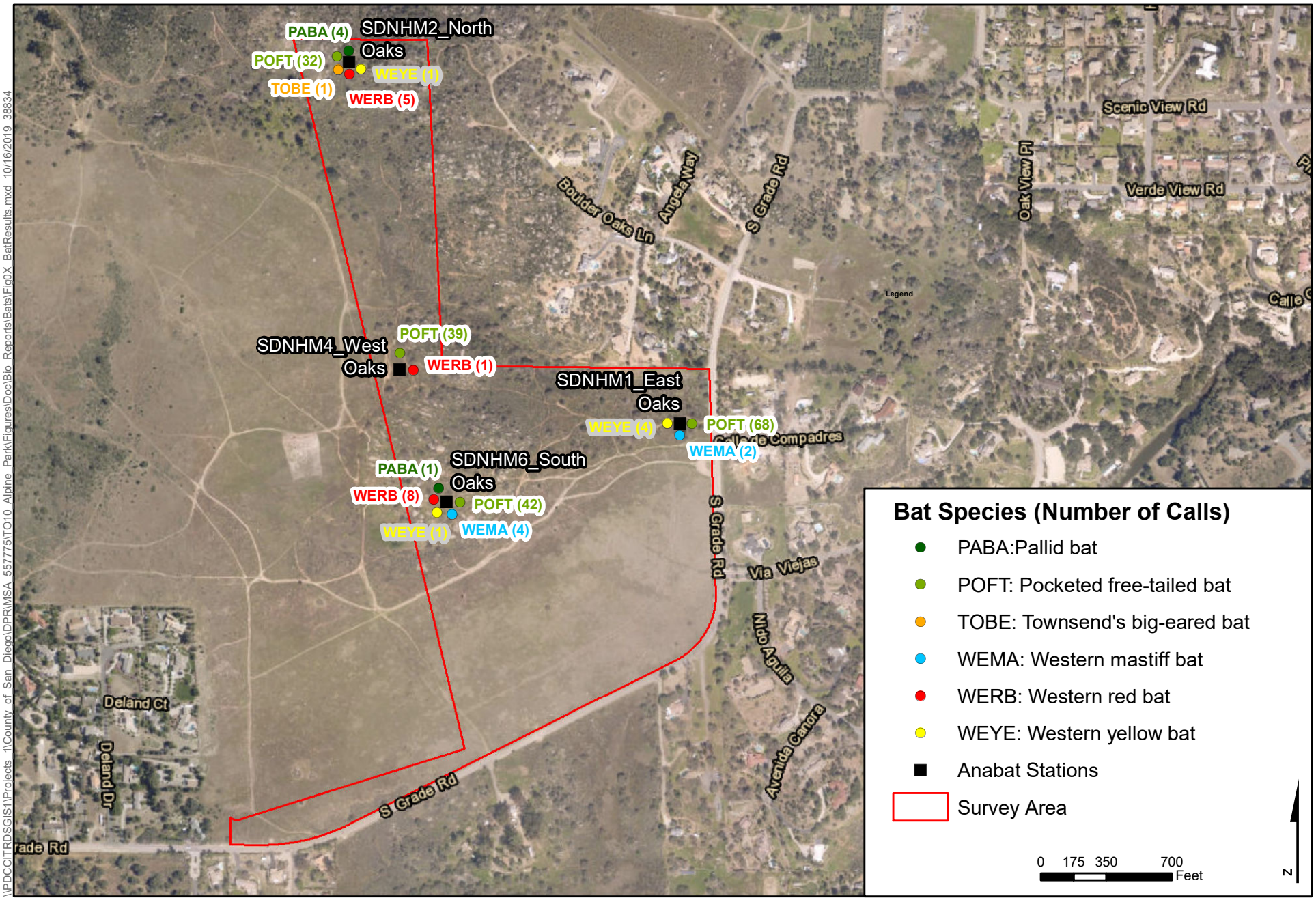

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Figure 1
Biological Resources Technical Report
Alpine Park Project

Appendix H

Bat Survey Report 2022

July 22, 2022

Resource Management Division
County of San Diego, Parks and Recreation

Subject: Alpine Park Project Bat Survey Report

This report documents the results of acoustic bat surveys within grasslands of the Alpine Park Project. These surveys were performed to identify the extent to which bats may currently be utilizing grasslands within, and outside of, the proposed project limits. Specifically, the purpose of the surveys was to identify whether the grasslands are currently being used for foraging by pallid bats (*Antrozous pallidus*), western red bat (*Lasiurius frantzii*), and other bats, in the proposed project footprint and preserve.

Location

The Alpine Park Project site (project site) is located southeast of the community of Alpine, in San Diego County, California (Appendix A, Figure 1). The project site is adjacent to, and east of Wright's Field along South Grade Road (Appendix A, Figure 2). For this study, the study area consists of grassland portions located in the proposed footprint and southern part of the proposed preserve (Appendix A, Figure 3).

Existing Conditions

The study area consists of relatively flat land among a more general backdrop of rolling hills and is made up of valley needlegrass and non-native grassland vegetative cover. Areas immediately adjacent to the study area include open space to the north and west, and generally low-density residential development elsewhere. The open space to the north includes part of the project site and consists of scrub habitats with relatively small patches of oak woodlands and grasslands intermixed. To the west is Wright's Field, a nature reserve consisting of grasslands immediately west of the study area, and scrub and grasslands elsewhere. Residential areas in the general area include patches of oak woodlands, scrub habitats, grasslands, and disturbances associated with low to medium density development. Pedestrian trails are found in portions of the open space north and west of the study area. Grasslands conditions during the study period consisted mostly of a dense cover of native and non-native grasses and forbs with few open areas.

Background

Previous Surveys and Recommendations

Acoustic surveys were conducted in 2019 as part of an environmental impact report for the proposed project, with a particular focus on roosting areas near Engelmann oak trees located on the project site. At that time, multiple bat species were recorded, including pallid bats, which forage in open areas and grasslands. Surveys were not conducted within grasslands during the 2019 surveys. The acoustic analysis in July 2019 assumed that all of the grassland areas would be utilized for foraging and did not evaluate the level of use or whether there were differences in use between areas that would be developed, and areas that would be preserved as mitigation for impacts to foraging bat habitat.

Dr. Patricia Brown reviewed the previous report and made recommendations to conduct additional acoustic surveys in the grassland areas in order to identify the relative importance of these areas for bats. Specifically, Dr. Brown recommended that four detectors be setup for 4-5 nights in the grassland areas. Two detectors were to be setup in the area proposed for development, and two setup in the area proposed for preservation. This would allow for an evaluation on how the proposed preservation area functions for bat foraging compared to the area that is proposed for development.

Methods

Acoustic Data Collection

Acoustic surveys were conducted by ICF biologists in grassland communities in the Alpine Park project site proposed for development, as well as adjacent grassland habitat proposed for preservation. Acoustic data was collected using Pettersson D500X ultrasound recording units. Four units were set up in four locations spread out in the identified grassland communities (Figure 4). A map was used to select four locations spaced to sample the grasslands relatively evenly while keeping the equipment away from pedestrian trails to minimize the risk that members of the public would interfere with the surveys. Detectors labeled as Alpine 1 and Alpine 2 were placed in the area proposed for development, while Alpine 3 and Alpine 4 were placed in the area proposed for preservation.

The detectors were set up to record bat calls beginning the evening of 6/23/2022 and ending the morning of 6/29/2022. Four to five nights of surveys were recommended; however, the detector set up at Alpine 2 malfunctioned and no data was collected on nights two and three. As such, a sixth night was added to the survey to ensure at least four nights of data were collected at all four locations. All other locations resulted in five nights (Alpine 1) or six nights (Alpine 3 and Alpine 4) of data.

The surveys were conducted during generally favorable weather conditions (i.e., calm winds with temperatures conducive to bat activity [52°F and above] and no precipitation). The detectors were set to record ultrasound calls from 30 minutes before sunset until 30 minutes after sunrise each

night. The detectors were placed just before the survey time each evening and picked up each morning to collect data and prevent theft or vandalism. Each microphone was attached to a PVC pipe so that the microphone would be set approximately 6' above the ground. No visual surveys were conducted as part of this survey effort.

Acoustic Analysis

Recordings of bat echolocation calls were downloaded from each monitor and processed using Sonobat version 4.2.2. Each recording was initially processed through the Sonobat program using the vetting function, which identified calls recorded to species when possible. There are generally three types of echolocation sequences: search phase, approach phase, and terminal phase. Search phase calls are used when searching for prey (i.e., insects), which are longer, lower frequency calls. Approach phase and terminal phase calls are used when approaching and closing in on prey, respectively, and become much more frequent and higher frequency. As a bat gets closer to an insect, the calls become shortened to detect the quick movements of the insect (Feldhamer et. al. 2007). Due to the variation in approach and terminal phase calls, echolocation calls are identified to species best by the search phase recordings. These types of calls generally have a consistent structure throughout the call sequence and usually have species-specific characteristics (Fenton and Bell 1981; O'Farrell et al. 1999 as cited by Murray et al.).

Each of the calls Sonobat identified to species were then manually assessed to determine if the identification to species was accurate. Although search phase calls are typically consistent in structure, species within the same frequency range can be similar in the different echolocation phases and can be misidentified within the program automation identification.

The number of echolocation calls recorded cannot be used to correlate the number of bats of a particular species in the area or detected in the recordings. Each time a call is emitted within range of detector, a recording is created. Therefore, it is possible for a single bat to be recorded multiple times if it is foraging for an extended period within range of the detector.

Results and Discussion

Acoustic Analysis

A total of five bat species were confidently identified acoustically during the surveys: big brown bat (*Eptesicus fuscus*), canyon bat (*Parastrellus hesperus*), California myotis (*Myotis californicus*), Yuma myotis (*Myotis yumanensis*), a Western Bat Working Group (WBWG) Low-Medium Priority species, and a County of San Diego Group II wildlife species, and Mexican free-tailed bat (*Tadarida brasiliensis*) (Table 1). Not all calls are recorded equally. The quality of a recorded call can be affected by various factors, including background noise, the microphone height and directionality, the bat's flight angle to the microphone, the bat's distance from the microphone, and site conditions (i.e., trees and rocks). As such, some poor-quality calls cannot be identified to species. Myotis species detected within the study area emit echolocation calls that have similar call shape and are within the same frequency range as both *M. californicus* and *M. yumanensis*. Species-specific call characteristics can be difficult to determine with poor quality calls. At most locations, low frequency

calls were recorded; however, due to the poor quality of the recordings, species could not be identified. All species confirmed as recorded during the surveys, and their locations are depicted in Table 1. Tables 2 through 5 depict bats detected at each location by survey night.

Table 1. Species Recorded at Each Monitoring Location During the Surveys.

Species Recorded	Monitors			
	Alpine 1 (Proposed Footprint)	**Alpine 2 (Proposed Footprint)**	**Alpine 3 (Proposed Preserve)**	**Alpine 4 (Proposed Preserve)**
Big brown bat (*Eptesicus fuscus*)			X	
California myotis (*Myotis californicus*)	X	X	X	
Yuma myotis (*Myotis yumanensis*)	X	X	X	
Canyon bat (*Parastrellus hesperus*)	X	X	X	X
Mexican free-tailed bat (*Tadarida brasiliensis*)				X

Table 2. Species Recorded at Location Alpine 1 (Proposed Footprint).

Species Detected	Night 1 6/23/2022	Night 2 6/24/2022	Night 3 6/25/2022	Night 4 6/26/2022	Night 5 6/27/2022	Night 6 6/28/2022
High Frequency Call						
Low Frequency Call		X	X		X	X
Myotis sp.*					X	
California myotis (*Myotis californicus*)		X				
Yuma myotis (*Myotis yumanensis*)	X					
Canyon bat (*Parastrellus hesperus*)				X		
Mexican free-tailed bat (*Tadarida brasiliensis*)						

* Based on call frequency and call characteristics, Myotis sp. calls are either *Myotis yumanensis* or *M. californicus*. However, due to the poor quality of the recording, definitive identification to species could not be made

Table 3. Species Recorded at Location of Alpine 2 (Proposed Footprint).

Species Detected	Night 1 6/23/2022	Night 2 ** 6/24/2022	Night 3 ** 6/25/2022	Night 4 6/26/2022	Night 5 6/27/2022	Night 6 6/28/2022
High Frequency Call				X	X	
Low Frequency Call	X				X	X
Myotis sp.*				X		
California myotis (*Myotis californicus*)					X	
Yuma myotis (*Myotis yumanensis*)	X				X	X
Canyon bat (*Parastrellus hesperus*)					X	
Mexican free-tailed bat (*Tadarida brasiliensis*)						

* Based on call frequency and call characteristics, Myotis sp. calls are either *Myotis yumanensis* or *M. californicus*. However, due to the poor quality of the recording definitive identification to species could not be made
**No data available due to equipment malfunctions

Table 4. Species Recorded at Location of Alpine 3 (Proposed Preserve).

Species Detected	Night 1 6/23/2022	Night 2 6/24/2022	Night 3 6/25/2022	Night 4 6/26/2022	Night 5 6/27/2022	Night 6 6/28/2022
High Frequency Call						
Low Frequency Call	X		X	X		X
Myotis sp.*				X		
Big brown bat (*Eptesicus fuscus*)						X
California myotis (*Myotis californicus*)		X		X	X	
Yuma myotis (*Myotis yumanensis*)	X	X				
Canyon bat (*Parastrellus hesperus*)	X	X				
Mexican free-tailed bat (*Tadarida brasiliensis*)						

* Based on call frequency and call characteristics, Myotis sp. calls are either *Myotis yumanensis* or *M. californicus*. However, due to the poor quality of the recording definitive identification to species could not be made

Table 5. Species Recorded at Location of Alpine 4 (Proposed Preserve).

Species Detected	Night 1 6/23/2022	Night 2 6/24/2022	Night 3 6/25/2022	Night 4 6/26/2022	Night 5 6/27/2022	Night 6 6/28/2022
High Frequency Call	X	X	X			
Low Frequency Call	X		X	X	X	X
Myotis sp.*					X	
California myotis (*Myotis californicus*)						
Yuma myotis (*Myotis yumanensis*)				X		
Canyon bat (*Parastrellus hesperus*)	X	X	X		X	
Mexican free-tailed bat (*Tadarida brasiliensis*)			X			

* Based on call frequency and call characteristics, Myotis sp. calls are either *Myotis yumanensis* or *M. californicus*. However, due to the poor quality of the recording definitive identification to species could not be made

Several poor-quality calls were recorded but were not identifiable to species. Some calls were identified as only a "high frequency" call, as the quality was too poor to determine to a specific species. These calls fell within the frequency range of both California and Yuma myotis, with similar call characteristics to these species. These were identified as "Myotis". Good quality calls were recorded for both these species during surveys.

Similarly, species that were identified as a "low frequency" call were reviewed. These recordings consisted of two or less calls, and not a full sequence. These calls had both characteristics and fell within the frequency of big brown bat, Mexican free-tailed bat, and silver haired bat (*Lasionycteris noctivagans*). Since these calls were only fragments of a call sequence and/or the quality of the recording was poor, identification to a specific species could not be made.

Additionally, two calls within the frequency range and with characteristics similar to pallid bats were recorded. One of these was at Alpine 3 (proposed preserve) and one was Alpine 2 (proposed footprint). One of the two recordings had calls that appeared to have the "dog paw" ledge near the characteristic frequency which is indicative of pallid bat. In both recordings, the overall call shape and frequency also show similarities to those of big brown bat. Due to the poor quality of the recording, and lack of a full call sequence, a conclusive determination could not be made.

Discussion

ICF set up four ultrasonic detectors within the proposed Alpine Park project site and preserve to determine how the grasslands might be used by pallid bats and bats in general. The data collected provides the opportunity to identify whether bats are currently using the surveyed areas, and

importantly, whether pallid bat use is consistent in the portion of the site proposed for development and the portion proposed for preservation. In general, multiple common bat species, as well as one special-status bat, Yuma myotis, were detected within both the proposed footprint and the proposed preserve. Based on the confirmed bat calls detected, there is a possibility that one or two pallid bats were detected, although no pallid bats were conclusively identified to be using either the footprint or the preserve during the survey window.

Pallid bats were previously detected in 2019 in low frequency near Engelmann oak trees on the project site, at one location in the far north of the preserve (4 calls recorded) and at one location within oak trees just to the north of the study area (1 call recorded). These calls were recorded only during the September survey, with no detections during the July or August surveys. The calls were also only recorded after midnight. Although not detected during this survey, it is reasonable to assume that pallid bats do, or may in the future, use the surveyed grasslands for foraging. Pallid bats are also known to forage primarily using sight and hearing rather than echolocation, with echolocation used primarily as a navigational and obstacle avoidance system rather than for prey detection (Dr. Patricia Brown, pers comm), which could potentially explain the low frequency of detections during the September 2019 survey, no detections during the July and August 2019 surveys, and no confirmed detections during this survey. In addition, altering the positioning and directionality of the microphones, as well as extending surveys over longer time periods, may yield a higher frequency of detections of pallid bats.

The results of this study suggest that there was no substantial use of the study area by pallid bats and that bat detections were consistent between the area proposed for development and the area proposed for preservation. However, two potential but unconfirmed pallid bat calls were detected, one in the impact footprint and one in the preserve area. Pallid bat use of the study area cannot be ruled out and further studies would be needed to conclusively determine pallid bat use of the grasslands for foraging. Nonetheless, this study suggests that establishing a permanent preserve containing grassland foraging habitat would serve to offset the development of the project footprint.

Should you have any questions please contact me at (909) 499-8230 or James.Hickman@icf.com.

Sincerely,

James Hickman
Senior Biologist
ICF

Enclosed:

Appendix A: Figures
Appendix B: Site Photos

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Appendix A
Figures

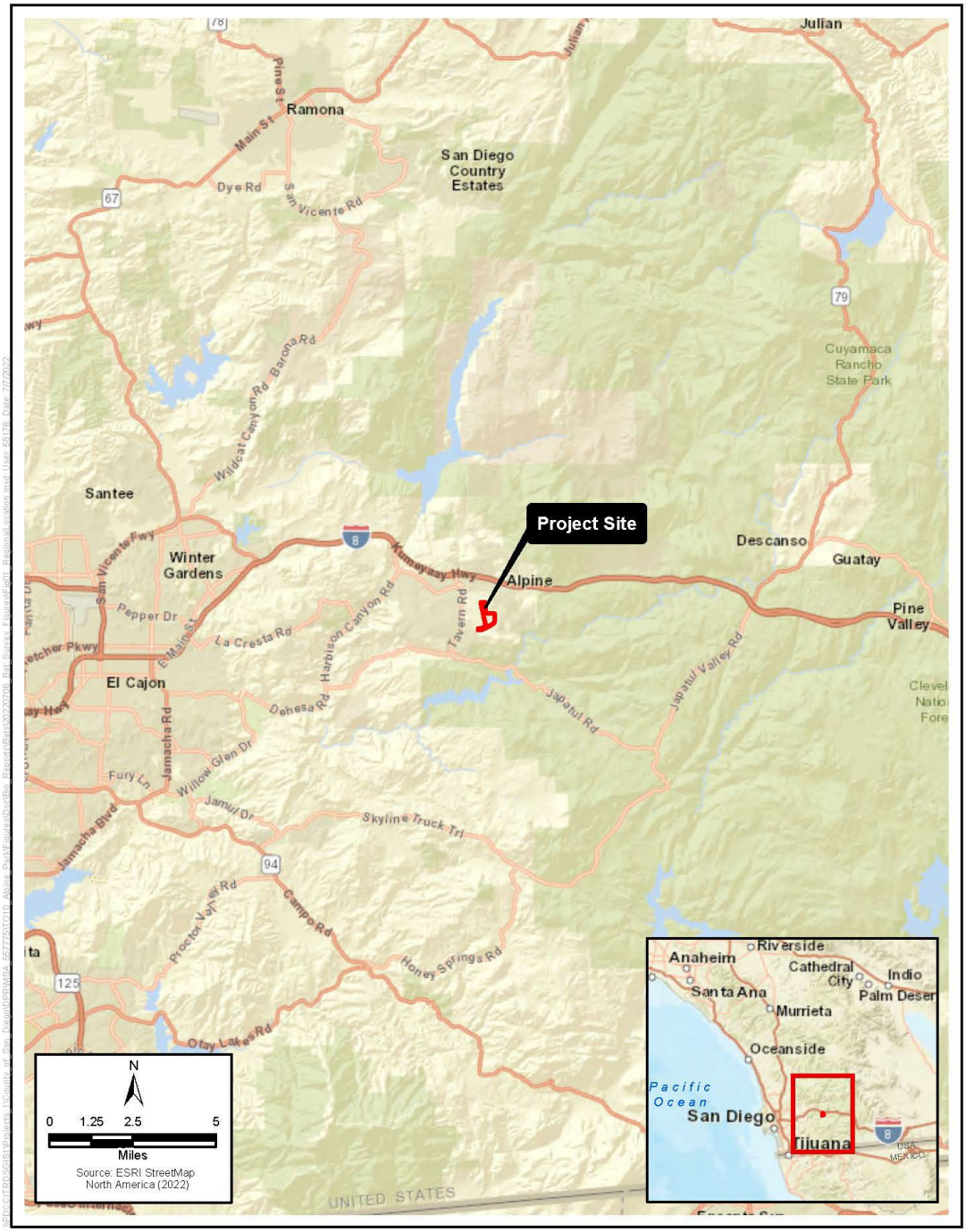

Figure 1
Regional Location
Alpine Park Project

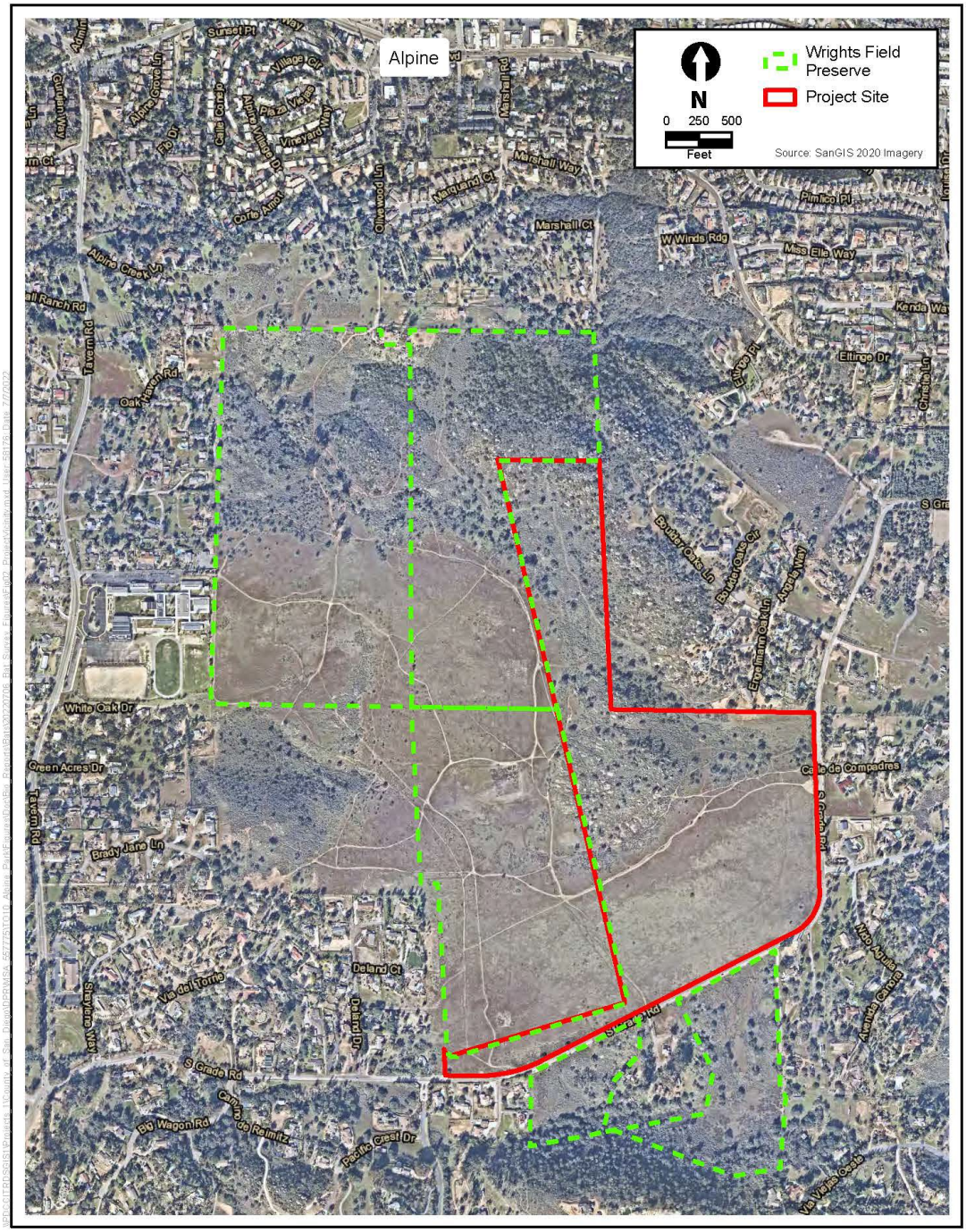

Figure 2
Project Vicinity
Alpine Park Project

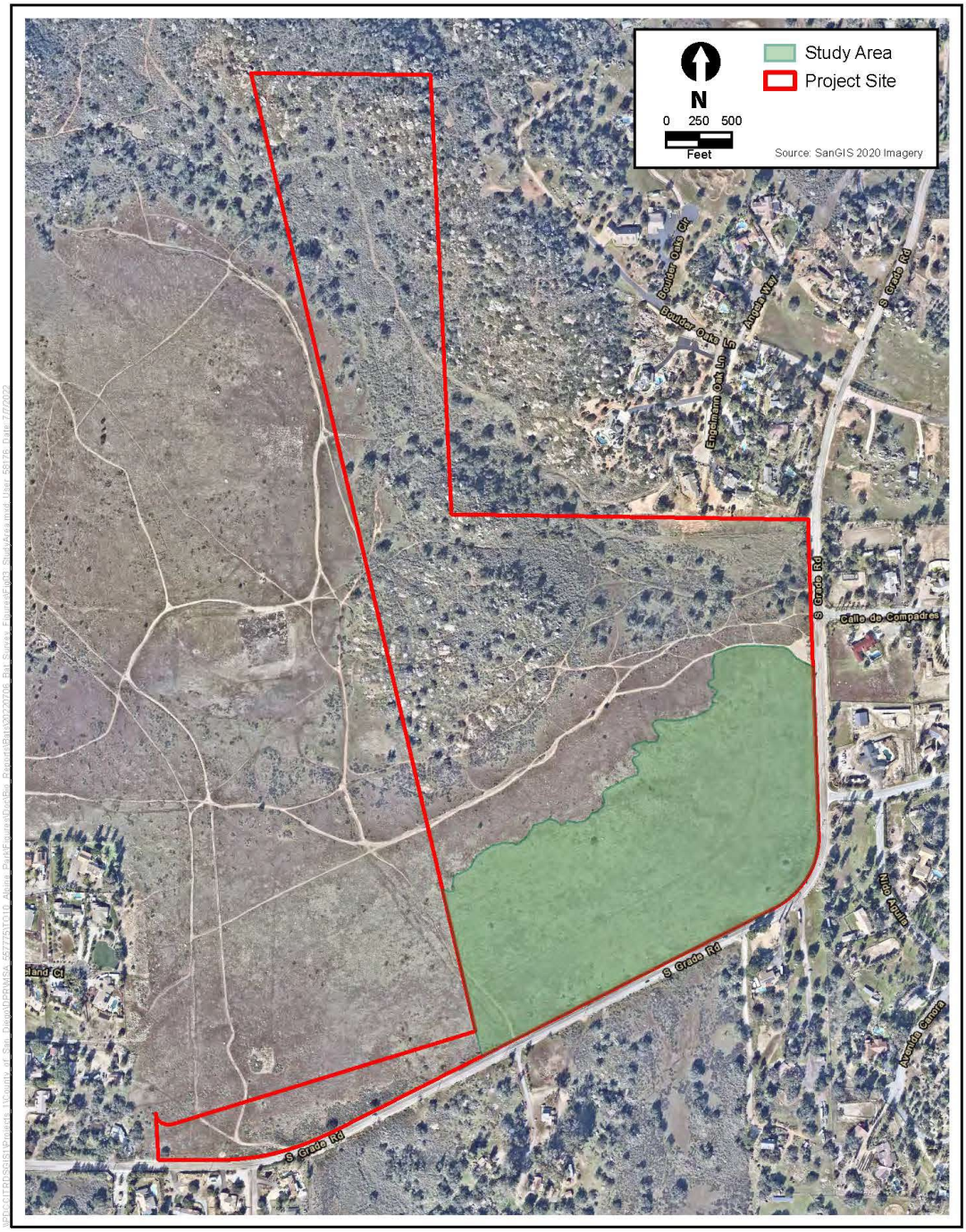

Figure 3
Study Area
Alpine Park Project

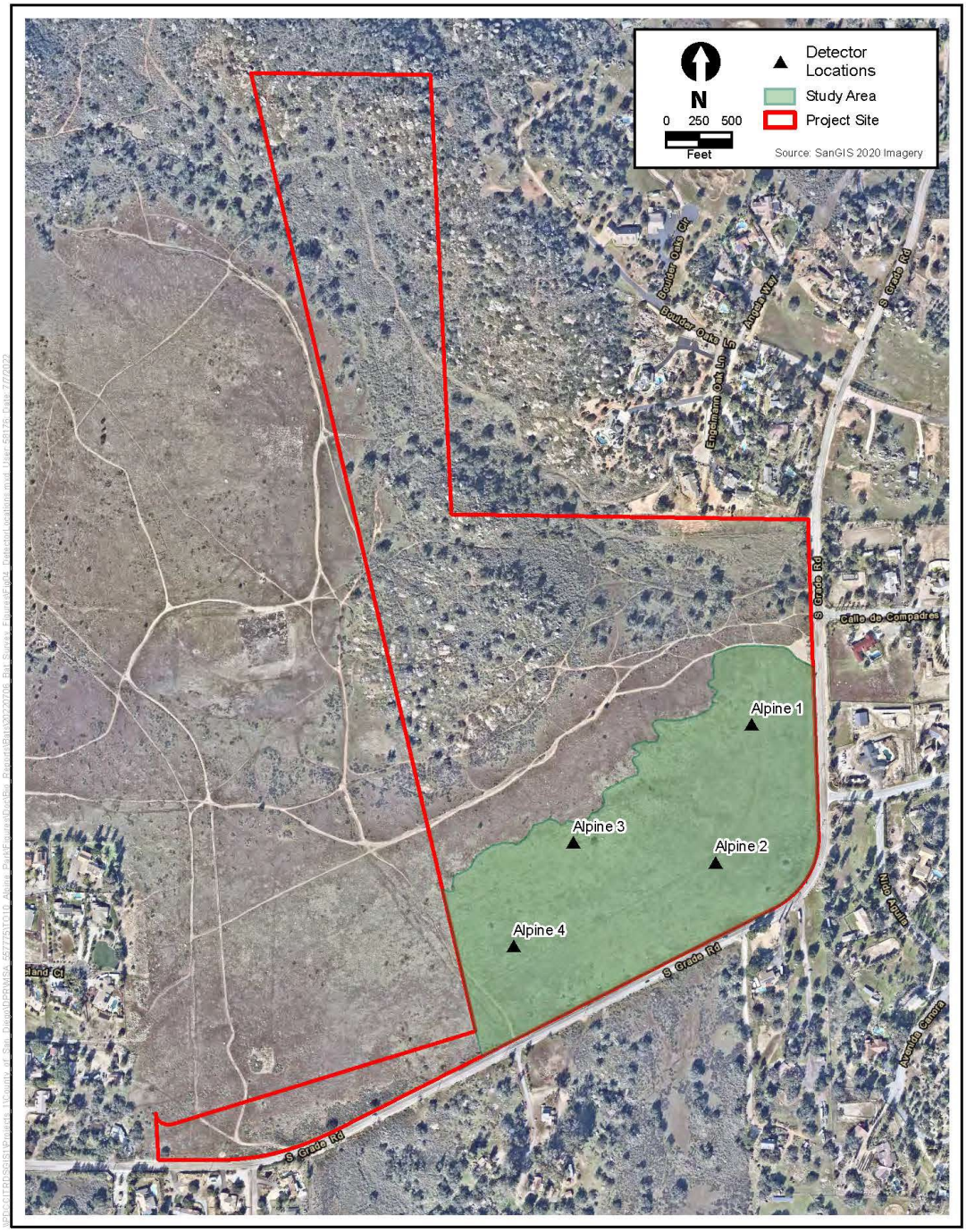

Figure 4
Detector Locations
Alpine Park Project

Appendix B
Site Photos



Photograph 1: Detector Alpine 1 positioned for recording data



Photograph 2: Detector Alpine 2 positioned for recording data



Photograph 3: Detector Alpine 3 positioned for recording data



Photograph 4: Detector Alpine 4 positioned for recording data

Appendix I

Observed Species List–Flora

Appendix H: Observed Species List - Flora

Scientific Name	Common Name	Special Status
EUDICOTS		
Adoxaceae - Muskroot family		
Sambucus nigra ssp. caerulea	Blue elderberry	
Anacardiaceae - Sumac Or Cashew family		
Rhus integrifolia	Lemonade berry	
Rhus ovata	Sugar bush	
Toxicodendron diversilobum	Western poison oak	
Apiaceae - Carrot family		
Apiastrum angustifolium	Mock parsley	
Daucus pusillus	Rattlesnake weed	
Lomatium dasycarpum ssp. dasycarpum	Woolly fruit lomatium	
Sanicula arguta	Sharptooth sanicle	
Sanicula bipinnata	Poison sanicle	
Asteraceae - Sunflower family		
Achillea millefolium	Common yarrow	
Acourtia microcephala	Sacapellote	
Amblyopappus pusillus	Dwarf coastweed	
Artemisia californica	California sagebrush	
Baccharis pilularis ssp. pilularis	Coyote brush	
Baccharis sarothroides	Broom baccharis	
Bahiopsis laciniata	San Diego County viguiera	CRPR 4.2
* *Carduus pycnocephalus ssp. pycnocephalus*	Italian thistle	
* *Centaurea melitensis*	Tocalote	
Chaenactis artemisiifolia	White pincushion	
Cirsium occidentale	Cobwebby thistle	
* *Cirsium vulgare*	Bull thistle	
Corethrogyne filaginifolia	Common sand aster	
Deinandra fasciculata	Fascicled tarplant	
* *Dimorphotheca sinuata*	Cape marigold	
Erigeron foliosus var. foliosus	Leafy daisy	
Eriophyllum confertiflorum	Yarrow	
Grindelia camporum	Field gumplant	
Gutierrezia californica	California matchweed	

Scientific Name	Common Name	Special Status
Hazardia squarrosa	Saw toothed goldenbush	
* *Hedypnois cretica*	Crete weed	
Helianthus annuus	Annual sunflower	
* *Hypochaeris glabra*	Smooth cat's-ear	
Isocoma menziesii var. decumbens	Decumbent goldenbush	CRPR 1B.2
Lasthenia californica ssp. californica	California goldfields	
Microseris douglasii ssp. platycarpha	Small-flowered microseris	CRPR 4.2
Osmadenia tenella	Osmadenia	
Pseudognaphalium californicum	California everlasting	
* *Senecio vulgaris*	Common ragwort	
* *Sonchus asper ssp. asper*	Prickly sow thistle	
* *Sonchus oleraceus*	Common sow thistle	
Stephanomeria exigua ssp. exigua	Small wire-lettuce	
Boraginaceae - Borage family		
Amsinckia menziesii	Menzies's fiddleneck	
Cryptantha intermedia	Clearwater cryptantha	
Emmenanthe penduliflora var. penduliflora	Whisperingbells	
Eucrypta chrysanthemifolia var. chrysanthemifolia	Spotted hideseed	
Harpagonella palmeri	Palmer's grapplinghook	CRPR 4.2
Pectocarya linearis ssp. ferocula	Narrow-toothed pectocarya	
Pectocarya peninsularis	Baja pectocarya	
Phacelia cicutaria var. hispida	Hairy caterpillar phacelia	
Phacelia parryi	Parry's phacelia	
Plagiobothrys acanthocarpus	Adobe popcornflower	
Plagiobothrys fulvus var. campestris	Field popcornflower	
Plagiobothrys nothofulvus	Rusty popcornflower	
Brassicaceae - Mustard family		
* *Brassica nigra*	Black mustard	
* *Capsella bursa-pastoris*	Shepherd's purse	
Descurainia pinnata	Western tansymustard	
* *Hirschfeldia incana*	Shortpod mustard	
Lepidium nitidum	Shining pepper-grass	
* *Lobularia maritima*	Sweet alyssum	
* *Sisymbrium irio*	London rocket	

Scientific Name	Common Name	Special Status
Cactaceae - Cactus family		
Opuntia littoralis	Coastal prickly pear	
Caryophyllaceae - Pink family		
* *Silene gallica*	Windmill catchfly	
Convolvulaceae - Morning-glory family		
Calystegia macrostegia ssp. cyclostegia	Coast morning-glory	
Crassulaceae - Stonecrop family		
Crassula connata	Pygmyweed	
Dudleya pulverulenta	Chalk dudleya	
Cucurbitaceae - Gourd family		
Marah macrocarpa	Wild cucumber	
Elaeagnaceae - Oleaster family		
* *Elaeagnus angustifolia*	Russian olive	
Ericaceae - Heath family		
Xylococcus bicolor	Mission manzanita	
Euphorbiaceae - Spurge family		
Croton setigerus	Doveweed	
Fabaceae - Legume family		
Acmispon americanus var. americanus	Spanish-Clover	
Acmispon glaber var. brevialatus	Long keeled deerweed	
Acmispon micranthus	San Diego lotus	
Acmispon strigosus	Strigose lotus	
* *Genista monspessulana*	French broom	
Lathyrus vestitus	Canyon sweet pea	
Lupinus bicolor	Miniature lupine	
Lupinus hirsutissimus	Stinging lupine	
Lupinus succulentus	Arroyo lupine	
Lupinus truncatus	Cut leaf lupine	
* *Medicago polymorpha*	California burclover	
* *Melilotus indicus*	Indian sweetclover	
Vicia hassei	Slender vetch	
Fagaceae - Oak family		
Quercus engelmannii	Engelmann oak	CRPR 4.2
Gentianaceae - Gentian family		
Zeltnera venusta	California centaury	

Scientific Name	Common Name	Special Status
Geraniaceae - Geranium family		
* *Erodium botrys*	Longbeak filaree	
* *Erodium cicutarium*	Redstem filaree	
Juglandaceae - Walnut family		
Juglans californica	Southern California black walnut	CRPR 4.2
Lamiaceae - Mint family		
* *Lamium amplexicaule*	Henbit	
* *Marrubium vulgare*	Horehound	
Salvia apiana	White sage	
Salvia columbariae	Chia	
Trichostema lanceolatum	Vinegar weed	
Montiaceae - Purslane family		
Calandrinia menziesii	Red maids	
Claytonia parviflora	Small flowered miner's-lettuce	
Myrsinaceae - Myrsine family		
* *Anagallis arvensis*	Scarlet pimpernel	
Nyctaginaceae - Four O'clock family		
Mirabilis laevis var. crassifolia	Coastal wishbone plant	
Onagraceae - Evening Primrose family		
Camissoniopsis bistorta	California sun cup	
Camissoniopsis hirtella	Hairy suncup	
Clarkia delicata	Delicate clarkia	CRPR 1B.2
Clarkia purpurea ssp. quadrivulnera	Four spot purple clarkia	
Epilobium canum	California fuchsia	
Oxalidaceae - Oxalis family		
Oxalis californica	California wood-sorrel	
* *Oxalis pes-caprae*	Bermuda buttercup	
Paeoniaceae - Peony family		
Paeonia californica	California peony	
Phrymaceae - Lopseed family		
Diplacus longiflorus	Bush monkeyflower	
Plantaginaceae - Plantain family		
Antirrhinum kelloggii	Climbing snapdragon	
Antirrhinum nuttallianum	Nuttall's snapdragon	
Nuttallanthus texanus	Blue toadflax	
Plantago erecta	Dot seed plantain	

Scientific Name	Common Name	Special Status
Polemoniaceae - Phlox family		
Eriastrum sapphirinum ssp. sapphirinum	Sapphire woollystar	
Gilia angelensis	Chaparral gilia	
Navarretia hamata ssp. hamata	Hooked navarretia	
Navarretia hamata ssp. leptantha	Slender hooked navarretia	
Polygonaceae - Buckwheat family		
Eriogonum fasciculatum var. foliolosum	Leafy California buckwheat	
Pterostegia drymarioides	Granny's hairnet	
Primulaceae - Primrose family		
Primula clevelandii	Padre's shooting star	
Primula clevelandii ssp. clevelandii	Padre's shooting star	
Ranunculaceae - Buttercup family		
Clematis pauciflora	Few-flowered virgin's bower	
Delphinium parishii ssp. parishii	Parish's larkspur	
Rhamnaceae - Buckthorn family		
Rhamnus crocea	Spiny redberry	
Rosaceae - Rose family		
Cercocarpus betuloides var. betuloides	Birchleaf mountain mahogany	
Drymocallis glandulosa var. wrangelliana	Field sticky woodbeauty	
Heteromeles arbutifolia	Toyon	
Rubiaceae - Madder family		
Galium angustifolium ssp. angustifolium	Narrow leaved bedstraw	
Scrophulariaceae - Figwort family		
Scrophularia californica	California figwort	
Solanaceae - Nightshade family		
Solanum americanum	White nightshade	
Solanum parishii	Parish's nightshade	
Verbenaceae - Vervain family		
Verbena lasiostachys var. lasiostachys	Western vervain	
Violaceae - Violet family		
Viola pedunculata	Johnny-jump-up	
MONOCOTS		
Agavaceae - Century Plant family		
Chlorogalum parviflorum	Smallflower soap plant	
Hesperoyucca whipplei	Chaparral yucca	

Scientific Name	Common Name	Special Status
Alliaceae - Onion or Garlic family		
Allium praecox	Early onion	
Iridaceae - Iris family		
Sisyrinchium bellum	Lovely blue-eyed-grass	
Liliaceae - Lily family		
Calochortus splendens	Splendid mariposa lily	
Calochortus weedii var. weedii	Weed's mariposa lily	
Fritillaria biflora var. biflora	Chocolate Lily	County List D
Poaceae - Grass family		
* *Avena barbata*	Slender wild oat	
* *Avena fatua*	Wild oat	
* *Bromus rubens*	Red brome	
* *Lamarckia aurea*	Goldentop grass	
Stipa pulchra	Purple needle grass	
Themidaceae - Brodiaea family		
Brodiaea terrestris ssp. kernensis	Dwarf brodiaea	
Dichelostemma capitatum ssp. capitatum	Blue dicks	
Muilla maritima	Common muilla	

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened

State:
SE = Endangered
ST =Threatened

CRPR – California Rare Plant Rank
1A. Presumed extinct in California and elsewhere
1B. Rare or Endangered in California and elsewhere
2A. Presumed extinct in California, more common elsewhere
2B. Rare or Endangered in California, more common elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

Threat Ranks
.1 - Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Appendix J

Special-Status Species Evaluated for Occurrence

Appendix J
Special-Status Species Evaluated for Occurrence

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Special-Status Plants			
Abrams' spurge (*Euphorbia abramsiana*)	-/-/2.2/-	Annual herb. Sandy soils in Mojavean desert scrub and Sonoran desert scrub; -5–915 m (-16–3,000 ft). Blooming period: August–November.	**Not expected.** Species not expected to occur, based on lack of suitable macrohabitat conditions.
Ashy spike-moss (*Selaginella cinerascens*)	-/-/4.1/SDC List D	Perennial rhizomatous herb. Chaparral and coastal sage scrub; 20–640 m (65–2,100 ft).	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Brewer's calandrinia *(Calandrinia breweri*)	-/-/4.2/SDC List D	Annual herb. Sandy or loamy soils, disturbed and/or burned sites in chaparral and coastal scrub; 10–1,220 m (32–4,000 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
California adder's-tongue (*Ophioglossum californicum*)	-/-/4.2/SDC List D	Perennial rhizomatous herb. Mesic areas in chaparral, valley and foothill grasslands, and the margins of vernal pools; 60–525. Blooming period: December–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
California adolphia (Adolphia californica)	-/-/2B.1/SDC List B	Deciduous shrub. Clay soils in chaparral, coastal scrub, and valley and foothill grassland; 45–740 m (147–2,428 ft). Blooming period: December–May.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Cedros Island oak *(Quercus cedrosensi*)	-/-/2B.2/	Evergreen tree. Closed-cone coniferous forest, chaparral, coastal scrub; 255–960 m (836–3,148 ft). Blooming period: April–May.	**Not expected.** Species is a conspicuous tree that would have been readily observed during surveys if present. This species is restricted to the far southern San Diego County border with Baja California.
Chaparral ash (*Fraxinus parryi*)	-/-/2B.2/-	Perennial shrub. Chaparral; 213–620 m (698–2,033 ft). Blooming period March–May.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Chaparral nolina (*Nolina cismontana*)	-/-/1B.2/SDC List A	Perennial evergreen shrub. Sandstone and gabbro soils in chaparral, and coastal scrub; 140–1,275 m (459–4,183 ft). Blooming period: May–July.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Chaparral ragwort (*Senecio aphanactis*)	-/-/2B.2/SDC List B	Annual herb. Chaparral, cismontane woodland, coastal scrub, and alkaline flats; 15–800 m (49–2,624 ft.). Blooming period: January–April.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Chaparral Rein Orchid (*Piperia cooperi*)	-/-/4.2/SDC List D	Perennial herb. Chaparral, cismontane woodland, and valley and foothill grassland; 15–1,585 m (49–5,200 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Chocolate lily (*Fritillaria biflora*)	SDC List D	Perennial bulb. Clay soils in grassland habitats. Blooming period: March.	**Observed.** Small scattered locations of chocolate lily were noted incidentally during 2019 QCB surveys and again during focused surveys for this species in March 2021. All occurrences are outside of the proposed project footprint.
Cleveland's bush monkeyflower (*Diplacus clevelandii*)	-/-/4.2/-	Perennial herb. Gabbroic, often in disturbed areas, openings, rocky. Chaparral, cismontane woodland, lower montane coniferous forest. 450–2,000 m (1,475–6,560 ft). Blooming period: April-June.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present. Also, this species is typically found at higher elevations within the Laguna and Cuyamaca Mountains of San Diego County.
Colorado Desert larkspur (*Delphinium parishii* ssp*. subglobosum*)	-/-/4.3/SDC List D	Perennial herb. Chaparral, cismontane woodland, pinyon and juniper woodland, and Sonoran desert scrub; 600–1,800 m (1,960–5,900 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Coulter's goldfields (*Lasthenia glabrata* ssp*. coulteri*)	-/-/1B.1/SDC List A	Annual herb. Coastal salt marsh, coastal salt swamps, playas, vernal pools; 1–1,220 m (3–4,000 ft). Blooming period: February–June.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Coulter's matilija poppy (*Romneya coulteri*)	-/-/4.2/SDC List D	Perennial rhizomatous herb. Chaparral and coastal scrub; often in burned areas; 20–1,200 m (65–3,900 ft). Blooming period: March–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Cove's cassia (*Senna covesii*)	-/-/2B.2/SDC List B	Perennial herb. Sandy Sonoran desert scrub; 285–1,070 m (935–3,500 ft). Blooming period: March–June.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Cuyamaca larkspur (*Delphinium hesperium* ssp. *cuyamacae*)	-/SR/B.2/SDC List A	Perennial herb. Relatively densely vegetated montane meadows and seeps, mesic lower montane coniferous forest, and vernal pools; 1,220–1,631 m (4,000–5,350 ft). Blooming period: May –July.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species occurs at much higher elevations than the BSA. Species not observed during special-status plant surveys conducted in 2019.
Dean's milk-vetch (*Astragalus deanei*)	-/-/1B.1/SDC List A	Perennial herb. Open shrubby slopes, coastal sage scrub, chaparral, cismontane woodland, riparian forest, and sandy washes; 75–695 m (246–2,279 ft). Blooming period: February–May.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
decumbent goldenbush (*Isocoma menziesii* var. *decumbens*)	-/-/1B.2/SDC List A	Perennial shrub. Chaparral and in sandy coastal scrub, often in sandy disturbed areas; 10–135 m (33–443 ft). Blooming period: April–November.	**Present.** Approximately 226 individuals observed in southern and eastern portions of BSA during special-status plant surveys in 2019.
Dehesa nolina (*Nolina interrata)*	-/-/1B.1, SDC List A	Perennial herb. Gabbroic, metavolcanic, or serpentinite soils in open southern mixed chaparral and chamise chaparral; 185–855 m (600–2,800 ft). Blooming period: June–July.	**Low potential**. Suitable macrohabitat conditions are present, though suitable soils are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Delicate clarkia (*Clarkia delicata*)	-/-/1B.2/SDC List A	Annual herb. Oak woodlands and chaparral, often on gabbroic soils; 235–1,000 m (770–3,280 ft). Blooming period: April–June.	**Present.** Two individuals observed in central portion of BSA during special-status plant surveys in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Dunn's mariposa-lily (*Calochortus dunnii*)	-/SR/1B.2/SDC NE/MSCP	Perennial bulbiferous herb. Gabbroic or metavolcanic soils, or rocky openings in chaparral or grassland/chaparral ecotone, also in closed-cone coniferous forest; 185–1,830 m (606–6,002 ft). Blooming period: February–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Encinitas baccharis (*Baccharis vanessae*)	FT/SE/1B.1/SD NE/MSCP	Deciduous shrub. Sandstone in maritime chaparral and cismontane woodland; 60–720 m (196–2,362 ft). Blooming period: August–November.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Engelmann Oak (*Quercus engelmannii*)	-/-/4.2/SDC List B	Deciduous tree. Cismontane woodland, chaparral, riparian woodland, and valley and foothill grassland; 50–1,300 m (164–4,265 ft). Blooming period: March–June.	**Present.** Approximately 127 individuals observed concentrated in the northern portion of BSA during special-status plant surveys in 2019.
Fish's Milkwort (*Polygala cornuta* var. *fishiae*)	-/-/4.3/SDC List D	Perennial deciduous shrub. Chaparral, cismontane woodland, and riparian woodland; 100–1,000 m (328–3,280 ft). Blooming period: May–August.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Gander's pitcher sage *(Lepechinia ganderi*)	-/-/1B.3/SDC List A/MSCP	Perennial shrub. Gabbroic or metavolcanic soils in closed-cone coniferous forest, chaparral, coastal scrub, and valley and foothill grassland; 305–1,005 m (1,000–3,296 ft). Blooming period: June–July.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Gander's ragwort (*Packera ganderi*)	-/CR/1B.2/SDC List A	Perennial herb. Chaparral often in burned areas and gabbroic outcrops; 400–1,200 m (1,312–3,937 ft). Blooming period April–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Golden-Rayed pentachaeta (*Pentachaeta aurea* ssp. *aurea*)	-/-/4.2/SDC List D	Annual herb. Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, riparian woodland, and valley and foothill grassland; 80–1,850 m (262–6,068 ft). Blooming period: March–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Graceful Tarplant (*Holocarpha virgata* ssp. *elongata*)	-/-/4.2/SDC List D	Annual herb. Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland; 60–1,100 m (196–3,600 ft). Blooming period: May–November.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Hammitt's clay-cress (*Sibaropsis hammittii*)	-/-/1B.2, SDC List A	Annual herb. Clay soils in openings in chaparral and valley and foothill grassland; 720–1,065 m (2,362–3,501 ft). Blooming period: March–April.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Elevation of BSA outside of suitable range for species. Species not observed during special-status plant surveys conducted in 2019.
Heart-leaved pitcher sage (*Lepechinia cardiophylla*)	-/-/1B.2/SDC List A/MSCP	Perennial shrub. Closed-cone coniferous forest, chaparral, cismontane woodland; 520–1,370 m (1,705–4,493 ft). Blooming period: April–July.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Lakeside ceanothus (*Ceanothus cyaneus*)	-/-/1B.2/SDC List A/MSCP	Evergreen shrub. Closed-cone coniferous forest, dense chaparral; 235–755 m (771–2,543 ft). Blooming period: April–June.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Little mousetail (*Myosurus minimus* ssp. *apus*)	-/-/3.1/SDC List C	Annual herb. Valley and foothill grassland, and alkaline vernal pools; 20–640 m (65–2,100 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though commonly associated with vernal pools and wetlands, which are not present in BSA. Species not observed during special-status plant surveys conducted in 2019.
Long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)	-/-/1B.2/SDC List A	Annual herb. Clay lenses, largely devoid of shrubs in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pools; 30–1,530 m (98–5,018 ft). Blooming period: April–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Mexican flannelbush *(Fremontodendron mexicanum*)	FE/SR/1B.1/SDC List A	Evergreen shrub. Gabbroic, metavolcanic, or serpentine soils in closed-cone coniferous forest, chaparral, and cismontane woodland; 10–716 m (32–2,349 ft). Blooming period: March–June.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Mission Canyon bluecup (*Githopsis diffusa* ssp. *filicaulis*)	-/-/3.1/SDC List C	Annual herb. Mesic soils and disturbed areas within chaparral; 450–700 m (1,476–2,296 ft). Blooming period: April–June.	**Not expected.** Suitable macrohabitat conditions exist, but no suitable mesic soils present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Mojave paintbrush (*Castilleja plagiotoma*)	-/-/4.3/-	Perennial herb. Dry sagebrush scrub, pinyon woodland. 300–2,500 m (984–8,202 ft). Blooming period: April–June.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019. Species presence in San Diego County (El Cajon quad) is not verified, and species is not listed in Simpson and Rebman's *Checklist of the Vascular Plants of San Diego County*.
Moreno currant (*Ribes canthariforme*)	-/-/1B.3/SDC List A	Deciduous shrub. Chaparral and riparian scrub; 340–1,200 m (1,115–3,937 ft). Blooming period: February–April.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Mud nama (*Nama stenocarpa*)	-/-/2B.2/SDC List B	Annual/perennial herb. Marshes and swamps, also riverbanks and lake margins; 5–500 m (16–1,640 ft). Blooming period: January–July	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Munz's sage (*Salvia munzii*)	-/-/2B.2/SDC List B	Evergreen shrub. Chaparral and coastal sage scrub; 120–1,065 m (393–3,493 ft). Blooming period: February–April.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Orcutt's brodiaea (*Brodiaea orcuttii*)	-/-/1B.1/SDC List A/MSCP	Bulbiferous herb. Found on mesic, clay, sometimes serpentinite soils in closed-cone coniferous forest, chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and vernal pools; 30–1,692 m (98–5,550 ft). Blooming period: May–July.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Otay manzanita (*Arctostaphylos otayensis*)	-/-/1B.2/SDC List A	Evergreen shrub. Chaparral or cismontane woodlands on volcanic rock outcrops; 275–1,700 m (902–5,576 ft). Blooming period: January–April.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Otay Mountain ceanothus (*Ceanothus otayensis*)	-/-/1B.2/-	Perennial evergreen shrub. Metavolcanic or gabbroic chaparral; 600–1,100 m (1,968–3,608 ft). Blooming period: January–April.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Palmer's goldenbush (*Ericameria palmeri* var. *palmeri*)	-/-/1B.1/SDC List B/MSCP	Evergreen shrub. Coastal drainages, in mesic chaparral sites, or rarely in coastal sage scrub; below 600 m (1,969 ft). Blooming period: August–October (uncommon in July).	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Palmer's grapplinghook (*Harpagonella palmeri*)	-/-/4.2/SDC List D	Annual herb. Clay soils in chaparral, grasslands, coastal sage scrub; 20–955 m (65 to 3,132 ft). Blooming period: March–May.	**Present.** Approximately 13,857 individuals observed during special-status plant surveys in 2019 within numerous clay lenses, primarily in the central and southern portions of the site.
Paniculate tarplant (*Deinandra paniculata*)	-/-/4.2/SDC List D	Annual herb. Usually found in vernally mesic soils in coastal scrub, valley and foothill grassland, and vernal pools; 25–940 m (82–3,084 ft). Blooming period: April–November.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Parry's tetracoccus (*Tetracoccus dioicus*)	-/-/1B.2/SDC List A/MSCP	Deciduous shrub. Chaparral and coastal sage scrub; 165–1,000 m (541–3,280 ft). Blooming period: April–May.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
Payson's jewel-flower (*Caulanthus simulans*)	-/-/4.2/SDC List D	Annual herb. Sandy and granitic soils in chaparral and coastal scrub; 90–2,200 m (295–7,218 ft). Blooming period: February–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Peninsular spineflower (*Chorizanthe leptotheca*)	-/-/4.2/SDC List D	Annual herb. Alluvial fans or granitic areas in chaparral, coastal scrub, and lower montane coniferous forest; 300–1,900 m (984–6,232 ft). Blooming period: May–August.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Pride-of-California (*Lathyrus splendens*)	-/-/4.3/SDC List D	Perennial herb. Chaparral; 200–1,525 m (656–5,002 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Ramona horkelia (*Horkelia truncata*)	-/-/1B.3/SDC List A	Perennial herb. Clay and gabbroic soils in chaparral and cismontane woodland; 400–1,300 m (1,312–4,265 ft). Blooming period: May–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*)	-/-/4.3/SDC List A	Annual herb. Openings in chaparral and sage scrub; below 885 m (2,900 ft). Blooming Period: January–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Rush-like Bristleweed (*Xanthisma junceum*)	-/-/4.3/SDC List D	Perennial herb. Chaparral and coastal scrub; 240–1,000 m (787–3,280 ft.). Blooming period: June–January.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Bernardino aster (*Symphyotrichum defoliatum*)	-/-/1B.2/-	Perennial rhizomatous herb. Near ditches, streams, and springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and vernally mesic valley and foothill grassland; 2–2,040 m (7–6,693 ft). Blooming period: July–November.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	FE/SE/1B.1/-/MSCP	Annual/perennial herb. Mesic soils in coastal scrub, valley and foothill grassland, and vernal pools; 20–620 m (65–2,034 ft). Blooming period: April–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Diego County needle grass (*Stipa diegoensis*)	-/-/4.2/SDC List D	Perennial herb. Rocky, often mesic soils within chaparral and coastal scrub; 10–800 m (32–2,624 ft). Blooming period: February–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though commonly associated with vernal pools, which are not present in BSA. Species not observed during special-status plant surveys conducted in 2019.
San Diego County viguiera (*Bahiopsis laciniate*)	-/-/4.2/SDC List D	Perennial shrub. Chaparral and coastal scrub; 10–750 m (33–2,461 ft). Blooming period: February–August.	**Present.** Approximately 67 individuals observed in the most northern and southwestern portions of the BSA during special-status plant surveys in 2019.
San Diego gumplant (*Grindelia hallii*)	-/-/1B.2/SDC List A	Perennial herb. Meadows, chaparral, lower montane coniferous forest, and valley and foothill grassland; 185–1,745 m (606–5,723 ft). Blooming period: May–October.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Diego marsh-elder (*Iva hayesiana*)	-/-/2B.2/SDC List B	Perennial herb. Marshes and swamps, wetland areas, and playas; 10–500 m (32–1,640 ft). Blooming period: April–October.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
San Diego milk-vetch (*Astragalus oocarpus*)	-/-/1B.2/SDC List A	Perennial herb. Openings in chaparral and cismontane woodland, at the periphery of meadows; 305–1,524 m (1,000–4,999 ft). Blooming period: May–August.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Diego sagewort (*Artemisia palmeri*)	-/-/4.2/SDC List D	Deciduous shrub. Sandy soils in mesic areas in chaparral, coastal scrub, riparian forest, riparian scrub, riparian woodland; 15–915 m (49–3,002 ft). Blooming period: February–September.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.
San Diego thorn-mint (*Acanthomintha ilicifolia*)	FT/SE/1B.1/SDC NE/MSCP	Annual herb. Prefers friable or broken clay soils in grassy openings in chaparral and coastal sage scrub, valley and foothill grassland, and vernal pools; 10–960 m (33–3,150 ft). Blooming period: April–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Luis Obispo sedge (*Carex obispoensis*)	-/-/1B.2/-	Perennial rhizomatous herb. Often found on serpentine or gabbro seeps or on clay soils in closed-coned coniferous forest, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland often in wetland conditions. 10–820 m (32–2,689 ft). Blooming period: April–June.	**Not expected.** Suitable macrohabitat conditions (i.e., wetlands) are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
San Miguel savory (*Clinopodium chandleri*)	-/-/1B.2/SDC List A/MSCP	Perennial shrub. Rocky, gabbroic, or metavolcanic areas in chaparral, cismontane woodland, coastal scrub, riparian scrub, and valley and foothill grassland; 120–1,075 m (393–3,526 ft). Blooming period: March–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Short-bracted bird's-beak (*Cordylanthus rigidus* ssp*. brevibracteatus*)	-/-/4.3/?	Annual herb. Granitic openings in Jeffrey-pine and pinyon/juniper forest, sagebrush scrub. 850–2,560 m (2,789–8,398 ft). Blooming Period: July–September.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though BSA is outside of this species expected range. Species not observed during special-status plant surveys conducted in 2019.
Singlewhorl burrobrush (*Ambrosia monogyra*)	-/-/2B.2/-	Perennial shrub. Sandy soils in chaparral, coastal sage scrub, Sonoran desert scrub, and washes; 10–500 m (328–1,640 ft). Blooming period: August–November.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present. BSA is east of species' expected habitat range.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Small-flowered microseris (*Microseris douglasii* ssp. *platycarpha*)	-/-/4.2/SDC List D	Annual herb. Clay soils in cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools; 15–1,070 m (49–3,510 ft). Blooming period: March–May.	**Present.** Two individuals observed in the southwestern portion of the BSA during special-status plant surveys in 2019.
Small-flowered morning glory (*Convolvulus simulans*)	-/-/4.2/SDC List D	Annual herb. Friable clay soils or serpentine seeps in chaparral openings, coastal scrub, and valley and foothill grassland; 30–700 m (98–2,297 ft). Blooming period: March–July.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though species tends to be found near seeps, which are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Smooth tarplant (*Centromadia pungens* ssp. *laevis*)	-/-/1B.1/SDC List A	Annual herb. Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grassland; 0–640 m (0–2,100 ft). Blooming period: April–September.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Southern California black walnut (*Juglans californica*)	-/-/4.2/SDC List D	Deciduous tree. Alluvial areas in chaparral, cismontane woodland, and coastal scrub; 50–900 m (164–2,952 ft). Blooming period: March–August.	**Present**. One individual observed in northern portion of the BSA during special-status plant surveys in 2019.
Southern mountain misery (*Chamaebatia australis*)	-/-/4.2/SDC List D	Evergreen shrub. Gabbroic or metavolcanic chaparral; 300–1,020 m (984–3,345 ft). Blooming period: November–May.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Southern Mountains Skullcap (*Scutellaria bolanderi* ssp. *austromontana*)	-/-/1B.2/SDC List A	Perennial rhizomatous herb. Moist embankments of montane creeks, mesic chaparral, mesic cismontane woodland, and mesic lower montane coniferous forest; 425–2,000 m (1,394–6,562 ft). Blooming period: June–August.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Tends to be found in wetland habitat which is not present within BSA. Species not observed during special-status plant surveys conducted in 2019.
Southwestern Spiny Rush (*Juncus acutus* ssp. *leopoldii*)	-/-/4.2/SDC List D	Perennial rhizomatous herb. Mesic soils in coastal dunes, alkaline seeps in meadows and seeps, and coastal salt marshes and swamps; 3–900 m (9–2,953 ft). Blooming period: May–June.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Spreading navarretia (*Navarretia fossalis*)	FT/-/1B.1/SDC List A/MSCP	Annual herb. Chenopod scrub, assorted freshwater marshes and swamps, playas, and vernal pools; 30–655 m (98–2,149 ft). Blooming period: April–June.	**Not expected.** Suitable macrohabitat conditions are not present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Sticky geraea (*Geraea viscida*)	-/-/2B.3/SDC List B	Perennial herb. Openings and disturbed areas in chaparral, often in sandy, xeric soils; 450–1,700 m (1,476–5,577 ft). Blooming period: May–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*)	-/-/1B.2/SDC List A	Evergreen shrub. Chaparral and cismontane woodland; 30–790 m (98–2,591 ft). Blooming period: April–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
Tecate cypress (*Hesperocyparis forbesii*)	-/-/1B.1/SDC List A/MSCP	Perennial evergreen tree. Clay, gabbroic, or metavolcanic soils within closed-cone coniferous forest and chaparral; 80–1,500 m (262–4,921 ft).	**Not expected.** Species is a conspicuous tree that would have been readily observed during surveys if present.
Tecate tarplant (*Deinandra floribunda*)	-/-/1B.2/SDC List A	Annual herb. Chaparral and coastal sage scrub, also in arroyos; 70–1,220 m (230–4,002 ft). Blooming period: August–October.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though located north of species' expected range. Species not observed during special-status plant surveys conducted in 2019.
Variegated dudleya (*Dudleya variegata*)	-/-/1B.2/SDC NE/MSCP	Perennial herb. Clay soils in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland, and vernal pools; 3–580 m (9–1,903 ft). Blooming period: April–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though species is commonly associated with vernal pools. BSA located east of species' expected range. Species not observed during special-status plant surveys conducted in 2019.
Vernal barley (*Hordeum intercedens*)	-/-/3.2/SDC List C	Annual herb. Coastal dunes, coastal scrub, saline flats and depressions in valley and foothill grassland, and vernal pools; 5–1,000 m (16–3,280 ft). Blooming period: March–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though species is commonly associated with wetland and vernal pool habitat. Species not observed during special-status plant surveys conducted in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/CNPS/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Western spleenwort (*Asplenium vespertinum*)	-/-/4.2/SDC List D	Perennial rhizomatous herb. Rocky areas in chaparral, cismontane woodland, and coastal scrub; 180–1,000 m (590–3,281 ft). Blooming period: February–June.	**Low potential.** Suitable macrohabitat conditions are present within the BSA. Species not observed during special-status plant surveys conducted in 2019.
White rabbit-tobacco (*Pseudognaphalium leucocephalum*)	-/-/2B.2/-	Perennial herb. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland; 0–2,100 m (0–6,888 ft). Blooming period: July–December.	**Low potential.** Suitable macrohabitat conditions are present within the BSA, though located south of species' expected range. Species not observed during special-status plant surveys conducted in 2019.
Woolly Chaparral Pea (*Pickeringia montana* var. *tomentosa*)	-/-/4.3/-	Evergreen shrub. Gabbroic, granitic, or clay soils in chaparral; 0–1,700 m (0–5,577 ft). Blooming period: May–August.	**Not expected.** Species is a conspicuous shrub that would have been readily observed during surveys if present.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Special-Status Wildlife Species			
Invertebrates			
Crotch's bumblebee (*Bombus crotchii*)	-/CE/-/-	Grasslands and shrublands in southern to central California, with occasional records in the northern portion of the state. Species requires floral resources and undisturbed nest sites and overwintering sites.	**Low potential.** Species has not been documented within 5 miles of the project site per CNDDB records. State Endangered Candidacy reinstated Sept. 30, 2022.
Hermes copper butterfly (*Lycaena hermes*)	-/CT/-/-	Mesa habitats; chaparral, mixed woodlands. Larval host plant is spiny redberry.	**Low potential.** Species not observed during surveys conducted in 2019 or 2020. However, host plant spiny redberry was observed within the survey area.
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	FE/-/SDC NE/MSCP	Vernal pools. All known localities are below 701 m (2,300 ft) and are within 64 km (40 miles) of the Pacific Ocean.	**Low Potential.** Species not observed during wet and dry season protocol surveys completed in 2019.
Quino checkerspot butterfly (*Euphydryas editha quino*)	FE/-/SDC NE/-	Inhabits openings on clay soils within or in the vicinity of shrublands, grasslands, meadows, vernal pools, and lake margins. Closely tied to its larval host plant, dwarf plantain (*Plantago erecta*) or owl's clover (*Castilleja exserta* ssp*. exserta*).	**Present.** Two Quino checkerspot butterflies were observed during surveys conducted in 2019, and one was observed in 2020 within the BSA. In addition, the QCB host plant dot-seed plantain was found in the BSA.
Reptiles and Amphibians			
Arroyo toad (*Anaxyrus californicus*)	FE/SSC/SDC NE/MSCP	Exposed shallow pools with a sand or gravel base are used for breeding. Breeding pools must occur in the vicinity (ca. 10–100 m) of a braided sandy channel with shorelines or central bars made of stable, sandy terraces.	**None.** Suitable habitat not present within the project site.
Baja California coachwhip (*Masticophis fuliginosus*)	-/CSC/-/-	Found in open areas such as grassland, shrubland, and coastal sand dune.	**High potential.** Suitable grassland habitat present on-site; however, species was not observed during surveys and has not previously been observed in project vicinity.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
California glossy snake (*Arizona elegans occidentalis*)	-/CSC/-/-	Inhabits arid scrub, rocky washes, grasslands, chaparral. Appears to prefer microhabitats of open areas and areas with soil loose enough for easy burrowing.	**Moderate potential.** The nearest CNDDB record for this species is more than 6 miles away from BSA. Suitable habitat for the species is present, although the heavy clay soils within much of the BSA may be less than ideal for this species.
Coast horned lizard (San Diego horned lizard) (*Phrynosoma blainvillii*)	-/CSC/SDC Group II/MSCP	Found in arid and semi-arid climate conditions in chaparral, coastal sage scrub, primarily below 2,000 feet in elevation. Critical factors are the presence of loose soils with a high sand fraction; an abundance of native ants or other insects, especially harvester ants (*Pogonomyrmex* spp.); and the availability of both sunny basking spots and dense cover for refuge.	**Present.** One individual was observed incidentally within the BSA in 2019. Project site elevation is upper limit of species elevation range.
Coast patch-nosed snake (*Salvadora hexalepis virgultea*)	-/CSC/SDC Group II/-	Inhabits semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains.	**High potential.** Suitable habitat for this species is present within the BSA and is known from this general area of San Diego County.
Coast range newt (*Taricha torosa*)	-/CSC/SDC Group II/-	Can be found in coastal areas and coastal range mountains in oak forests, woodlands, or rolling grasslands. In the terrestrial phase, they live in moist to dry habitats under woody or leafy debris, in rock crevices, or in animal burrows. In the aquatic phase, they are found in ponds, reservoirs, lakes and slow-moving streams.	**Low potential.** Only four CNDDB records for this species are known from San Diego County, all four of which are more than 12 miles northeast of the BSA within the Cuyamaca Mountains. These individuals were documented along Cedar Creek and Boulder Creek. Required aquatic habitat, such as slow-moving streams, is not present within the BSA.
Coastal western whiptail (*Aspidoscelis tigris stejnegeri*)	-/CSC/SDC Group II/-	Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage such as chaparral, woodland, and riparian areas.	**Present.** One individual was observed incidentally within the BSA in 2019.
Coronado skink (*Plestiodon skiltonianus interparietalis*)	-/CSC/SDC Group II/-	Forest, open woodland and grassy areas. Usually found under leaf litter, logs or rocks.	**High potential.** Suitable habitat for this species is present within the BSA and is known from this general area of San Diego County.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Orange-throated whiptail (*Aspidoscelis hyperythra*)	-/CSC/-/MSCP	Occur in semi-arid brushy areas with loose soil and rocks. Can be found in washes, streamsides, rocky hillsides, and chaparral. Typically found at elevations between 0 and 2,000 ft.	**Present.** Two individuals were observed incidentally within the BSA in 2019. Project site elevation is upper limit of species' elevation range.
Red-diamond rattlesnake (*Crotalus ruber*)	-/CSC/SDC Group II/-	As far north as Puente Hills in Yorba Linda and southwest San Bernardino County, and occurs south to Loreto, Baja California, Mexico; known elevation range is sea level to just under 15,000 feet but apparently rare above about 3,940 feet; greatest frequency in areas of heavy brush, such as chamise chaparral, but also in open areas at lower densities; boulders and rocky outcrops.	**Present.** One individual was observed in the BSA incidentally during 2019 surveys. Suitable conditions for species on project site.
Southern California legless lizard (*Anniella stebbinsi*)	-/CSC/SDC Group II/-	Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas often indicate suitable habitat.	**Moderate potential**. Suitable habitat is present on-site, including in the leaf litter under the Engelmann oaks and within fire clearance areas where ground disturbance is not proposed. The majority of potential habitat in the proposed preserve portion of the BSA. Not observed during surveys.
Southwestern pond turtle (*Emys marmorata* [=*Actinemys pallida*])	-/CSC/SDC Group I/ MSCP	Requires slack- or slow-water aquatic habitat as well as aerial and aquatic basking sites. Also requires an upland oviposition site on an unshaded slope with clay soils, in the vicinity of the aquatic site.	**None**. Habitat for species not present in BSA.
Two-striped gartersnake (*Thamnophis hammondii*)	-/CSC/SDC Group I/-	Inhabits perennial and intermittent streams with rocky beds and bordered by willow thickets or other dense vegetation.	**None**. Habitat for species not present in BSA.
Western spadefoot (*Spea hammondii*)	-/CSC/SDC Group II/- Species is currently under review to be listed under the federal ESA	Temporary pools with water temperatures between 9°C and < 30°C that last at least 3 weeks within areas of open vegetation.	**Present**. Three individual adults were observed in the western portion of the BSA in March 2022 outside of the proposed active park footprint. An egg mass was observed in one ponded area in 2019 within the proposed active park footprint.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Birds			
Bell's sage sparrow (*Artemisiospiza belli belli*)	-/WL/SDC Group I/-	Open chaparral and sage scrubs. Nests typically in shrubs, well below the canopy, occasionally on the ground. Nest sites were in chamise, Cleveland sage, big sagebrush, and on the ground amid broken-down branches of big sagebrush. The habitat must not be too dense or too encumbered by leaf litter to favor this bird that spends most of its time running on the ground.	**Moderate potential**. Although not observed during any of the numerous wildlife surveys conducted for the proposed project, this species could occur due to the presence of suitable habitat in the BSA. The nearest CNDDB record is more than approximately 9 miles away.
Burrowing owl (*Athene cunicularia*)	-/SSC/SDC NE/MSCP	Inhabits open, dry, nearly or quite level grassland; prairie; desert floor; shrubland should be considered potential habitat if shrub cover is below 30%. In coastal Southern California, a substantial fraction of birds are found in microhabitats highly altered by man, including flood control and irrigation basins, dikes, and banks, abandoned fields surrounded by agriculture, and road cuts and margins. Strong association between burrowing owls and burrowing mammals, especially ground squirrels (*Spermophilus* spp.); however, they will also occupy manmade niches such as banks and ditches, piles of broken concrete, and even abandoned structures.	**Present (Wintering)**. One individual was observed incidentally during winter surveys in 2018–2019 outside of the proposed Alpine Regional Park area. **Moderate potential (Breeding).** Species not observed breeding during focused burrowing owl surveys completed in 2019. Suitable ground squirrel burrows present within survey area.
Coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*)	-/CSC/SDC NE/MSCP	Cactus thickets of *Opuntia* or *Cylindropuntia* species, preferably more than 1 meter tall.	**None.** Suitable cactus habitat not present within the BSA.
Coastal California gnatcatcher (*Polioptila californica californica*)	FT /SSC/SDC NE/MSCP	Occurs within coastal sage scrub along the California coast. Prefers low-lying vegetation dominated by sagebrush, buckwheat, salvia, and prickly-pear cactus. Forages almost exclusively on insects.	**Low potential.** Species not observed during protocol surveys completed in 2019. The project site is at the far eastern edge of this species' geographic range.
Cooper's hawk (*Accipiter cooperii*)	-/ WL/SDC Group I/MSCP	Oak groves and mature stands of riparian woodland. This species has adapted well to development and is abundant in urban canyons with eucalyptus trees.	**Present.** Observed during coastal California gnatcatcher surveys.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Ferruginous hawk (*Buteo regalis*)	-/WL/SDC Group I/MSCP	Occurs in San Diego County as a wintering resident from October to March. Distribution is patchy and corresponds to larger tracts of grasslands.	**Moderate potential.** Only one documented CNDDB occurrence in San Diego County, approximately 20 miles north of Alpine Park project site. *San Diego Bird Atlas* identifies that migrant ferruginous hawk have been observed wintering in the quadrangle where Wright's Field/Alpine Park is located. However, ferruginous hawk was not observed during any of the many surveys on the property, including surveys conducted during winter months. It is not anticipated to breed in San Diego County.
Grasshopper sparrow (*Ammodramus savannarum*)	-/CSC/SDC Group I/-	Occurs in dry, dense grasslands, especially those with a variety of grasses and tall forbs and scattered shrubs for singing perches. Nests in slight depressions in dense grasslands.	**Moderate potential**. Only one documented CNDDB occurrence of this species is in San Diego County, approximately 13 miles west of BSA. The *San Diego Bird Atlas* identifies that breeding is "probable" and that low counts of grasshopper sparrow have been observed wintering in the quadrangle where Wright's Field/Alpine Park is located. Grasshopper sparrow was not observed during any of the surveys on the property.
Golden eagle (*Aquila chrysaetos*)	-/FP/SDC Group I/MSCP	Nest on cliff ledges or trees on steep slopes. Forage in grasslands, sage scrub or broken chaparral.	**Low potential.** Nesting habitat not present on project site, but species could forage in grasslands.
Lawrence's goldfinch (*Spinus lawrencei*)	BCC/-/-/-	Nests mostly in dry, open oak woodlands with chaparral, weedy fields, and a source of freshwater. They also nest and forage in coastal scrub, pinyon pine–juniper woodlands, and streamside habitats.	**High Potential.** Suitable habitat present within the BSA, including within the proposed active use park area. Species not observed during surveys.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Least Bell's vireo (*Vireo bellii pusillus*)	FE/SE/SDC NE/MSCP	Found as a summer resident of Southern California where it inhabits low riparian growth in the vicinity of water or in dry river bottoms below 2,000 feet. Species selects dense vegetation low in riparian zones for nesting; most frequently located in riparian stands between 5 and 10 years old; when mature riparian woodland is selected, vireos nest in areas with a substantial robust understory of willows as well as other plant species.	**None.** Suitable riparian habitat not present on project site.
Northern harrier (*Circus hudsonius*)	-/CSC/SDC Group I/MSCP	Grasslands and marshes. Nests are on the ground and typically concealed within a marsh or other dense, low-growing vegetation. The northern harrier is considered a breeding resident and a migrant species. Nesting harriers are now considered rare and the known breeding population in San Diego County is estimated at 25 to 75 pairs (Unitt 2004).	**Low potential.** There are no CNDDB records of northern harrier within approximately 20 miles of the project site and none were observed during surveys. The *San Diego Bird Atlas* also does not identify possible or probable breeding or wintering in the quadrangle where Wright's Field/County parcel occur.
Oregon vesper sparrow (*Pooecetes gramineus affinis*)	-/CSC/-/- (Wintering)	Obligate grassland species. Wintering grounds are low elevations on mainly open ground with little vegetation or grown to short grass and low annuals, including stubble fields, meadows, and road edges. Winters in Southern California from September to April.	**High potential.** Species not observed during any of the surveys conducted during winter and early spring (e.g., fairy shrimp, Quino checkerspot butterfly) conducted for the proposed project. However, the *San Diego Bird Atlas* notes its presence within "native grassland at Wright's Field."
Red-shouldered hawk (*Buteo lineatus*)	-/-/SDC Group I/-	Found within oak woodlands, riparian woodland, scattered rural residences, orchards, and eucalyptus groves. Through the last quarter of the century it became more and more of an urban bird, adding palms to its repertoire of nest sites.	**Present.** One individual was observed in the BSA foraging over the northern portion of the proposed equestrian staging area.
Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	-/WL/SDC Group I/MSCP	Fairly common, widespread, and generally fairly conspicuous resident of rocky grassland and patchy shrub habitats, often including areas with disturbance from fire, trash, soil compaction, and non-native vegetation.	**Moderate potential.** Suitable habitat present within the BSA. Species not observed during any biological surveys for proposed project. The BSA represents the eastern extent of its range in San Diego County.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Southwestern willow flycatcher (*Empidonax traillii extimus*)	FE/SE/SDC NE/MSCP	The southwestern willow flycatcher breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands including lakes and reservoirs.	**None**. Suitable riparian habitat not present on project site.
Swainson's hawk (*Buteo swainsoni*)	-/ST/SDC Group I/MSCP	Inhabits open, dry fields and grasslands. Forages on a variety of prey items, including small mammals, reptiles, and birds. Migratory. According to the *San Diego Bird Atlas,* this species is now a rare migrant, with the Borrego Valley serving as a stating site in the spring.	**Low potential**. Not known to breed in San Diego County. Suitable foraging habitat present on-site but, based on the rarity of sightings in San Diego County for migrating individuals, it is not expected to occur within the BSA.
Tricolored blackbird (*Agelaius tricolor*)	-/CSC/SDC Group I/MSCP	Breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats.	**None.** Suitable marsh habitat not present within the BSA.
Western bluebird (*Sialia mexicana*)	-/-/SDC Group II/-	Cavity nester that inhabits montane coniferous forest and oak woodlands. Species shows signs of spreading out of its primitive range, colonizing urban areas with mature trees and lawns.	**Present.** Observed during coastal California gnatcatcher surveys.
White-tailed kite (*Elanus leucarus*)	-/FP/SDC Group I/-	Species is wide-spread over the coastal slope of San Diego County, preferring riparian woodland, oak groves, or sycamore groves adjacent to grasslands. White-tailed kites build their nest in the crowns of trees, especially the coast live oak, or on clumps of mistletoe. They also use non-native trees and large shrubs for nest sites.	**High potential.** There are no CNDDB records of white-tailed kite within approximately 15 miles of the project site and none were documented during surveys. Although this species is more commonly found in coastal San Diego County, the BSA provides suitable nesting and foraging habitat. The *San Diego Bird Atlas* also identifies possible breeding and/or wintering in the quadrangle where Wright's Field/County parcel occur. Species was not documented during surveys, despite it being very conspicuous.
Yellow-breasted chat (*Icteria virens*)	-/CSC/SDC Group I/-	Dense riparian woodland.	**None.** Suitable marsh habitat not present within the BSA.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Mammals			
American badger (*Taxidea taxus*)	-/CSC/SDC Group II/MSCP	Associated with large grassland and sparse sage scrub habitats. Occupies large dens/burrows and forages on small mammals (e.g., ground squirrels, rabbits), snakes, birds, and insects.	**Low potential**. Suitable grassland habitat present on-site but never observed during any of the numerous surveys conducted on site. This species and its burrows are easily observed if present.
Big free-tailed bat (*Nyctinomops macrotis*)	-/CSC/SDC Group II/-	Inhabits arid, rocky areas; roosts in crevices in cliffs. Has been recorded in urban locations in San Diego County. Species is rare in California.	**Present**. Documented during focused bat surveys in 2019.
Dulzura pocket mouse (*Chaetodipus californicus femoralis*)	-/CSC/SDC Group II/-	This species prefers dense chaparral and is less common in dry grassland and scrub. Burrows are excavated in gravelly or sandy soil.	**Low potential.** This species does not utilize heavy clay soils such as those within the project area. In addition, there is very little chaparral within the BSA.
Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	-/CSC/SDC Group II/-	Sandy herbaceous areas, usually in association with rocks and coarse gravel in southwest California; coastal and desert border areas in San Bernardino, Riverside, and San Diego counties. Elevation ranges from sea level to 6,000 feet. Vegetation community preferences include sage scrub, chamise-redshank chaparral, mixed chaparral, sage brush, desert wash, desert scrub, desert succulent scrub, pinyon-juniper, annual grassland.	**Moderate potential.** Suitable habitat present on project site. Sandy micro-habitat conditions not present within the BSA, although small pockets of sandy soils may be present.
Pallid bat (*Antrozous pallidus*)	-/CSC/SDC Group II/-	Species is found from coast to mixed conifer forest; grasslands, shrublands, woodlands, and forest; most common in open, dry habitats with rocky areas for roosting; year-long resident in most of range. Roosts in rock crevices, caves, mine shafts, under bridges, in buildings and tree hollows.	**Present.** Documented during focused bat surveys in 2019.
Pocketed free-tailed bat (*Nyctinomops femorosaccus*)	-/CSC/SDC Group II/-	Lives in deserts and sage scrub, roosts in rocky crevices.	**Present.** Documented during focused bat surveys in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)	-/CSC/SDC Group II/-	Common throughout state, except at high elevations in herbaceous and desert shrub areas, sage scrub, grasslands, open chaparral and woodland/forest areas; relatively disturbance tolerant.	**Moderate potential**. Suitable habitat present on-site.
San Diego desert (Bryant's) woodrat (*Neotoma lepida intermedia*)	-/CSC/SDC Group II/-	Dry and/or sunny shrublands, favoring (but not requiring) areas with cacti and abundant rocks and crevices. Does not require a source of drinking water. Sage scrub communities are frequently occupied.	**Moderate potential.** Suitable habitat present on-site.
Stephen's kangaroo rat (*Dipodomys stephensi*)	FE/CT/SDC Group I/-	Occurs in open grasslands that consist of native and nonnative annual herbs, filaree, and native and nonnative grasses. Also occurs in sparsely vegetated coastal sage scrub habitats with perennial species such as Encelia, coastal sagebrush, and California buckwheat occur. Certain nonnative grasses can exclude this species from otherwise suitable habitat (e.g., *Bromus diandrus*). Found from approximately 55–1,250 m above sea level and typically occurs on relatively flat or gently sloping ground.	**None**. The BSA is far outside of the species known range in San Diego County, which is northern San Diego County. In addition, the heavy clay soils would exclude this species from the BSA, which prefers looser gravel soils.
Townsend's big-eared bat (*Corynorhinus townsendii*)	-/CSC/SDC Group II/-	Species can be found in a variety of habitats throughout the state where appropriate roosting habitat exists. Roosts primarily in caves and cavern-like spaces; also include in abandoned buildings, mines, culverts, box-like spaces in bridges and other structures, and large hollows in trees. Very sensitive to human disturbances.	**Present**. Documented during focused bat surveys in 2019.
Western long-eared myotis (*Myotis evotis*)	-/-/SDC Group II/-	Found in a wide range of habitats, but is most common in mixed coniferous forests, from humid coastal areas to montane forests. Roosts in tree cavities in dense forests, stumps, large snags for day roosts. These bats usually prefer snags that reach high into or above the forest canopy. Also found roosting in the crevices of boulders. Other places that function as day roosts are abandoned buildings, cracks in the ground, caves, mines, and loose bark on living and dead trees.	**Present.** Documented during focus bat surveys in 2019.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur
Western mastiff bat (*Eumops perotis californicus)*	-/CSC/SDC Group II/-	Primarily a cliff dwelling species for breeding. Found foraging in a variety of habitats, from dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, montane meadows, and agricultural areas.	**Present.** Documented during focused bat surveys in 2019.
Western red bat (*Lasiurus blossevillii*)	-/CSC/SDC Group II/-	Usually among dense foliage, in forests and wooded areas, making long migrations from the northern latitudes to warmer climes for winter, sometimes hibernates in tree hollows or woodpecker holes.	**Present**. Documented during focused bat surveys in 2019.
Western small-footed myotis (*Myotis ciliolabrum*)	-/-/SDC Group II/-	Rears young in cliff-face crevices, erosion cavities, and beneath rocks on the ground. Commonly found near sources of water with a large insect population. Elevation of selected habitats ranges from 300 to 3,300m above sea level. These bats are unique in that they do not roost in trees, inhabiting cliff faces and rocky outcroppings no farther than 2 km away from their foraging grounds.	**Present**. Documented during focused bat surveys in 2019.
Western yellow bat (*Lasiurus xanthinus*)	-/CSC/-/-	Species recorded below 600 m (2,000 ft) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Occurs year-round in California. Forages over water and among trees. Roosts in trees. Has been captured roosting under palm trees. Probably forms small maternity groups in trees and palms.	**Present**. Documented during focused bat surveys in 2019.
Yuma myotis (*Myotis yumanensis*)	-/-/SDC Group II/-	Optimal habitats are open forests and woodlands with sources of water over which to feed. Roosts in buildings, mines, caves, or crevices. Fairly common in San Diego County.	**Present.** Documented during focused bat surveys in 2019 and 2022.

Species Common/ Scientific Name	Status[a] Federal/ State/San Diego County/MSCP	Habitat Requirements	Potential to Occur

[a] Status Codes

Federal

FE–listed as endangered under the federal Endangered Species Act.
FT–listed as threatened under the federal Endangered Species Act.
FP–listed as fully protected.
F Delisted–delisted.

State

SE–listed as endangered under the California Endangered Species Act.
ST–listed as threatened under the California Endangered Species Act.
CT–candidate threatened.
S Delisted–delisted.
CDFW FP–fully protected species in California.
CSC–species of special concern in California.
WL –Watch List.

CA Rare Plant Rank (CRPR) – Formerly known as CNPS List

1A. Presumed extirpated in California and either rare or extinct elsewhere.
1B. Rare, threatened, or endangered in California and elsewhere.
2A. Presumed extirpated in California, more common elsewhere.
2B. Rare, threatened, or endangered in California, more common elsewhere.
3. Plants for which we more information is needed–Review List.
4. Plants of limited distribution–Watch List

Threat Ranks

.1–Seriously endangered in California.
.2–Fairly endangered in California.
.3–Not very endangered in California.

San Diego County Group (SDC Group)

I–includes animal species that have a very high level of sensitivity, either because they are listed as threatened or endangered or because they have very specific natural history requirements that must be met.
II–includes animal species that are becoming less common but are not yet so rare that extirpation or extinction is imminent without immediate action. These species tend to be prolific within their suitable habitat types.
NE–narrow endemic species.

County MSCP–Covered Species under the MSCP South County Subarea Plan

San Diego County Sensitive Plant List

A–Rare, threatened, or endangered in California and elsewhere.
B–Rare, threatened, or endangered in California but more common elsewhere.
C–Maybe quite rare, but more information is needed to determine their status.
D–Limited distribution and uncommon but not presently rare or endangered.

Appendix D1

Multiple Species Conservation Program Conformance Statement

MULTIPLE SPECIES CONSERVATION PROGRAM CONFORMANCE STATEMENT

Alpine County Park Project

December 2022

I. Introduction

The Alpine County Park Project would occur in Alpine, a community in south-central San Diego County, approximately 1.3 miles south of the intersection of Tavern Road and Interstate 8 and 1 mile east of the intersection of Tavern Road and South Grade Road. The project would consist of development of Alpine County Park and establishment of passive recreational opportunities within an adjacent open space area. Specifically, the County of San Diego (County) is proposing development of an approximately 23-acre active park, formalization of existing trails, as well as closure of existing trails, all within 96.6 acres of undeveloped County-owned land. The remainder of the project site would be conserved as open space.

Alpine County Park

The proposed Alpine County Park would involve development of an active park with amenities such as multi-use turf areas, a baseball field, an all-wheel park, bike skills area, recreational courts (i.e., basketball, pickleball), fitness stations, leash-free dog area, restroom facilities, an administrative facility/ranger station, equestrian staging area and a corral, nature play area, community garden, a volunteer pad, picnic areas with shade structures and picnic tables, game table plaza, and multi-use trails. An open parking area would accommodate approximately 250 to 275 vehicles. In addition, 10 Americans with Disabilities Act–compliant spaces would be available near the primary entrance and administrative building as well as in the eastern portion of the site along South Grade Road. Volunteer pad parking spaces, equestrian staging areas, and corrals would be in the northern portion of the project site.

The proposed project would include an equestrian staging area that would be graded and covered with decomposed granite, allowing it to be used for vehicle parking. This area would be in the northern portion of the active park, directly west of the north entrance. The equestrian staging area would provide parking spaces for five equestrian trailers. It would also have receptacles for waste and manure. A Manure Management Plan would be prepared for the proposed project.

One solid-surface volunteer pad is proposed in the northern portion of the park. A volunteer pad is a permanent staging area for a recreational vehicle or similar type of vehicle. One volunteer would live on-site full time to help with maintenance and management of the park. Proposed electric facilities at the administrative facility/ranger station would be extended to the volunteer pad.

All permanent exterior security lighting would be installed so that lamps and reflectors would not be visible beyond the project site. Furthermore, lighting would not cause excessive reflective glare, would be directed so as not to illuminate the night sky, would be minimized within the project facility and in its immediate vicinity, and would comply with local policies and ordinances. Outdoor lighting would be solar powered; photovoltaic panels would be mounted on overhead structures above the parking spaces within the proposed active park.

The proposed project would either connect to the existing sewer system or include a septic system to serve the restroom facilities, administration facility/ranger station, and volunteer pad. An on-site connection to the existing sewer line is the first of two options available for sewage disposal at the site. This option would involve connecting to the existing sewer line within Tavern Road, west of the project site, or the existing sewer line within the northern portion of South Grade Road, near the intersection with Alpine Boulevard. The existing sewer line is served by the San Diego County Sanitation District. A pipeline would run from a force main to the restroom facility in the southern portion of the proposed park. The pipeline would be trenched along an existing road right-of-way, in the shoulder, and along the proposed parking area leading to the restroom building in the southern portion of the project site. Soil would be excavated, sand would be layered in the trench, and the pipeline would be laid. The trench would then be backfilled with the excavated material.

An on-site septic system is the second option for the disposal of sewage associated with the proposed project. The system would be in the northern portion of the project site, north of the equestrian staging area. Soil would be excavated to bury the septic tank underground. The size of the tank would be determined in the final design. However, it is anticipated that the proposed septic system would have the capacity for 5,000 gallons per day. Solids would be removed from the septic tank approximately once a week by truck. The system's filter treatment process would involve treatment, recirculation, and discharge stages. The standard septic system incorporates a dosing system to disperse liquids with use of a drip system. The septic system's drip lines would be placed at a depth of 12 inches. Effluent would be discharged to a treatment leach field with subsurface drip irrigation. The effluent would be transferred from the restroom facility to the leach field through a non-perforated pipe. The aboveground improvements associated with the treatment system would be a manhole and a cleanout at ground level.

Stormwater retention basins would be located throughout the park, and connection points for electricity would be located near the park's primary entrance. Water would be provided by Padre Dam Municipal Water District. It is not anticipated that natural gas will be used on the project site.

Construction would occur in multiple phases. The first phase may focus on the northern portion of the site. Construction equipment would include tractors, excavators, backhoes, a water truck, drill rig, bobcat, forklift, rollers, a rubber-tired loader, wheel tractor-scrapers, an air compressor, a generator set, crane, and concrete truck. Approximately 23 acres of grading would occur. The project site may be balanced with cut and fill or may require the import of soil to the site. The export of unsuitable material and/or rock may also be

required. The southern portion of the site would contain a retention basin. Compliance with the General Construction Permit would require preparation of a Stormwater Pollution Prevention Plan, which would outline the best management practices that would be implemented during construction to prevent soil erosion. Such practices would also prevent runoff from leaving the construction site and traveling to nearby water bodies.

Open Space and Passive Recreation

Approximately 1.1 miles of existing multi-use trails and access roads west and north of the proposed Alpine County Park would be maintained in perpetuity. These trails are currently within existing disturbed or bare ground; therefore, vegetation removal is not anticipated. Periodic maintenance of the trails would occur; this may include minor trail improvements, such as the installation of water breaks. The County would maintain access through the preserve by installing signage that clearly identifies public access areas. Signs would be installed in the least sensitive areas possible. Construction of access control gates (e.g., at the southern end of the County parcel, at the boundary with Wright's Field) may be required, resulting in minor ground disturbance involving less than 50 square feet.

The length and location of the 1.1 miles of trails and access roads described above may be modified by the County if required to ensure public health and safety or resource protection, respond to user preferences, or adapt to physical conditions. Realignment of trails would occur only within scrub habitats in the northern portion of the project site, areas that are less desirable for Quino checkerspot butterfly (QCB). No trail realignments would occur in the southern portion of the project site. Trail realignment activities are not intended to create new trails. The County would restrict access (i.e., close) to approximately 3,300 feet of existing trails throughout the preserve, allowing those areas to revegetate and stabilize naturally. The County would use signage and barriers such as vegetation, rocks/boulders, or fencing to restrict access to closed trail areas.

Operations and Maintenance

The proposed project would be open to the public from sunrise to sunset. Dogs on leashes would be allowed within all areas of the park, and off-leash dogs would be permitted within the dog park. During operation, "no parking" signs may be installed along the shoulder of South Grade Road, if deemed necessary by the Department of Public Works Traffic Division, to prevent potential overflow parking on South Grade Road. The proposed project would require one on-site ranger, two maintenance people, and one volunteer. The volunteer would live on-site full time to help with maintenance and management of the property.

Current Fuel Reduction Zones. In accordance with the County Consolidated Fire Code and the Alpine Fire Protection District Ordinance, the County is clearing vegetation within the fire fuel reduction zones outlined below, which, historically, have been cleared per the direction of the Alpine Fire Protection District. These recommendations are also contained within the Fire and Emergency Operational Assessment (FEOA) prepared by Rohde & Associates.

- At the far northeastern edge of the County's parcel where it abuts residences along Engelmann Oak Lane, 100 feet south of their property lines. This area is cleared of vegetation and mapped as disturbed habitat.
- Along South Grade Road, within 30 feet of the road edge along the County's parcel. This area includes predominantly Valley needlegrass grassland and smaller stands of open Engelmann oak woodland at the northern and eastern edges of the County's property, then transitions to denser scrub vegetation within moderate to steep slopes and three Engelmann oak trees toward the southern and western edges of the County's property. No Engelmann oaks would be removed as part of these activities.

Fire Fuel Reduction Zone as Part of the Project. Along South Grade Road, where the boundary for Alpine County Park would be adjacent to the road, an additional 20 feet would be part of the fire fuel reduction zone along the western and northern portion of the road. The fire fuel reduction zone would occur within the current footprint of the proposed park. An additional 20 feet of fire fuel modification would also be required along South Grade Road, approximately 100 feet south of the northeastern corner of the County's parcel adjacent to the Native Habitat Avoidance Area.

Fire fuel clearance would occur within 100 feet of the volunteer parking pad in the northern portion of the proposed active park. Per the FEOA, both a Zone A (30 feet) and Zone B (100 feet) fire fuel clearance would be required. Within 30 feet of the volunteer parking pad, the area would be cleared to Zone A standards, resulting in "landscape replacement" per the FEOA. No Engelmann oak trees occur within Zone A. Zone B fire clearance should achieve at least a 75 percent reduction in fire-line intensity from a wildfire, which would be accomplished in this area by removing shrub fuels (predominantly flat-topped buckwheat) at a minimum of 50 percent and grass/herb fuels at a minimum of 80 percent. Canopies associated with four Engelmann oaks occur within the Zone B area. Engelmann oaks may require canopy trimming to meet the minimum 10- to 15-foot separation distance required in the FEOA for Zone B areas, in coordination with a certified arborist.

II. Impact Summary

Implementation of the project would have two classes of impacts that would be relevant to the Multiple Species Conservation Program (MSCP): 1) permanent direct impacts on vegetation communities and the sensitive plants living in them, along with the resulting loss of habitat for sensitive animals, and 2) indirect effects on certain sensitive animal species from increased public presence over the long-term during operation of the passive recreational opportunities.

Habitat Impacts

Complete development of the project could result in permanent impacts on up to 22.4 acres of native habitats, which represents approximately 4.9 percent of the total available open space and conserved lands within the immediate vicinity of the project. These existing open space and conserved lands include the Wright's Field Preserve, privately held open space lands, lands with conservation easements, and the proposed Alpine Park Preserve.

Implementation of a septic system and associated leach field to process sewage from the proposed restroom facilities could result in up to 0.1 acre of additional permanent impacts on disturbed habitat. These permanent impacts are anticipated from the septic field, which would be graded and prepared during construction to receive sewer effluent and maintained as a septic field.

Implementation of the sewer system is not anticipated to result in significant impacts on habitats because the proposed sewer main would be installed within existing roadways (i.e., South Grade Road) or paved areas within the Alpine County Park wherever feasible. Table 1, below, summarizes the maximum potential impacts on habitat types/vegetation communities from development the project, including the multi-use trails and septic system.

Sensitive Plant Impacts

Implementation of the project could result in permanent and direct impacts on two sensitive plant species: decumbent goldenbush and Palmer's grappling hook. Decumbent goldenbush could be directly affected at one location in the north-central portion of the proposed Alpine County Park, within an area that supports approximately 110 individuals and covers approximately 3,500 square feet. These impacts would be significant on the existing population of decumbent goldenbush without mitigation. The remaining individuals would be protected in perpetuity by establishment of the Alpine Park Preserve. Areas identified as "Native Habitat Avoidance Area" are within the generalized boundary of the proposed Alpine County Park and would not be subject to mass grading or vegetation removal during site preparation activities. These areas are at the northern end of the proposed park, adjacent to the proposed equestrian staging area. The County would also implement **MM-BIO-1**, which would require salvaging on-site plants and replacing lost individuals a 3:1. After implementation of this mitigation measure, there would be no net loss of individuals and no substantial adverse effects on local long-term survival of the species.

Table 1. Maximum Project Impacts on Habitat/Vegetation Communities

Vegetation Community/Land Cover[a]	Tier[c]	Area in Acre(s)						
		Permanent Impacts[e]			Temporary Impacts		Impact Neutral	Total
		Alpine County Park[d]	Leach Field	New Fire Fuel Modification Areas	Native Habitat Avoidance Area	Sewer Pipe	Maintenance of Existing Trails	
Disturbed Habitat (11300)	IV	0.5	0.1	< 0.1	< 0.1	—	1.0	1.6
Diegan Coastal Sage Scrub (32500), Including Disturbed and Baccharis Dominated (32530)	II	< 0.1	—		< 0.1	—	—	< 0.1
Disturbed Flat-topped Buckwheat (32800)	II	1.6	0.3	0.3	1.0	< 0.1	—	3.2
Flat-topped Buckwheat (32800)	II	1.7	—	0.1	0.7	< 0.1	—	2.4
Flat-topped Buckwheat – Existing Fire Fuel Modification Zone (32800)	II	< 0.1	—		--	—	—	< 0.1
Coastal Sage-Chaparral Transition (37G00)	II	—	—		--	—	—	—
Southern Mixed Chaparral (37120)	III	—	—		--	—	—	—
Valley Needlegrass Grassland (42100)	I	14.4	—		< 0.1	—	—	14.5
Valley Needlegrass Grassland – Existing Fire Fuel Modification Zone (42100)		0.3	—		—	—	—	0.3
Disturbed Valley Needlegrass Grassland (42100)	I	—	—		—	—	—	—
Non-native Grassland (42220)	III	3.6	—		—	—	—	3.6
Open Engelmann Oak Woodland (71181)	I	—	—	0.1	0.4		—	0.5
Non-native Woodland (79000)	IV	< 0.1	—	< 0.1	< 0.1		—	< 0.1
Eucalyptus Woodland (79100)	IV	—	—		—		—	—
Total[b]		**22.2**	**0.4**	**0.5**	**2.1**	**< 0.1**	**1.0**	**26.1**

a. Vegetation categories and numerical codes are from Holland (1986) and Oberbauer et al. (2008).
b. Individual rows may not sum to total because of rounding.
c. Tier categories are defined in the County's Biological Mitigation Ordinance.
d. The additional 20-foot fire clearance zone where the park footprint is adjacent to South Grade Road is within the current Alpine Park footprint, so no additional impacts would occur beyond what is shown below.
e. An additional 471 square feet of impacts on sensitive natural communities would occur from implementation of the western spadefoot mitigation measure (**MM-BIO-4**) requiring the construction of three basins for spadefoot. It is not known exactly where these basins would be constructed, but the County would endeavor to place these in areas with non-native grasses or flat-topped buckwheat and avoid native grassland areas. Impacts associated with construction of the basins would be mitigated in accordance with **MM-BIO-9**.

Approximately 13,857 Palmer's grapplinghook individuals were observed during special-status plant surveys in 2019. Of the 13,857 individuals, 200 would be affected by the project, representing approximately 1 percent of the on-site population. Given the small number of individuals affected, the relatively large number of individuals in the entirety of the study area, and the available habitat that would be protected in perpetuity in the preserve, impacts would not result in a regional decline in the species and therefore would be less than significant. No impacts on chocolate lily would occur, either directly or indirectly, because all chocolate lilies occur more than 200 feet from the proposed Alpine County Park.

No direct removal of any Engelmann oaks would occur with implementation of the project. Canopy thinning may be required for seven oaks within the new fire fuel management zones proposed as part of the project, in coordination with a certified arborist. Four of these oaks are in the Zone B fire fuel reduction zone where canopy thinning for some oaks may be required. The other three oaks are directly west of South Grade Road, in a 20-foot area where fire fuel management would be extended west from the existing fire fuel management area along South Grade Road. Indirect impacts may result from grading activities within the root protection zone of 25 Engelmann oaks. Impacts would not occur within the dripline/canopy of the trees. Approximately 0.94 acre would be within the root protection zone where grading/site preparation (e.g., compaction) and the construction of park infrastructure would occur. The County would implement **MM-BIO-2**.

Short-term indirect impacts on decumbent goldenbush, Palmer's grapplinghook, and Engelmann oak could occur during construction because each of these sensitive species occurs adjacent to areas where the proposed Alpine County Park would be built. These three species all occur within at least 200 feet of proposed construction activities. Absent any dust control measure, construction-related indirect impacts could include dust deposition, which could alter the photosynthetic vigor of individual plants, and the potential spread of invasive species into the preserve from the construction area. These short-term indirect impacts could become permanent if invasive non-native species become established and are not eradicated. However, dust control measures would be required for this project, in addition to weed abatement by County personnel. Therefore, impacts would not be anticipated.

Other potential long-term indirect impacts include a higher likelihood for plants being trampled because of an anticipated increase in trail users and anthropogenic presence in the preserve compared to baseline conditions. There is also potential for unauthorized activities to occur, such as trail building or the establishment of new trails in areas. However, the public is currently walking and, at times, parking on the County's property; therefore, these impacts are not expected to be appreciably greater after construction of the proposed park. Moreover, the County has proposed additional signage and a live-in volunteer and park rangers to monitor the Alpine Park Preserve and Alpine County Park, along with a formalized staging area for parking, which would minimize impacts on special-status species from unauthorized trail activities (e.g., off-trail trampling, building of jumps/berms within the trails, parking in unauthorized areas). After implementation of the proposed project, it is anticipated that fewer long-term impacts on special-status plants would occur compared to baseline conditions. In addition, it is anticipated that

fewer long-term impacts on special-status plants would occur compared to baseline conditions.

Other sensitive species documented within the project area include chocolate lily, delicate clarkia, San Diego County viguiera, small-flowered microseris, and Southern California black walnut. No direct or indirect impacts on these species are anticipated because they would be more than 200 feet from the proposed Alpine County Park and within areas proposed for permanent protection and long-term management within the preserve.

Sensitive Wildlife Impacts

Invertebrates

QCB, a special-status butterfly, is known to occur in the project area; however, the project is not within a recovery area or designated critical habitat for QCB (U.S. Fish and Wildlife Service [USFWS] 2003). Protocol surveys for adult QCB were conducted in the project area in 2019 and 2020. Two adult QCB were observed in the survey area in April 2019 and March 2020. The USFWS QCB survey guidelines (USFWS 2014, p. 2) state that surveys shall continue "until a Quino is detected." Therefore, QCB surveys could have been discontinued after the seventh week, but four additional surveys were conducted to provide additional depth and understanding regarding the degree to which QCB utilizes the site.

The project would result in impacts on approximately 22.4 acres of QCB-occupied habitat, consisting of two of the seven locations (29 percent) where QCB adults were observed on the project site or on Wright's Field in the past, including the observation made in 2010, as documented in the USFWS Carlsbad Fish and Wildlife Office GIS data (USFWS 2020) and during surveys in 2019 and 2020. Both locations would be affected by construction of Alpine County Park. No locations would be affected by maintenance of the existing trails. Five locations[1] (71 percent) where QCB adults were observed in the past would be permanently protected within either the Wright's Field Preserve or the proposed preserve.

Incidental take of QCB could occur from harassment, harm, injury, or mortality. Direct impacts that could result in incidental take of QCB would occur through the permanent removal of habitat, which is expected to be completed in the first year of project implementation. There is also potential for inadvertent take of a small number of QCB in the preserve when implementing the habitat management activities anticipated as part of the Habitat Conservation Plan's (HCP's) conservation measures, which may include on-site enhancement and restoration of dot-seed plantain (*Plantago erecta*) occurrences. It is anticipated that site preparation activities tied to habitat restoration could result in accidental trampling of QCB larvae and host plants during monitoring and or trail management. The project is not within a recovery area or designated critical habitat for QCB (USFWS 2003). The project would implement **MM-BIO-3**.

[1] This includes two observations from 2019, two observations from 2020, and one observation from the California Natural Diversity Database recorded in 2010 in the southwest portion.

Habitat for an additional special-status butterfly, Hermes copper butterfly, exists on-site. Presence/absence surveys for the Hermes copper butterfly (*Lycaena hermes*) were performed per County guidelines in 2019 and 2020. In 2019, surveys were conducted only within the County-owned parcels. In 2020, surveys were repeated within the County-owned parcels and within suitable habitat on the 231-acre Wright's Field property, directly adjacent west of the County property. Surveys were conducted where the larval host plant, spiny redberry (*Rhamnus crocea*), occurs in proximity (within 15 feet) to California buckwheat (*Eriogonum fasciculatum*), their primary nectar plant (i.e., suitable habitat). Because Hermes copper butterfly has been observed using various other species as a nectar source (USFWS 2020), suitable habitat for Hermes copper butterfly has been modified to include areas where the host plant occurs, regardless of whether it is found in proximity to California buckwheat.

Hermes copper butterfly was not observed within the project site during comprehensive surveys in 2019 and 2020 and determined to have low potential to occur on the project site; therefore, impacts on this species from the proposed project are not anticipated to occur. No impacts on the Hermes copper butterfly host plant, spiny redberry, would occur from construction of the proposed Alpine County Park, establishment of new fire fuel reduction areas, or maintenance of existing trails. The project would, however, affect 20.3 acres of proposed designated USFWS critical habitat for Hermes copper butterfly. Because the site is currently unoccupied by Hermes copper butterfly, impacts on critical habitat for the species would be less than significant. USFWS will consider impacts on Hermes copper butterfly critical habitat resulting from the project as part of its review of the HCP the County is preparing to address impacts on QCB.

Two species of federally listed endangered fairy shrimp are known to occur in San Diego County: San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni)*. Twenty-eight basins were observed in the study area during the wet season; these supported inundation for at least 30 days in 2018–2019, which is enough time for these two species to reach maturity. No fairy shrimp individuals of either local species (San Diego fairy shrimp and Riverside fairy shrimp) were observed during wet-season sampling within the 28 sampled pools. No fairy shrimp cysts were observed in any of the 28 sampled pools in the 2019 dry-season sampling. Federally listed endangered fairy shrimp species were not observed within the project site during comprehensive surveys during 2019 and 2020. The species were determined to have low potential to occur within the project site; therefore, impacts on this species from the proposed project are not anticipated to occur.

Reptiles and Amphibians

Special-status reptiles, consisting of Belding's orange-throated whiptail, Blainville's horned lizard coastal western whiptail, red-diamond rattlesnake, and Western spadefoot, were observed within the study area. Baja California coachwhip, California glossy snake, coast patch-nosed snake, Coronado skink, and Southern California legless lizard were not observed during surveys but have moderate to high potential to occur within the survey area. These species could be directly and indirectly affected through construction of Alpine County Park. Direct impacts would include the conversion of up to 22.4 acres of

native and naturalized habitat that could support these species due to development of the park and construction activities if individuals are in the project footprint. Indirect impacts on these species in adjacent areas could occur during construction of the project and include increased dust from grading and construction, increased noise and vibration from construction crews and equipment, and increased foot traffic during construction. Dust suppression and stormwater pollution prevention best management practices would be implemented throughout construction to minimize any potential impacts. Through implementation of the project, with its formalized trails, on-site volunteer, County rangers, trash cans, bathrooms, signs, and designated staging area for parking, the current foot traffic would be reduced in the undesignated areas that the public is currently accessing, either on foot and/or in vehicles. As part of project implementation, the proposed preserve portion of the County property, in addition to the other adjacent open space and preserved land, would provide habitat for the aforementioned species. The project would implement **MM-BIO-9** and **APM-BIO-1**.

Habitat for western spadefoot exists in the northern perimeter of the study area. A survey conducted in 2022 determined that the seasonally inundated basins within the County's parcel are associated primarily with the trails that exist along the northern perimeter of the study area. Approximately 48 ponded areas were surveyed within or adjacent to dirt access roads, of which approximately 35 were mapped within the County's parcel and 13 were mapped on Wright's Field. During 2022 surveys, no western spadefoot adults, larvae, or eggs were observed during surveys of seasonally inundated basins within the County's parcels. It was determined that two basins on Wright's Field (WF-6 and WF-7) are the primary breeding pools for western spadefoot within the survey area, although successful western spadefoot recruitment was not observed in 2022. Basins within the County's parcel are too shallow and/or do not hold water long enough to support western spadefoot breeding activities during all but the wettest years. Three adults were observed within the County's parcel during the nocturnal survey on March 4, 2022, on the west side of the County's parcel, within approximately 70 to 150 meters of the basins on Wright's Field and more than 250 meters away from the closest inundation areas. It appears that the County's parcel provides upland habitat for western spadefoot. No spadefoots were observed within the project footprint during surveys in 2022.

In 2019, one breeding pool of approximately 157 square feet (AP-7) was documented within the active park development footprint; this may be utilized by western spadefoot seeking to expand from the core population on Wright's Field Preserve during exceptionally wet years, such as 2019 when an egg mass was observed in AP-7. AP-7 would be removed during construction of the active park. Therefore, a western spadefoot breeding pool may be affected by the project. Impacts on this potential breeding pool would be significant, absent mitigation. The project would implement **MM-BIO-4.**

Adult western spadefoot emerge a few nights per year to forage and breed (San Diego Management and Monitoring Program 2022); these activities are most likely to occur within the same general area as burrowing habitat. Because these foraging and breeding events would happen in the evening when construction equipment would not

be active, it is unlikely that direct impacts on western spadefoot, such as crushing or illegal collecting, would occur during foraging and breeding events. However, the possibility exists that estivating western spadefoots would occur within the proposed project footprint where grading would occur, and individuals could be crushed from construction equipment. These impacts would be significance, absent mitigation. The project would implement **MM-BIO-4.**

Birds

Construction of Alpine County Park could have potential permanent direct impacts and indirect impacts on avian species endemic to the region. Burrowing owl, a California Species of Special Concern; California Cooper's hawk, a California Species of Special Concern; red-shouldered hawk, a County Group I species; and western bluebird, a County Group 2 species, were observed in the study area during protocol surveys in 2019 and 2020 and could be affected by the project.

California gnatcatchers (*Polioptila californica californica*) were not observed within the project site during USFWS protocol presence/absence focused surveys conducted during 2019 or during other biological surveys conducted for the project. The study area is at the far eastern extent of the known range of California gnatcatcher and possibly just east of the known current range for this species, based on species occurrence data from USFWS (USFWS Carlsbad Fish and Wildlife Office 2020), the California Natural Diversity Database (California Department of Fish and Wildlife [CDFW] 2020), and the SanBIOS database (San Diego Association of Governments 2020). In addition, the elevation and related weather extremes of the site may preclude occupation by California gnatcatcher. Therefore, California gnatcatchers were determined to have low potential to occur within the project site, and no impacts on California gnatcatcher from the proposed project are anticipated to occur.

Given the presence of suitable habitat within the project area, a habitat assessment and protocol surveys were conducted for burrowing owls (*Athene cunicularia*), in accordance with the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). Breeding burrowing owl was determined to have low potential to occur; as a result, impacts on this species are not expected to occur.

Special-status tree-nesting raptors documented within the study area include Cooper's hawk and red-shouldered hawk. Tree-nesting raptors have potential to nest in the mature vegetation in the study area, including trees such as Engelmann oak, coast live oak, and western sycamore, and forage in the grasslands and shrub/chaparral stands in the study area. White-tailed kite is a wide-ranging species with high potential to occur within the study area. Bell's sage sparrow, ferruginous hawk, grasshopper sparrow, and Southern California rufous-crowned sparrow all have a moderate potential to occur within the study area. Implementation of the project would result in the permanent loss of up to 22.4 acres of functional foraging and/or breeding habitat for these avian species in sensitive natural or naturalized vegetation communities. However, creation of the preserve would conserve functional foraging habitat for raptors in perpetuity.

Grassland obligate bird species, or avian species that strongly prefer open grassland habitats, also would be affected by the proposed project. These include the observed burrowing owl (observed wintering only), grasshopper sparrow, Oregon vesper sparrow, and ferruginous hawk. Approximately 19 acres of native and non-native grasslands used by these species are proposed to be removed during construction of the active park.

Bell's sage sparrow, a County Group I species; Lawrence's goldfinch, a Bird of Conservation Concern; and Southern California rufous-crowned sparrow, a County Group I species, could occur within the approximately 3.6 acres of open flat-topped buckwheat scrub stands in the proposed active park area. These species would experience permanent loss of habitat with construction of the active park.

Temporary direct impacts would occur during construction of the project. Expected impacts include increased dust from grading and construction, increased noise from construction crews and equipment, increased foot traffic during construction, and increased noise pollution from crews and equipment. This may temporarily alter the natural behaviors of avian species in the area.

The proposed preserve portion of the County property, in addition to the other adjacent open space and preserved land, and proposed grassland restoration would provide habitat for the aforementioned species through permanent habitat preservation. In addition, dust suppression and stormwater pollution prevention best management practices would occur throughout construction to minimize any potential impacts. Although the public is currently accessing the County property, through implementation of the project, with its on-site volunteer, County rangers, trash cans, bathrooms, signs, formalized trails, and designated staging area for parking, foot traffic would be reduced in the undesignated areas that the public is currently accessing, either on foot and/or in vehicles. The project would implement **APM-BIO-1, MM-BIO-5, MM-BIO-6, and MM-BIO-9.**

Mammals

The northwestern San Diego pocket mouse, San Diego black-tailed jackrabbit, and Bryant's woodrat (all County Group 2 species) were determined to have moderate potential to occur within the study area and the potential to be affected by implementation of the project. Suitable habitat for all three species can be found in the Valley needlegrass grasslands, non-native grasslands, and open flat-topped buckwheat scrub habitats within the study area and within the construction footprint of Alpine County Park. Grasslands and flat-topped buckwheat within the construction footprint would be directly affected and converted to a developed park, removing it as habitat that could support these species.

Temporary direct and indirect impacts on the aforementioned species are expected to occur during and post-construction of the project. Temporary direct impacts on these species include possible accidental take due to construction activities, increased dust from grading and construction, increased noise from construction crews and equipment, and increased foot traffic during construction. Natural behaviors of these species could

be affected. Because these species are active mostly at night (Tremor et al. 2017), foraging habits are not anticipated to be significantly affected; however, the project may cause species to be active during the day to avoid construction activities. These forced disruptions to the circadian rhythm could have negative effects on their ability to regulate their temperature and metabolism, causing general stress to these individuals. The San Diego pocket mouse is known to utilize burrows as its form of shelter. Because this species is less active during the day, when construction would be most active, there is potential for impacts on this species, which might be resting in burrows.

Passive and active bat surveys were conducted in 2019 by professional bat biologist Drew Stokes using Titley Electronics Anabat bat detectors, the unaided ear, and visual techniques, including use of a handheld spotlight. Fifteen of the 22 known bat species in San Diego County were detected during 2019 surveys. Seven of these observed bats are listed as California Species of Special Concern: pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, pocketed free-tailed bat, and big free-tailed bat. All these species, except the western yellow bat, are listed as San Diego County Group II species. Suitable roosting and foraging habitat for these species can be found on-site. Permanent direct and temporary indirect impacts on some or all of these bat species are expected to occur. Direct impacts on approximately 22.3 acres of sensitive habitats would remove foraging habitat for these bat species during vegetation clearing associated with construction of Alpine County Park. Implementation of the project would not affect any known maternal colony sites. However there may be potential for bats to use rock outcrops as maternity and/or roost sites as well as Engelmann oaks. No large rock outcrops would be removed as part of construction of the project. No oaks would be removed by project implementation, although limbing will be likely to occur as part of the fire protection; work would also occur within the root zones of oaks. The County is proposing restoration of native grassland and permanent preservation of a portion of the County property, in addition to active management on-site for the proposed preserve land and Alpine County Park. However, through design measures and on-site management with implementation of the project, in addition to mitigation measures **MM-BIO-7**, pallid bat boxes; **MM-BIO-8**, bat roost avoidance; **MM-BIO-9**, compensatory habitat-based mitigation; and **MM-BIO-10**, native grassland mitigation, as well as establishment of Alpine Park Preserve (**APM-BIO-1**), which would protect the remaining habitat for these species in perpetuity, the impact would be less than significant. The permanent protection of suitable bat foraging habitat within the Alpine Park Preserve would further reduce impacts on foraging bat species.

There are only two known pallid bat colony sites in San Diego County (Stokes 2018). The individuals observed during focused bat surveys are believed to belong to the maternal colony that roosts in Viejas on a private residence. This species has a specific foraging strategy and utilizes grasslands and open oak woodlands as its main foraging habitat. It has characteristics that affect its success with increased urbanization. This includes its tendency to fly at low altitude, its inability to fly long distances, and its specialized foraging strategies. As a result of these factors, the loss of pallid bat foraging habitat would result in a significant impact on the pallid bat. These significant impacts would be reduced to less-than-significant levels through implementation of **MM-BIO-7**, in addition to **MM-BIO-9** and **APM-BIO-1**.

Indirect impacts on bat species, such as disruption of foraging behavior, could occur if construction takes place during evening hours. Because bats are nocturnal species and construction is expected to occur during daytime hours, indirect impacts on these species due to construction activities would be minimal and would not be expected to alter natural behaviors. Maintenance of existing trails near or within oak woodlands would not be expected to alter the quality of forage or affect roosting habitat for these species because the trails occur within areas that are already disturbed bare ground.

Post-construction, the existence of Alpine County Park would increase the amount of anthropogenic influence in the areas immediately surrounding the park footprint. There is a possibility for increased littering and foot traffic within the park and the maintained trail system, which exists in habitat that could support special-status wildlife species. Other indirect impacts could include the introduction of non-native or invasive plant species, which could affect viable habitat if not maintained. These indirect impacts may cumulatively result in reduced use of habitat immediately surrounding the project footprint. There is also potential for unauthorized activities to occur along trails and affect special-status wildlife as well as special-status plants. Such activities could include unauthorized trail building or establishing new trails in areas.

The restoration efforts and active management of the proposed preserve portion of the project would assist in preventing the spread of invasive plants and benefit the native habitats the species rely on. Signs would be posted and the public would be subject to park rules within the proposed preserve land and the park to prevent impacts from domestic animals and horses within sensitive habitats. Ranger-led hikes would also assist the public in learning further about the resources the County proposes to protect in perpetuity and the importance of staying on designated trails and picking up after domestic animals. Impacts could be significant. The County has proposed additional signage, the formalization of existing trails, and a live-in park ranger to monitor the preserve and Alpine County Park, prevent illegal trail building, and maintain the existing trails (e.g., ensuring trash is cleaned up and the public is staying on formal trails), which would minimize impacts on special-status species from unauthorized trail activities. After implementation of the proposed project, it is anticipated that fewer long-term impacts on special-status wildlife and plants would occur compared to baseline conditions.

Project implementation would not reduce the likelihood of recovery of listed species. Although project implementation would result in impacts on occupied QCB habitat, those impacts would be mitigated through an incidental take permit (ITP) for impacts on occupied QCB habitat and the associated HCP and the Habitat Restoration and Enhancement Plan for the Project. The Section 10 species permitting process would ensure that there would be no reduced likelihood of recovery for QCB.

Jurisdictional Wetlands and Waterways Impacts

The proposed project would not result in impacts on jurisdictional wetlands or waterways. No state or federal wetlands or waters were mapped within the study area; therefore, no impacts on state or federal wetlands or waters would occur. The project would also avoid impacts on CDFW jurisdictional habitat because none is present.

Core Wildlife/Wildlife Corridors Impacts

An important consideration is the setting of a project site with respect to regional connectivity with undeveloped lands. Large blocks of contiguous habitat are important to support resident populations of plants and wildlife as well as provide suitable conditions for wildlife movement and dispersal. The study area and the adjacent Wright's Field are surrounded by low-density exurban residential development, which result in an island of habitat with limited connectivity to open space and other preserve areas. The project design was planned to reduce edge effects and preserve the existing island for wildlife and plants. The proposed project would be constructed at the eastern edge of this island of open space, leaving a smaller but similarly situated island of habitat west of the proposed park. Therefore, development of the project would not have a significant impact on wildlife corridors. The conversion of a maximum of 22.4 acres of native habitat to a developed park facility would not constrain wildlife movement because the park would be located adjacent to existing development on three sides. The Alpine County Preserve would be created on the western edge of the park and maintained in perpetuity as an MSCP preserve, and areas identified as "Native Habitat Avoidance Area" would be maintained within the generalized boundary of the proposed Alpine County Park. Impacts within the Native Habitat Avoidance Area would be considered temporary indirect impacts. Trails would be expected to be utilized by medium and large mammals for ease of movement through the preserve. No features would be constructed that would impinge on any movement areas, including ridgelines or canyons. These trails are currently within existing disturbed or bare ground; therefore, no vegetation removal is anticipated. Periodic maintenance of the trails would occur, which could include minor improvements, such as installation of water breaks. The County Department of Parks and Recreation (DPR) would maintain public access through the open space/preserve area by installing signage to clearly identify public access areas. Trail markers, fences/barriers, and benches would also be installed within disturbed areas, as needed. Signs would be installed in the least sensitive areas possible.

The project would affect up to 22.4 acres of native habitat within a core wildlife area. The project would not significantly affect or interfere with connectivity or wildlife corridors or affect the long-term viability of this core wildlife area, given the presence of adjacent intact preserve land. The project area and the adjacent Wright's Field are surrounded by low-density exurban residential development in all directions. The project area is also directly adjacent to a busy arterial road, South Grade Road, that already limits wildlife movement in the area to the south and east. As such, the proposed project would not significantly affect the viability of a core wildlife area. Furthermore, development of the project would not exclude any existing wildlife from accessing foraging habitat, breeding habitat, or water sources. Finally, creation of the Resource Management Plan, as well as limiting usage of the preserve to daytime hours, would further reduce impacts on the functioning of the preserve as a core wildlife area. In addition, the project would not create artificial wildlife corridors. The trails may be utilized by medium to large mammals, but the project would not modify or constrain any corridors on the preserve. The project would not propose any new nighttime lighting or nighttime usage of the preserve. Public access to the preserve would be limited to a low level and would not substantially increase noise within the preserve.

The project would not significantly impede nocturnal movement in wildlife corridors. Public access is proposed only during daylight hours, which would not affect the nighttime movement of medium to large mammals. Implementation of the project would not significantly constrain movement of reptiles, small mammals, or birds. The project would not significantly constrain the visual continuity of wildlife corridors or linkages. Development would be focused on the eastern edge of the existing open space adjacent to the busy South Grade Road.

III. Mitigation Measures

To reduce potentially significant impacts on biological resources to a less-than-significant level, the County proposes the following mitigation measures as part of the project:

Applicant Proposed Measure (APM) 1 – Establishment of the Alpine Park Preserve: As required under the County's MSCP Subarea Plan, Alpine Park Preserve will be managed in perpetuity in accordance with a Resource Management Plan. This plan will outline management activities to be carried out by the County. Activities likely to be included in the Resource Management Plan would enhance and preserve the affected sensitive natural communities. These activities include long-term monitoring of on-site preservation areas, non-native and invasive species vegetation management, and habitat restoration on the preserve as applicable. Through these strategic measures to mitigate for impacts, the preserved sensitive natural communities will be managed to maintain high-quality and functioning habitat, and the County will demonstrate its long-term commitment to species conservation within Alpine Park Preserve.

MM-BIO-1: Replace Decumbent Goldenbush. To mitigate for significant impacts on decumbent goldenbush, the County DPR shall replace at a 3:1 mitigation ratio any affected decumbent goldenbush individuals. Individual plants and/or seeds will be salvaged from the onsite population prior to the start of construction and installed within the open space/preserve. Plantings shall be monitored for a minimum of 3 years to ensure the 3:1 mitigation ratio has been met and that the planted individuals have properly established themselves. Seed/material from onsite populations may be contract grown to provide replacement plantings.

MM-BIO-2: Implement Engelmann Oak Avoidance and Minimization Measures. The following measures will minimize and avoid potential impacts on Engelmann oaks resulting from the Project:

1. Engelmann oaks within 50 feet of any mass grading shall be fenced entirely around the tree dripline to ensure that no construction activities, including equipment staging, vegetation grubbing, driving, or grading, occur within the tree's dripline. These restrictions shall be communicated to the construction contractor prior to work in this area.
2. To mitigate for any potential significant impacts to Engelmann oak trees, the County will monitor the health of all Engelmann oaks within 200 feet of the proposed Alpine County Park development footprint for 5 years following

construction. A certified arborist with experience monitoring oak health will conduct the monitoring. Mortality or serious declines in the health of the Engelmann oaks during these 5 years within this area will be mitigated at a 3:1 ratio, should significant impacts occur. Specifically, three Engelmann oaks will be planted for each oak tree that has died or is in serious decline. The mitigation would occur within on-site Engelmann oak woodland areas that will be permanently protected. Planting shall occur within either the Native Habitat Protection Area or within the northwestern portion of the open space preserve. All oak plantings must be certified pathogen free, including for *Phytophthora* species.

3. Any areas within the Engelmann oak root protection zone (i.e., all areas within 50 feet of Engelmann oak canopy) shall be identified on a map that is provided to the construction contractor. Any grading or construction activities within the root protection zone shall be monitored to minimize impacts on oaks to the maximum extent possible. Training shall be provided for the construction contractor by a biological monitor prior to the start of construction activities in this area. This training will detail ways that the construction contractor can reduce impacts as much as possible on Engelmann oaks within the root protection zone. The following avoidance and minimization measures must be implemented: (1) minimizing repetitive travel routes within the root protection zone, (2) restricting any long-term storage of heavy materials within the root protection zone, and (3) restricting work within the root protection zone when the ground is wet to avoid compaction as much as possible after a rain event. Additional avoidance and minimization measures not envisioned here that can be feasibly implemented during construction must be identified and implemented.

MM-BIO-3: Ensure No Net Loss of Quino Host Plants and Provide Permanent Protection of Quino Habitat. The County DPR shall seek a Section 10 ITP (or Section 7 ITP if there is a federal nexus) for impacts on QCB-occupied habitat. Regardless of the conservation measures required under the ITP, the County will mitigate for impacts on occupied QCB habitat by providing, at a minimum, on-site preservation of occupied habitat for QCB within the open space preserve as well as the assurance that no net loss of QCB host plants will occur because of the project. The County DPR shall ensure that there is no net loss of QCB host plants by performing on-site enhancement and restoration activities within QCB habitat, including planting dot-seed plantain, removing thatch to support healthy populations of dot-seed plantain, and maintaining and monitoring these enhancement areas for a minimum of 5 years. Construction activities will not occur until the ITP is secured. Conservation measures shall be implemented pursuant to that ITP and include measures to restore and enhance QCB and provide permanent habitat protection and maintenance activities within the open space preserve.

As part of its ongoing monitoring, the County will demonstrate that QCB persists on the project site at the end of the 5-year restoration and enhancement period. If QCB can no longer be found on either the County's preserve or within the adjacent Wright's Field in a normal flight year at the end of the 5-year restoration period, the County will secure a specific off-site parcel that will contribute meaningfully to the species' long-term conservation.

MM-BIO-4: Western Spadefoot. The County will mitigate for impacts on one western spadefoot breeding pool encompassing approximately 157 square feet by creating three permanent basins encompassing a minimum of 471 square feet to support western spadefoot breeding. These constructed basins will be created within clay soils on the permanently protected lands on the County's parcel, no closer than 100 feet from the western edge of the Alpine County Park. Basins will be constructed within approximately 262 meters of the core breeding population on Wright's Field to maximize opportunities for western spadefoots on Wright's Field to naturally expand into these newly constructed basins. No basins will be constructed within the areas proposed for QCB habitat enhancement activities.

Hydrological analysis will be conducted prior to site selection to map the micro-watersheds in potential sites and ensure the constructed basins fill naturally with rainwater. Basins will be constructed to allow for maximum inundated depths of approximately 18 to 24 inches (20 to 60 centimeters), with the goal that they remain inundated long enough to increase the chances for breeding to be successful during dry years. Conversely, the newly constructed basins shall be designed in such a way that they support standing water only for several weeks following seasonal rains so that aquatic predators (e.g., fish, bullfrogs, crayfish) cannot become established. Because the ponding duration is so critical to the success of this effort, additional studies may be needed to estimate infiltration rates, soil profile, depth of clay soil layer, etc. The County will conduct these studies, as needed, to estimate ponding duration within constructed basins. Terrestrial habitat surrounding the proposed relocation site shall be as similar in type, aspect, and density to the location of the existing pool(s) as feasible.

The County will develop a Western Spadefoot Habitat Mitigation and Monitoring Plan to describe requirements for the constructed basins, how basin sites are chosen, what activities will be conducted during the installation of the new basins, adaptive management, maintenance activities, access controls (e.g., fences), and what monitoring and reporting activities will occur and when. The data for the micro-habitat hydrological analysis will also be presented within this plan. The Western Spadefoot Habitat Mitigation and Monitoring Plan will be provided to the CDFW and USFWS for review and comment.

The new basins will be constructed concurrently with the Alpine County Park, and western spadefoots observed within the project footprint will be relocated to suitable basins outside the project footprint.

Monitoring of the newly constructed basins will be conducted during the wet season (approximately December through April) at approximately 1-week intervals beginning

with the first significant rain event each year for 5 years following completion of the basin construction. The County's biologist will map the spatial extent of the basins, document inundation depths of the basins and breeding outcomes, and determine if adaptive management is needed to increase survival and recruitment within the constructed basins. Notes will be made if egg masses or larvae are observed. One nocturnal adult survey will also be conducted in each of the 5 years when a breeding event is occurring to document the foraging/mobility patterns of western spadefoots near the new basins. The County will also monitor the core breeding population on the Wright's Field Preserve using the same methods described above (basin mapping and weekly checks, nocturnal survey, etc.) to document the population dynamics of the entire population over time.

Monitoring/survey data will be provided to CDFW and USFWS by the monitoring biologist following each monitoring period, and a written report summarizing the monitoring results will be provided to CDFW and USFWS at the end of the monitoring effort each year. Success criteria for the monitoring program shall include evidence of ponding duration suitable to support western spadefoot reproduction within at least one of the constructed basins in at least one of the 5 years of monitoring.

After exclusionary fencing has been installed around all initial ground-disturbing construction, but prior to initiation of initial ground disturbance, the spadefoot biologist will conduct at least three nighttime surveys for spadefoots within the fenced area. Surveys will continue until no more spadefoots are captured and relocated out of the fenced footprint and/or upon the recommendations of the spadefoot biologist. These surveys will be conducted during appropriate climatic conditions and during the appropriate hours (i.e., nighttime, during rain events in breeding season) to maximize the likelihood of encountering spadefoots. If climatic conditions are not highly suitable for spadefoot activity, spadefoot habitat in the project footprint will be watered to encourage aestivating toads to surface. All spadefoots found within the project area will be captured and translocated by the spadefoot biologist to the nearest suitable habitat outside of the work area. Upon completion of these surveys and prior to initiation of construction activities, the spadefoot biologist will report the capture and release locations of all spadefoots found and relocated during these surveys to CDFW and USFWS.

MM-BIO-5: Avoid and Minimize Impacts on Special-Status Avian Species and Other Birds Protected under the Migratory Bird Treaty Act (MBTA). To mitigate for potentially significant impacts on sensitive nesting birds and raptors, the County DPR shall avoid ground-disturbing activities during the bird breeding season to keep the project in compliance with state and federal regulations regarding nesting birds (i.e., the federal MBTA and California FGC). The bird breeding season is defined as January 15 to September 15, which includes the tree-nesting raptor breeding season of January 15 to July 15, the ground-nesting raptor breeding season of February 1 to July 15, and the general avian breeding season of February 1 to September 15. If removal cannot be avoided during the bird and/or raptor nesting season, a nesting bird survey will be conducted no more than 72 hours prior to ground-disturbing activities by a qualified avian biologist within 500 feet of proposed ground- or vegetation-disturbing activities. Biologists will also survey for raptor nests up to 1,500 feet from proposed ground- or vegetation-disturbing activities. This is necessary to definitively ascertain whether raptors or other

migratory birds are actively nesting on the project site or in an area that could be indirectly affected by work activities (i.e., through noise or visual disturbances). Special attention will be paid to determining the presence of nesting grassland-endemic bird species, such as grasshopper sparrow, that may be nesting within dense grasses present within the proposed development footprint.

If any active nests are detected, the area will be flagged and mapped on construction plans, along with a buffer, as recommended by the qualified biologist. The buffer area(s) established by the qualified biologist will be avoided until the nesting cycle is complete or it is determined that the nest is no longer active. The qualified biologist shall be a person familiar with bird breeding behavior and capable of identifying the bird species of San Diego County by sight and sound and determining alterations of behavior because of human interaction. Buffers may be adjusted, based on the observations by the biological monitoring on the response of the nesting birds to human activity.

MM-BIO-6: Burrowing Owl Preconstruction Surveys. Prior to the initiation of project clearing, grading, grubbing, or other construction activities, pre-construction surveys for determining the presence of burrowing owl will be conducted, including surveys of suitable habitat within the project footprint and a 300-foot buffer, by a qualified biologist; no grading shall occur within 300 feet of an active burrowing owl burrow. The pre-construction surveys shall follow the take avoidance survey methods outlined in the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). The first survey shall be conducted within 30 days of initial site disturbance, and the second survey shall occur within 24 hours of initial site disturbance.

Following the initial pre-grading survey, the project site will be monitored for new burrows each week until grading is complete. Subsequent pre-construction surveys will be required if lapses in the project occur exceeding 72 hours. If present in the project construction footprint or within 300 feet of the project site, coordination with CDFW and USFWS shall occur to establish measures to avoid potential impacts on burrowing owl. Such measures will be decided in coordination with the CDFW and USFWS and follow the “Strategy for Mitigating Impacts to Burrowing Owls in the Unincorporated County” (Attachment A of the County’s Report Format and Content Requirements – Biological Resources).

Following the first pre-construction survey within 30 days of initial site disturbance, the qualified biologist will submit a Pre-Grading Survey Report to the County, CDFW, and USFWS within 14 days of the survey and include maps of the project site. If any burrowing owls are observed, the burrowing owl locations on aerial photos and in the format described in the mapping guidelines of the County’s Report Format and Content Requirements – Biological Resources will be included. A qualified biologist will attend the pre-construction meeting to inform construction personnel about the burrowing owl requirements.

MM-BIO-7: Support Pallid Bat. The County DPR shall work with a bat expert to design and install bat boxes to attract pallid bat prior to vegetation removal activities commencing on-site. These bat boxes shall be designed to accommodate both solitary individuals and

maternal roost sites. Bat box design shall reflect the best practices at the time of installation and be specific to larger bats like pallid bat with respect to roost chamber sizes, etc. The design and placement of bat boxes shall also consider how to best maintain proper roost temperature. When possible, the bat boxes shall be placed along the edges of the wooded areas on-site. The final design, numbers, and placement of bat boxes will be determined by the bat expert in consultation with County DPR personnel using the best practices known at the time.

Monitoring of the bat boxes shall be conducted quarterly for the first 2 years and twice-yearly during years 3 through 5 after installation. Any problems that are noted (e.g., mortality, predation) shall be addressed in consultation with the bat expert. Occupancy status, including species, numbers, etc., shall be documented to the extent possible without disturbing the occupants. If, after the first 2 years, a bat box remains unoccupied by any bat species, the County DPR and bat expert will discuss if the bat box needs to be repositioned on-site or redesigned. An annual report shall be prepared by the bat expert or designee to document the findings of the monitoring visits. The County will provide copies of this annual report to CDFW and include updates on the bat box monitoring on the site in the County's annual report for the MSCP.

MM-BIO-8: Bat Roost Avoidance. Because of the difficulty in detecting all potentially occurring roosting bats (e.g., the western red bat within the Engelmann oaks, pallid bats within rock crevices), no construction activities that could disturb maternal roost site will occur during the pupping season (typically April 1 through August 31). This measure specifically precludes high-frequency surveying as well as intensive noise-generating activities (e.g., jackhammering, etc.) within 200 feet of any Engelmann oaks or rock outcrops during the pupping season.

If construction activities must occur within this 200-foot avoidance buffer during the pupping season, the County will conduct definitive bat roost surveys to determine the presence or absence of maternal day-roost and/or night-roost locations within the 200-foot avoidance buffer that overlaps the construction footprint. The bat biologist(s) who conducts these surveys shall have the appropriate education, training, and experience. The bat roost survey methodology will be described in a Bat Roost Management, Monitoring, and Mitigation Plan, which will be prepared at least 30 days prior to the start of construction and provided to CDFW.

Bat roost survey methods may include mist netting and tracking individual bats using telemetry and/or additional acoustic surveys timed to determine if individual Engelmann oaks or rock outcrops within the 200-foot avoidance buffer are supporting bat roost sites. If any maternal roost sites within the 200-foot avoidance buffer are identified, an appropriate avoidance buffer shall be established around that roost site in accordance with the requirements established in the Bat Roost Management, Monitoring, and Mitigation Plan. Avoidance buffer distances will account for the ability of individual bat species to tolerate specific types of low- and high-frequency construction noise and other human disturbance associated with the project. No construction activities that could disrupt the roost site will be permitted within the established avoidance buffer.

Bat biologists will monitor construction activities occurring adjacent to the bat roost avoidance areas in accordance with the Bat Roost Management, Monitoring, and Mitigation Plan. Monitoring frequency and duration also will conform to the Bat Roost Management, Monitoring, and Mitigation Plan and be able to determine if the established bat roost avoidance buffers are large enough to prevent maternal roost site impacts, including, but not limited to, roost site abandonment. Avoidance buffers will be expanded if any stress or disturbance to the maternal roost site is observed during monitoring. In years 1, 3, and 5 following construction, the County will conduct bat surveys, including maternal bat roost surveys, within the areas originally surveyed prior to construction.

If the maternal bat roost sites previously observed prior and during construction are still observed during these monitoring surveys, no additional mitigation will be required. If any maternal roost sites observed prior to or during construction are no longer present (i.e., are not observed in any of the three post-construction surveys), the County will mitigate for the loss of the maternal roost site at a 2:1 ratio, using methods agreed upon in the Bat Roost Management, Monitoring, and Mitigation Plan. This may include planting additional Engelmann oaks within the proposed preserve if the affected maternal roost site utilized Engelmann oak trees or by building artificial bat roosts specifically for the affected bat species.

MM-BIO-9: Provide Compensatory Habitat-Based Mitigation. To mitigate for potentially significant impacts on Tier I, Tier II, and Tier III sensitive habitats, the County will provide compensatory mitigation consistent with its Biological Mitigation Ordinance (BMO) to reduce significant impacts on sensitive vegetation communities. Mitigation will be provided within Alpine Park Preserve and/or within off-site location(s), as summarized below:

Mitigation Requirements

Tier[a]	Total Impacts	Mitigation Ratio	Mitigation Requirement	On-site Mitigation[b]	Off-site Mitigation
Tier I	14.86	2:1	29.73	17.48 acres of preservation plus 4.84 acres of restoration (see **MM-BIO-10**)	7.41 acres of restoration on Wright's Field Preserve (see **MM-BIO-10**)
Tier II	3.97	1.5:1	5.95	5.95	None
Tier III	3.57	1:1	3.57	None	3.57[2]

a. Tiers correspond to those described in the County's BMO and mitigation sites will meet the criteria for BRCA.
b. Habitat-based mitigation for permanent direct impacts on non-native grasslands will be satisfied through purchase of credits and/or land acquisition of a similar high-quality non-native grassland in an offsite location.

MM-BIO-10: Native Grassland Mitigation. Impacts on 14.86 acres of Valley needlegrass grassland will be mitigated at a 2:1 ratio through preservation of 10.60 acres of Valley needlegrass grassland and 6.88 acres of open Engelmann oak woodland on-site, in addition to 4.84 acres of restoration of non-native grassland to Valley needlegrass grassland within the County's parcel and 7.41 acres of restoration on Wright's Field Preserve. All restoration will be conducted in accordance with a Habitat Restoration and

Enhancement Plan (HREP) approved by the Wildlife Agencies (USFWS and CDFW). Success criteria established in that HREP will include meeting at least a 5 percent absolute cover of purple needlegrass within restoration areas while retaining similar cover and species composition of native forbs currently present within non-native grassland areas on-site. If restoration does not meet the restoration goals, the County will implement adaptive management measures to be approved by the Wildlife Agencies.

IV. Findings of Conformance

The project is a public project, determined to be essential by the County. Therefore, the project can be found to be exempt from the BMO, Section 86.503(a)(8), as determined by the following findings:

a) The project has been found to conform to the County General Plan, the MSCP Plan, and Subarea Plan.

County General Plan conformance: The proposed project is consistent with the County General Plan, as shown in the following findings:

The proposed project is consistent with several County General Plan goals, including:

- Maintenance of the County's Rural Character (GOAL LU-2): Encouraging conservation and enhancement of the unincorporated County's varied communities, rural setting, and character;
- Sustainability of the Natural Environment (GOAL COS-2): Sustaining ecosystems with long-term viability to maintain natural processes, sensitive lands, and sensitive as well as common species, coupled with sustainable growth and development;
- Park and Recreational Facilities (GOAL COS-21): Ensuring park and recreational facilities enhance the quality of life and meet the diverse active and passive recreational needs of county residents and visitors, protect natural resources, and foster an awareness of local history, with approximately 10 acres of local parks and 15 acres of regional parks provided for every 1,000 persons in the unincorporated county; and
- Recreational Opportunities in Preserves (GOAL COS-23): Promoting the acquisition, monitoring, and management of valuable natural and cultural resources where public recreational opportunities are compatible with the preservation of those resources.

The project is also consistent with the County General Plan "Rural Lands" regional category, with an Open Space-Conservation (OS-C) land use designation in the western portion and a Semi-Rural Residential (SR-2) land use designation in the eastern portion.

The proposed project is consistent with several Alpine Community Plan goals, including:

- Land Use General Goal 1: Encourage a balance of land uses that will conserve natural and manmade resources, retain Alpine's rural character, and accommodate people of diverse lifestyles, occupations, and interests;
- Open Space Goal 1: This goal calls for a system of open space that preserves the unique natural elements of the community, retains and extends areas in open space that are recognized as valuable for conservation of resources, supports open space uses that promote public health and safety, and provides open space areas, or areas that are inappropriate for urbanization or required as buffers for urban development, that harmonize with and help integrate conservation and recreation components, creating a well-balanced community of natural plant and animal habitat; and
- Recreation Goal 1: This goal encourages a balanced system of both natural and improved parks with recreational facilities and services that incorporate outstanding natural features for recreational opportunities, enrich the lives of Alpine residents, and meet the needs of the community.

b) All feasible mitigation measures have been incorporated into the project; there are no feasible and less environmentally damaging locations, alignments, or non-structural alternatives that would meet project objectives.

The proposed project involves development of Alpine County Park, an active park with amenities such as multi-use turf areas, a baseball field, an all-wheel park, bike skills area, recreational courts (i.e., basketball, pickleball), fitness stations, a leash-free dog area, restroom facilities, an administrative facility/ranger station, equestrian staging areas and a corral, nature play area, community garden, a volunteer pad, picnic areas with shade structures and picnic tables, game table plaza, and multi-use trails; parking and a volunteer pad would also be provided.

Existing trails will be retained where appropriate and rehabilitated. Impacts on sensitive species and habitats will be avoided to the maximum extent practicable. As documented in the California Environmental Quality act (CEQA) document for the project, significant impacts will occur because of the project. Significant impacts will be mitigated to less than significant through implementation of mitigation measures **MM-BIO-1** through **MM-BIO-10** and **APM-BIO-1**.

c) Where the project encroaches into a wetland or floodplain, mitigation measures will be required, resulting in a net gain in wetland and/or riparian habitat.

The project will not encroach into a wetland or floodplain. No impacts on wetlands or floodplains will occur because of project implementation.

d) Where the project encroaches into steep slopes, native vegetation will be used to revegetate and landscape cut-and-fill areas.

The project will not encroach into steep slopes.

e) No mature riparian woodland will be destroyed or reduced in size because of otherwise allowed encroachments.

The project will not destroy or reduce in size mature riparian woodland.

f) All Critical Populations of Sensitive Plant Species within the MSCP Subarea Plan (Attachment C of Document No. 0769999, on file with the Clerk of the Board); Rare, Narrow Endemic Animal Species within the MSCP Subarea Plan (Attachment D of Document No. 0769999, on file with the Clerk of the Board); Narrow, Endemic Plant Species within the MSCP Subarea Plan (Attachment E of Document No. 0769999, on file with the Clerk of the Board); and San Diego County Sensitive Plant Species, as defined herein, will be avoided as required by, and consistent with, the terms of the Subarea Plan.

A wintering burrowing owl was observed within the project Study Area. The County will preserve at a 1:1 or higher ratio suitable habitat for burrowing owl (**MM-BIO-9**, **MM-BIO-10**, and **APM-BIO-1**), in addition to pre-construction surveys (**MM-BIO-6**). Decumbent goldenbush will be mitigated at a 3:1 ratio through transplanting and/or seeds within preserved land (**MM-BIO-1**).

Multiple Species Conservation Program

The findings contained within this document are based on County records, staff field visits, and the Biological Resources Report for the Alpine Park Project, dated December 2022 and prepared by ICF.

1. Biological Resource Core Area Determination

The impact area and the mitigation site shall be evaluated to determine if either or both sites qualify as a Biological Resource Core Area (BRCA) pursuant to the BMO, Section 86.506(a)(1).

A. Report the factual determination as to whether the proposed impact area qualifies as a BRCA. The impact area shall refer only to that area within which project-related disturbance is proposed, including any on- and/or off-site impacts.

The project area qualifies as a BRCA because it is located within the County's Pre-Approved Mitigation Area (PAMA) and includes BRCAs.

B. Report the factual determination as to whether the mitigation site qualifies as a BRCA.

The preserve is designated as a PAMA on the Wildlife Agencies' pre-approved mitigation map for the Metro-Lakeside-Jamul segment of the MSCP County Subarea Plan. According to Section 86.506 of the San Diego BMO (County 2010), if land is shown as pre-approved mitigation on a preapproved mitigation

map approved by the Wildlife Agencies, such as in the MSCP Subarea Plan, it is considered a BRCA. If mitigation occurs outside the preserve, it will occur at a site that meets the qualifications of the BRCA, per the BMO.

2. Biological Mitigation Ordinance Findings

Although the project is exempt from the BMO because it is a public project and determined to be essential by the County, the following discussion has been included to demonstrate MSCP conformance.

A. Project Design Criteria.

1. Project development shall be sited in areas to minimize the impact on habitat.

The project was designed to minimize impacts on sensitive habitat, including land determined to be a Biological Resource Core Area to the maximum extent practicable. Permanent impacts on Engelmann oak woodlands were reduced to a minimum during the County's redesign of the Concept Plan of the proposed project in 2020. The County would avoid all Engelmann oak woodlands, trees, and their associated canopy during construction. No wetland features or aquatic resources were found within the study area during any field surveys. Permanent impacts on sensitive natural communities would occur predominantly within Valley needlegrass grassland, disturbed flat-topped buckwheat stands, and non-native grasslands. Permanent direct impacts may occur on up to 22.4 acres of sensitive natural habitats, while approximately 70 acres (72 percent) of land within the County's parcels will be permanently protected. In addition, proposed impacts on sensitive vegetation communities will be mitigated at a tier equal to or greater than the affected vegetation community; mitigation land will meet the criteria of a Biological Resource Core Area consistent with the BMO to reduce significant impacts on sensitive vegetation communities.

No federally or state-listed endangered or threatened plant species were observed within the biological study area; eight sensitive plant species (California Rare Plant Rank [CRPR] and County) were observed and documented. The project was designed to avoid impacts on these sensitive plant species to the maximum extent practicable, although two species could be affected by the project, decumbent goldenbush and Palmer's grappling hook. Approximately 13,857 Palmer's grapplinghook individuals were observed during special-status plant surveys in 2019. Of the approximately 13,857 individuals, approximately 200 could be affected by the Project footprint, representing approximately 1 percent of the on-site population; the remainder would not be affected. Because of the small number of individuals affected, the relatively abundant number of individuals in the entirety of the study area, and the available habitat that would be protected in perpetuity in the preserve, impacts would not result in a regional decline in the species and therefore would be less than significant. In addition, approximately 110 individuals of decumbent goldenbush could be affected by the project; however, the County would implement **MM-BIO-1**, which would require salvaging on-site plants and replacing lost individuals at a minimum ratio of 3:1. Permanent impacts on Engelmann oak woodlands were reduced to a minimum during the County's

redesign of the Concept Plan of the proposed park in 2020. The County would avoid Engelmann oak woodlands, trees, and their associated canopy during construction to the extent feasible. There are no proposed impacts on critical populations of sensitive plant species within the MSCP Subarea Plan that are listed in Attachment C of the BMO. County will preserve at a 1:1 or higher ratio suitable habitat for burrowing owl (**MM-BIO-9**, **MM-BIO-10**, and **APM-BIO-1**), in addition to pre-construction surveys (**MM-BIO-6**), as there was a wintering burrowing owl observed in the Study Area. No impacts on narrow endemic plant species within the MSCP Subarea Plan that are listed in Attachment E of the BMO.

2. Clustering to the maximum extent permitted by County regulations shall be considered where necessary as a means of achieving avoidance.

   The proposed project would be located adjacent to existing development on three sides and clustered to avoid impacts to the extent feasible.

3. Notwithstanding the requirements of the slope encroachment regulations contained within the Resource Protection Ordinance, effective October 10, 1991, projects shall be allowed to utilize designs that may encroach into steep slopes to avoid impacts on habitat.

   Project development on steep slopes would not occur.

4. The County shall consider a reduction in road standards to the maximum extent consistent with public safety considerations.

   The proposed project's roads and trails will be designed to consider public safety and avoid impacts on sensitive environmental resources to the extent practicable.

5. Projects shall be required to comply with applicable design criteria in the County MSCP Subarea Plan, attached hereto as Attachment G (Preserve Design Criteria) and Attachment H (Design Criteria for Linkages and Corridors).

   Conformance with the objectives of the County Subarea Plan is demonstrated by the findings below in the section titled Subarea Plan Findings.

Preserve Design Criteria (Attachment G)

Acknowledge the "no net loss" of wetlands standard that individual projects must meet to satisfy state and federal wetland goals, policies, and standards and implement applicable County ordinances regarding wetland mitigation.

- No wetland features or aquatic resources were found within the study area during any field surveys; therefore, no net loss of wetlands or other aquatic resources would occur.

1. Include measures to maximize the habitat structural diversity of conserved habitat areas, including conservation of unique habitats and habitat features.

   The preservation and management of the Alpine Park Preserve would preserve currently existing habitat types used by a variety of wildlife species.

2. Provide for the conservation of spatially representative examples of extensive patches of coastal sage scrub and other habitat types that were ranked as having high and very high biological value by the MSCP habitat evaluation model.

   The preservation and management of the Alpine Park Preserve would preserve currently existing habitat types used by a variety of wildlife species. Within the preserved and managed lands, the following sensitive vegetation communities will be maintained in perpetuity: Diegan coastal sage scrub; Diegan coastal sage scrub, *Baccharis* dominated; flat-topped buckwheat; coastal sage-chaparral transition; southern mixed chaparral; Valley needlegrass grassland; non-native grassland; and open Engelmann oak woodland. Habitat-based mitigation for permanent direct impacts on sensitive habitats would be satisfied through a combination of on-site preservation for Tiers I, II, and III and purchase of credits and/or land acquisition. Mitigation shall be within a habitat tier equal to or greater than the impact site.

3. Create significant blocks of habitat to reduce edge effects and maximize the ratio of surface area to the perimeter of conserved habitats. Subsequently, using criteria set out in Chapter 6, Section 6.2.3 of the MSCP Plan, potential impacts from new development on biological resources within the preserve that should be considered in the design of any project include access, non-native predators, non-native species, illumination, drain water (point source), urban runoff (non-point source), and noise.

   The County designed the project to avoid impacts to the maximum extent practicable, and the County will preserve and manage the Alpine Park Preserve in perpetuity to support preserve assembly envisioned under the MSCP. The project design considered potential impacts from access, non-native predators, non-native species, illumination, drain water, urban runoff, and noise, and the design and associated mitigation measures were created to reduce edge effects and address potential impacts.

4. Provide incentives for development in the least sensitive habitat areas.

   The proposed project would be constructed at the eastern edge of an island of open space and adjacent to existing development on three sides and would be directly adjacent to a busy arterial road. The project was designed in such a manner to meet the goals of the project and avoid impacts on sensitive habitat types to the maximum extent practicable while also providing preservation of sensitive habitat in perpetuity. Within the preserved and managed lands, the following sensitive vegetation communities will be maintained in perpetuity: Diegan coastal sage scrub; Diegan coastal sage scrub, *Baccharis* dominated; flat-topped buckwheat; coastal sage-chaparral transition; southern mixed chaparral; Valley needlegrass grassland; non-native grassland; and open Engelmann oak woodland.

5. Minimize impacts on narrow endemic species and avoid impacts on core populations of narrow endemic species.

   No narrow endemic plants are present within the project site or would be affected. Breeding populations of narrow endemic animal species are not present within any portion of the project area for Alpine County Park or Alpine Park Preserve.

   The project would not reduce the likelihood of recovery of listed species. Although the project would result in impacts on occupied QCB habitat, impacts would be mitigated through implementation of **MM-BIO-3** and the associated HCP and Habitat Restoration and Enhancement Plan for the project. The Section 10 species permitting process would ensure no reduced likelihood of recovery of QCB.

6. Preserve the biological integrity of linkages between BRCAs.

   Short-term indirect impacts could occur on decumbent goldenbush, Palmer's grapplinghook, and Engelmann oak during construction activities because each of these sensitive species occur within 200 feet of the adjacent to areas where the proposed Alpine County Park would be built. This project has been designed to minimize impacts on the BRCA by keeping the development footprint as small as possible while still meeting the project purpose and need. Multi-use trails have been designed to be as narrow as possible while allowing for public access. Project-related impacts on habitat within the BRCA would be mitigated consistent with the BMO through the implementation of compensatory mitigation within Alpine Park Preserve and/or within off-site location(s) that meet the qualifications of a BRCA. The project would directly and permanently affect Valley needlegrass grassland, non-native grassland, and flat-topped buckwheat within a BRCA. The County redesigned the proposed project's equestrian staging area to avoid impacts on Engelmann oaks. No permanent buildings would be built within 100 feet of oaks, and the nearest building would be more than 200 feet away from the nearest Engelmann oak canopy. Fire fuel modification activities would occur within approximately 0.1 acre of Engelmann oak woodland. Approximately seven Engelmann oak tree canopies are located within the area where fire fuel management would occur. Four of these oaks are in the Zone B fire fuel reduction zone where canopy thinning of some oaks may be required, in coordination with a certified arborist, while three oaks are located directly west of South Grade Road in the 20-foot area where fire fuel management will be extended west from the existing fire fuel management along South Grade Road.

7. Achieve the conservation goals for covered species and habitats (refer to Table 3-5 of the MSCP Plan).

   The preservation and management of the approximately Alpine Park Preserve adjacent to the proposed project would contribute to the conservation goals for covered species and habitats, as detailed in Table 3-5 of the MSCP Plan.

Design Criteria for Linkages and Corridors (Attachment H)

For project sites in a regional linkage and/or supporting one or more local corridors, the following findings shall be required to protect the biological value of the resources: habitat linkages, as defined by the BMO, rather than just corridors, will be maintained.

1. Existing movement corridors within linkages will be identified and maintained.

   The development of the project would not interfere with connectivity or wildlife corridors. The conversion of 22.4acres of native habitat to a developed park facility would not constrain wildlife movement, because the park would be adjacent to existing development on three sides (north, south, and east) and would be directly adjacent to a busy arterial road, South Grade Road, that already limits wildlife movement in the area. A preserve (Alpine Park Preserve) would be created on the western edge of the park and maintained as an MSCP preserve in perpetuity. This preserve would be located directly adjacent to the existing 231-acre Wrights' Field Preserve, further enhancing protected preserve lands in this area.

   Existing trails on the County property may be utilized by medium and large mammals for ease of movement through the preserve. No features would be constructed that would impinge on any movement areas for these animals, and most existing trails in the area would remain open. No restrictions would be created on ridgelines or through canyons/depressional areas. Areas identified as "Native Habitat Avoidance Area" are within the generalized boundary of the proposed Alpine County Park, but they would not be subject to mass grading or vegetation removal during site preparation activities.

   The study area and the adjacent Wright's Field are surrounded by low-density exurban residential development. Therefore, the study area and Wright's Field currently function as an "island" of habitat with limited connectivity to open space and other preserve areas. The proposed project would be constructed at the eastern edge of this island of open space, leaving a smaller but similarly situated "island" of habitat to the west of the proposed project. As such, the project site would not be considered a wildlife corridor and would not disrupt habitat connectivity.

   Public access is proposed only during daylight hours and would not affect the nighttime movement of medium to large mammals. Implementation of the project would not constrain movement of reptiles, small mammals, or birds. The project would not create artificial wildlife corridors. The trails may be utilized by medium to large mammals but would not modify or constrain any corridors on the preserve.

2. Corridors with good vegetative and/or topographic cover will be protected.

   Although the study area is not considered a wildlife corridor, the County will preserve and manage the Alpine Park Preserve in perpetuity to support preserve assembly envisioned under the MSCP, including areas with good vegetative and/or topographic cover.

3. Regional linkages that accommodate travel for a wide range of wildlife species, especially those linkages that support resident populations of wildlife, will be selected.

   The project is not located in a regional linkage. The preservation and management of the Alpine Park Preserve would preserve currently existing local movement areas used by a variety of wildlife species. In the proposed project, public access is proposed only during daylight hours and would not affect the nighttime movement of medium to large mammals.

4. The width of a linkage will be based on the biological information for the target species, the quality of the habitat within and adjacent to the corridor, topography, and adjacent land uses. Where there is limited topographic relief, the corridor must be well vegetated and adequately buffered from adjacent development.

   The preservation and management of the Alpine Park Preserve would preserve currently existing linkages used by a variety of wildlife species. In the proposed project, public access is proposed only during daylight hours and would not affect the nighttime movement of medium to large mammals. Implementation of the project would not constrain movement of reptiles, small mammals, or birds.

5. If a corridor is relatively long, it must be wide enough for animals to hide in during the day. Generally, wide linkages are better than narrow ones. If narrow corridors are unavoidable, they should be relatively short. If the minimum width of a corridor is 400 feet, it should be no longer than 500 feet. A width greater than 1,000 feet is recommended for large mammals and birds. Corridors for bobcats, deer, and other large animals should reach rim-to-rim along drainages, especially if the topography is steep.

   The preservation and management of the Alpine Park Preserve would preserve currently existing local movement areas used by a variety of wildlife species.

6. Visual continuity (i.e., long lines of sight) will be provided within movement corridors. This makes it more likely that animals will keep moving through it. Developments along the rim of a canyon used as a corridor should be set back from the canyon rim and screened to minimize their visual impact.

   The project would not constrain the visual continuity of wildlife corridors or linkages. Development would be focused on the eastern edge of the existing open space adjacent to the busy South Grade Road. Trails would not interrupt visual continuity.

7. Corridors with low levels of human disturbance, especially at night, will be selected. This includes maintaining low noise levels and limiting artificial lighting.

   The project does not propose any new nighttime lighting or nighttime usage of the preserve. Public access to the preserve would be limited to a low level and would not substantially increase noise within the preserve. Public access in the proposed project is proposed only during daylight hours and would not affect the nighttime movement of medium to large mammals. The preservation and management of the Alpine Park Preserve would preserve currently existing natural conditions.

8. Barriers, such as roads, will be minimized. Roads that cross corridors should have 10-foot-high fencing that channels wildlife to underpasses located away from interchanges. The length-to-width ratio for wildlife underpasses is less than 2, although this restriction can be relaxed for underpasses with a height of greater than 30 feet.

   No wildlife corridors are present within the project area. No new roads or barriers would be introduced. No roads and therefore no wildlife underpasses are included in the design for the proposed project.

9. Where possible at wildlife crossings, road bridges for vehicular traffic rather than tunnels for wildlife use will be employed. Box culverts will be used only when they can achieve the wildlife crossing/movement goals for a specific location. Crossings will be designed as follows: sound insulation materials will be provided; the substrate will be left in a natural condition and vegetated with native vegetation, if possible; a line of sight to the other end will be provided; and, if necessary, low-level illumination will be installed in the tunnel.

   No wildlife underpasses or crossings are included in the design for the proposed project.

10. If continuous corridors do not exist, archipelago (or stepping-stone) corridors may be used for short distances. For example, the gnatcatcher may use disjunct patches of sage scrub for dispersal if the distance involved is less than 1 to 2 miles.

    The preservation and management of the Alpine Park Preserve would preserve currently existing dispersal habitat used by a variety of wildlife species.

Subarea Plan Findings

Conformance with the objectives of the County Subarea Plan is demonstrated by the following findings:

1. The project will not conflict with the no-net-loss-of-wetlands standard in satisfying state and federal wetland goals and policies.

   No wetland features or aquatic resources were found within the study area. The project has been designed to avoid impacts on CDFW jurisdictional habitat.

2. The project includes measures to maximize the habitat structural diversity of conserved habitat areas, including conservation of unique habitats and habitat features.

   Structurally diverse habitats are present on-site. The project has incorporated design measures to conserve the habitats on-site. These measures include the use of existing trails, paths, and disturbed areas to the maximum extent practicable; prohibition of the use of motorized vehicles on trails; the use of natural vegetation, topography, limited fencing, and signage to direct trails users to designated trails and away from sensitive habitat areas; the requirement that dogs be leashed at all times; and trails being no greater than 4 feet wide.

3. The project provides for conservation of spatially representative examples of extensive patches of coastal sage scrub and other habitat types that were ranked as having high and very high biological values by the MSCP habitat evaluation model.

   Native Habitat Avoidance Areas are located within the northern end of the Alpine County Park adjacent to the proposed equestrian staging area and include open Engelmann oak woodland, flat-topped buckwheat, and disturbed flat-topped buckwheat. Native Habitat Avoidance Areas will not be subject to mass grading or vegetation removal during site preparation activities.

   The preserve is located within the PAMA of the County's MSCP Subarea Plan. The project has been designed to minimize impacts to the adjacent preserve, and as required under the County's MSCP Subarea Plan, the preserve will be managed in perpetuity in accordance with a Resource Management Plan. This plan will outline management activities to be carried out by the County—specifically, by County park rangers and on-site personnel who will live on-site. Activities likely to be included in the Resource Management Plan would enhance and preserve the affected sensitive natural communities. These activities include long-term monitoring of on-site preservation areas, non-native and invasive species vegetation management, and habitat restoration on the preserve as applicable. Through these strategic measures to mitigate for impacts, the preserved sensitive natural communities will be managed to maintain high-quality and functioning habitat. Through these initiatives, the County will demonstrate its long-term commitment to species conservation within the preserve.

4. The project provides for the creation of significant blocks of habitat to reduce edge effects and maximize the ratio of surface area to the perimeter of conserved habitats.

   The project has been designed to minimize direct and indirect impacts by concentrating Alpine County Park infrastructure adjacent to developed lands. The Alpine Park preserve will be situated immediately west and northwest of the Alpine County Park; the preserve is situated adjacent to the approximately 231-acre Wright's Field Preserve on its western border. As a result, the preserve, along with Wright's Field Preserve, forms a large block of habitat of approximately 300 acres with minimal edge effects. The design and configuration of the Alpine County Park maximizes the ratio of surface area to the perimeter of conserved lands.

5. The project provides for the development of the least sensitive habitat areas.

   The proposed project has been designed to minimize or avoid impacts on sensitive habitat areas. No direct impacts will occur on any Engelmann oaks, Engelmann oak woodland (Tier I habitat), or Engelmann oak canopy from the proposed project. The project is not anticipated to cause indirect impacts at levels that would be likely to harm sensitive habitats over the long term. Though anthropogenic presence is likely to increase through construction of the Alpine County Park, measures have been sought to reduce impacts on the sensitive natural communities in the neighboring preserve. The current informal trail system will be converted to a more formalized system, discouraging unauthorized uses within the Alpine Park

Preserve. A permanent live-in park range volunteer will also be situated within the Alpine County Park, which will further reduce indirect impacts on sensitive habitats through an increased monitoring presence in the area.

6. The project provides for the conservation of key regional populations of covered species and representations of sensitive habitats and their geographic sub-associations in biologically functioning units.

   The proposed project has been designed to minimize or avoid impacts on habitat and special-status species. Native Habitat Avoidance Areas within Alpine County Park and the preserve will conserve native habitat that will provide for the conservation of multiple species and all five Tier I through Tier III habitats (i.e., Diegan coastal sage scrub, including *Baccharis* dominated; flat-topped buckwheat; Valley needlegrass grassland; non-native grassland; open Engelmann oak woodland) documented within the County's 96.6-acre parcel. Mitigation measures have been incorporated into the project, and mitigation for impacts on habitat will be consistent with the mitigation requirements of the BMO.

7. Conserves large interconnecting blocks of habitat that contribute to the preservation of wide-ranging species such as mule deer, golden eagle, and predators as appropriate. Special emphasis will be placed on conserving adequate foraging habitat near golden eagle nest sites.

   The project area does not have suitable breeding habitat for golden eagle. A reduction in potential foraging habitat would not result in a substantial adverse effect on the long-term survival of this species. It is unknown if the site is occupied by mule deer or other large predators, such as mountain lion, because it is surrounded by development on at least three sides (north, south, west), with some exurban development on the south side. The configuration of the preserve adjacent to the Wright's Field Preserve would result in approximately 300 acres of preserved habitat that would connect to private conservation easements directly south of the preserve and Cleveland National Forest lands located approximately 0.25 mile south of the preserve. The project would not result in take of golden eagles. The project is situated within eagle foraging habitat, but the impacts associated with implementation of the project would not significantly affect eagle foraging and would not result in take. No project elements are proposed within 4,000 feet of a golden eagle nest.

8. All projects within the San Diego County Subarea Plan shall conserve identified critical populations and narrow endemics to the levels specified in the Subarea Plan. These levels generally call for no impact on critical populations and no more than 20 percent loss of narrow endemics and specified rare and endangered plants.

   No rare, narrow endemic species and no critical populations of sensitive plant species were observed in the study area. There are no anticipated impacts on rare, narrow endemic animal species.

9. No project shall be approved that will jeopardize the possible or probable assembly of a preserve system within the Subarea Plan.

The proposed project will not affect the assembly of the County's MSCP preserve. Acquisition of the property for the creation of the Alpine County Preserve on the western edge of the proposed project was intended to contribute to the assembly of the preserve.

10. All projects that propose to count on-site preservation toward their mitigation responsibility must include provisions to reduce edge effects.

    The project has been designed to minimize edge effects through numerous iterations of the design and configuration of the proposed project, which has a clear, linear boundary on the western edge. In addition, edge effects will be reduced through establishment of the Alpine Park Preserve, which will be managed in perpetuity in accordance with a Resource Management Plan that will outline management activities to be carried out by County. Activities likely to be included in the Resource Management Plan would enhance and preserve the affected sensitive natural communities. These activities include long-term monitoring of on-site preservation areas, non-native and invasive species vegetation management, and habitat restoration on the preserve as applicable. Through these strategic measures to mitigate for impacts, the preserved sensitive natural communities will be managed to maintain high-quality and functioning habitat, and the County will demonstrate its long-term commitment to species conservation within the Alpine Park Preserve. Additional measures will be implemented, as necessary.

11. Every effort has been made to avoid impacts on BRCAs, sensitive resources, and specific sensitive species, as defined in the BMO.

    This project has been designed to minimize impacts on the BRCA by keeping the development footprint as small as possible while still meeting the project purpose and need. Multi-use trails have been designed to be as narrow as possible while allowing for public access. Project-related impacts on habitat within the BRCA would be mitigated consistent with the BMO within Alpine Park Preserve and/or within off-site location(s) that meet the qualifications of a BRCA. The proposed project will affect 22.4 acres of native or naturalized habitat, including 14.86 acres of Tier 1 habitat (Valley needlegrass grassland, including disturbed Engelmann oak woodland), 3.97 acres of Tier II habitat (Diegan coastal sage scrub, including disturbed and *Baccharis* dominated; flat-topped buckwheat, including disturbed) and 3.57 acres of Tier III habitat (non-native grassland). Habitat-based mitigation for permanent direct impacts on sensitive habitats will be consistent with the BMO and satisfied through a combination of on-site preservation for Tiers I, II, and III and purchase of credits and/or land acquisition. Mitigation shall be within a habitat tier equal to or greater than the impact site, and the mitigation site shall meet the criteria of a BRCA.

    The project would result in the maintenance of 1.0 acre of existing multi-use trails throughout the property; maintenance of these use trails would not result in the removal of any native habitat.

    To reduce potential indirect impacts on sensitive biological habitats and species, including nesting birds, the design measures discussed below have been

incorporated into the project. A permanent live-in park volunteer will be situated within the Alpine County Park, which will reduce indirect impacts on sensitive habitats through an increased monitoring presence in the area. There will be no night lighting from the park, and construction of a formal trail system will keep visitors from venturing into the undisturbed native habitats within the Alpine Park Preserve. There will be no new nighttime lighting or nighttime usage of the preserve, and public access to the preserve would be limited to a low level and would not substantially increase noise within the preserve. The changes in hydrology expected from implementation of the septic system (i.e., increase in water use compared to baseline conditions) would occur within disturbed habitat that is currently regularly disced for fire prevention/fuel modification. As a result, an increase in the amount of water in these areas would not result in a significant impact on sensitive species because none currently occur in this disturbed area. Additional measures include utilizing existing trails, paths, and disturbed areas to the maximum extent practicable; prohibition of motorized vehicles on trails; the use of natural vegetation, topography, limited fencing, and signage to direct trails users to designated trails and away from sensitive habitat areas; and the requirement that dogs be leased as all times. In addition, trail grading and construction will be prohibited during the bird breeding season, defined as January 15 to September 15, unless it is determined through surveys that nesting birds are not present. If nesting birds are documented on-site, the area will be flagged and mapped on construction plans, along with a buffer, as recommended by the qualified biologist. The buffer area(s) established by the qualified biologist will be avoided until the nesting cycle is complete or it is determined that the nest is no longer active. Water quality best management practices, including gravel bags, fiber rolls, and silt fencing, will be implemented throughout the project site during and after construction.

No feasible, less environmentally damaging alternative could be employed that would allow implementation of this essential public project.

Department of Parks and Recreation

December 2022

Memorandum

HELIX Environmental Planning, Inc.
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Date: November 3, 2026

To: Kiran Seibel, County of San Diego, Parks and Recreation

From: Laura Moreton

Subject: Addendum to the Biological Resources Report for the Alpine County Park Project in the County of San Diego

HELIX Project: 00187.00133.056

Message:

This memo serves as an addendum to the Alpine County Park Project Biological Resources Report (BRR) (ICF 2022) to comply with a court order related to biological resources in the Peremptory Writ of Mandate issued on January 23, 2026, for CASE NO: 37-2024-00000536-CU-WM-CTL (Writ), and as further detailed in the Minute Order issued on June 9, 2025, in the same proceeding (Minute Order). The court determined that the Environmental Impact Report (EIR; State Clearinghouse #2021030196, County of San Diego [County] 2023) required further substantial evidence and reasoned analysis to adequately address the petitioners' comments related to two special-status animal species: western spadefoot (*Spea hammondii*) and pallid bat (*Antrozous pallidus*). Changes made after public review of the 2026 RDEIR are shown in ~~double strike-out~~/underline and are shaded light gray for the ease of reader review.

PROJECT BACKGROUND

The County of San Diego Department of Parks and Recreation (DPR) is proposing to construct the approximately 25-acre Alpine Park Project (project) in the community of Alpine, California. The Biological Survey Area (BSA) studied in the 2022 BRR includes the 96.6-acre project site (of which 2.4 acres is in the public right-of-way in South Grade Road).

The County acquired the 96.6-acre project site in 2019 to build a County-owned public park and establish preserve land in the area outside Alpine County Park. The County plans to manage the approximately 70-acre Alpine Park Preserve in perpetuity, as part of the preserve assembly envisioned under the Multiple Species Conservation Program (MSCP; County 1998).

The project site is in the community of Alpine, California, in south-central San Diego County, approximately 1.3 miles south of Interstate 8. Specifically, the project site is located along South Grade

Road, approximately one mile east of the intersection of Tavern Road and South Grade Road. The project occurs within the U.S. Geological Survey (USGS) *Alpine, California* 7.5-minute topographical quadrangle map. The center coordinates for the project in decimal degree format (NAD 83) are 32.82058° N and -116.75918° W. The project site is currently an undeveloped grassy field with multiple informal use trails but no permanent structures or infrastructure.

WESTERN SPADEFOOT TOAD

Writ

The language included in the Writ regarding western spadefoot is included below:

> *Western Spadefoot Toad. Respondent shall address, providing reasoned analysis supported by substantial evidence in the record, comments submitted by Petitioners' expert stating that the Spadefoot can travel up to 600 meters from their breeding pools and noting that the USGS recommended an undeveloped buffer of 300 to 400 meters around breeding pools.*

Minute Order

The language included in the Minute Order regarding western spadefoot, which provides further details regarding the Writ's directive, is included below:

> *The Western Spadefoot Toad ("Spadefoot") is a candidate for listing under the federal endangered species act. AR 1497. Petitioners argue the EIR's finding that the Project will have no impact on the surrounding Spadefoot population lacks evidence. OB at p.16. They argue their expert showed the Spadefoot can travel up to 600 meters from their breeding pools, meaning they may migrate into the development footprint and thus transmit waterborne contamination from vehicles, animal waste and landscaping, and Argentine Ants that impact Spadefoot's prey.* Id.*, citing AR 1340-1342 (also noting the USGS recommended an undeveloped buffer measuring 300 to 400 meters around breeding ponds). Petitioners argue the EIR's conclusion that the Spadefoot would only travel approximately 262 meters from pools to conclude no impact would occur ignores petitioners' expert evidence, and the EIR failed to address this in response to petitioners' comments. OB at p.17, citing* Banning Ranch Conservancy v. City of Newport Beach *(2017) 2 Cal.5th 918, 940 (The Guidelines state that an EIR should identify '[a]reas of controversy known to the lead agency including issues raised by [other] agencies." (Guidelines, § 15123, subd. (b)(2).) 'Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts." (Guidelines, § 15151.) '[M]ajor environmental issues raised when the lead agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail. (Guidelines, § 15088, subd.(c)."). The County argues petitioners' comments on the recirculated Spadefoot analysis was late and, thus, the County did not have a duty to respond. Oppo. at p.16, citing AR 5369 (Nov. 7, 2023 letter) and citing* Gray v. Cnty. of Madera *(2008) 167 Cal.App.4th 1099, 1111 (under CEQA* [California Environmental Quality Act]*, lead agency is not required to respond to late comments). Petitioners argue they submitted expert comments on the edge effects in the draft EIR in 2021,*

and the recirculated and final EIR did not respond to those comments. Reply at p.12- 13, citing AR 1336, 1341.

Here, the record shows petitioners submitted comments on the Spadefoot, including the need to mitigate potential adverse effects associated with the development edge to provide for buffer distances of 300 to 400 meters around breeding ponds in 2021. AR 1336, 1340-1341. The EIR does not appear to address petitioners' expert comments on this issue. The County's analysis of indirect impacts on Wright's Field biological resources -- potential impacts approximately 600 to 800 feet from the eastern edge of the field -- also does not respond to the issue.

In its briefing and at the hearing, the County argued it relied on the study cited by petitioners' own expert (the 2019 Baumberger study) to adopt the datapoint of 262 meters in the EIR. Oppo. at p.16, citing Claremont Canyon Conservancy v. Regents of Univ. of California *(2023) 92 Cal. App. 5th 474, 483 (for the proposition that an EIR does not need to analyze every permutation of the data or address all variations of the issues). Petitioner's expert review, however, explained that a more recent study – by Halstead et al. in 2021 – followed up on Baumberger's earlier study findings, and that Halstead's study found a distance of 486 meters. AR1339-1340. The expert's review also noted the USGS recommended an undeveloped buffer measuring 300 to 400 meters. AR 1340. Thus, the issue with the EIR's reliance on the 262 meters datapoint is not merely about an agency's discretion of what is ultimately included in an EIR. Rather, it is that the EIR does not address and provide a reasoned analysis as to why the smaller buffer distance would support the EIR's conclusions on the Project's impacts to Spadefoot despite the newer conflicting evidence in the record. Accordingly, petitioners have shown the County erred when it concluded the Project's impact to Spadefoot would be less than significant after mitigation.*

Technical Reports

The Draft EIR, published for public review from September 30, 2021, to November 15, 2021, did not include an analysis of western spadefoot. As a result of public comments, the 2021 Draft EIR was revised and recirculated, with a Final EIR (FEIR) completed in October 2023. The Recirculated Draft EIR included a western spadefoot analysis, including the results of a 2022 western spadefoot survey. The following information regarding western spadefoot was provided in the 2022 BRR, Recirculated Draft EIR, and in the FEIR:

Excerpt from Biological Resources Report (FEIR Appendix D) Section 4.1.13.3

The winter of 2018–2019 was an exceptionally wet winter for coastal San Diego County. During fairy shrimp surveys in 2019, a western spadefoot egg mass was observed in basin AP-7. These eggs were discovered on February 8, 2019; the basin was inundated through March 29, 2019, a total of seven weeks. It was dry after that date. No evidence of western spadefoot breeding was observed in any other basins on-site during the surveys. Larvae were never observed in basin AP-7 during weekly checks from February 8 through March 29, 2019. The single breeding attempt within AP-7 during February 2019 was very likely opportunistic in nature and indicative of the exceptionally wet winter. The basins on the County parcel appear to be too small and ephemeral in nature to allow for complete larval development during all but perhaps record rainfall years; they more often act as reproductive sinks for the species.

Based on the results of the 2022 western spadefoot survey, the seasonally inundated basins within the County's parcel are associated primarily with the trails that exist along the northern perimeter of the BSA. Approximately 48 ponded areas were surveyed within or adjacent to dirt access roads, of which approximately 35 were mapped within the County's parcel and 13 were mapped on Wright's Field.

No western spadefoot adults, larvae, or eggs were observed during surveys of seasonally inundated basins within the County's parcels in 2022. Based on the surveys conducted in 2022, the two basins on Wright's Field (WF-6 and WF-7) are the primary breeding pools for western spadefoot within the survey area, although successful western spadefoot recruitment was not observed in 2022. Based on the survey results, it appears basins within the County's parcel are too shallow and/or do not hold water long enough to support western spadefoot breeding activities during all but the wettest rain years.

*Three adults were observed within the County's parcel during the nocturnal survey on March 4, 2022. All three were on the western side of the County's parcel, within approximately 70 to 150 meters of the basins on Wright's Field and more than 250 meters away from the closest inundation areas on the County's parcel. It appears that the County's parcel does provide upland habitat for western spadefoot; they were observed foraging only in the far western portions of the parcel. Western spadefoot were not documented foraging within the proposed Alpine Park boundary in 2022. Potential impacts on western spadefoot are addressed in Section 2.2.3, below; mitigation measure **MM-BIO-4** is proposed to reduce those impacts.*

Appendix E provides additional details on the 2022 surveys for western spadefoot conducted in the BSA.

Excerpt from Biological Resources Report (FEIR Appendix D) Section 2.2.3.2

*Western spadefoot may be affected by the project. One breeding pool of approximately 157 square feet (AP-7) was documented within the active park development footprint in 2019. This breeding pool may be utilized by western spadefoot seeking to expand from the core population on Wright's Field Preserve during exceptionally wet years, such as 2019 when an egg mass was observed in AP-7. AP-7 would be filled in during construction of the active park (**Impact-BIO-4**). Impacts on this potential breeding pool would be significant absent mitigation.*

As described in the Western Spadefoot Survey Report (Appendix E), the core breeding population of western spadefoot is located within seasonally inundated basins on Wright's Field Preserve. Three adults were observed within the County's parcel during the nocturnal survey on March 4, 2022. All three were on the western side of the County's parcel, within approximately 70 to 150 meters of the basins on Wright's Field and more than 250 meters away from the closest inundation areas on the County's parcel. It appears that the County's parcel does provide upland habitat for western spadefoot, but western spadefoot were documented foraging only in the far western portions of the parcel during the 2022 surveys.

Based on a recent study (Baumberger et al. 2019) that documented the distances from breeding pools to burrow locations, burrows and estivating adults could be expected to occur within approximately 262 meters of the known breeding pools on Wright's Field Preserve. The area

within this 262-meter distance includes the western portion of the BSA but not areas within the proposed active park where grading would occur (see Figure 4.4-4).

Adult western spadefoot also emerge a few nights per year to forage and breed (San Diego Management and Monitoring Program 2022). These activities are most likely to occur within the same general area as burrowing habitat, although the presence of eggs within the basin AP-7 during 2019 demonstrate that they can migrate farther east and into the area proposed for park development during these nocturnal breeding events but very likely only during particularly wet years. Because these foraging and breeding events happen in the evening when construction equipment would not be active, it is unlikely that direct impacts on western spadefoot, such as crushing or illegal collecting, would occur during foraging and breeding events. However, there is a possibility that some estivating western spadefoots would occur within the proposed project footprint where grading would occur. If western spadefoots were estivating in areas where grading is proposed, individuals could be crushed from construction equipment. These impacts are significance, absent mitigation, as described further in Section 3.2. The County would address potential impacts with mitigation measure ***MM-BIO-4****; therefore, the impact would be less than significant.*

FEIR Comment

The comment referred to in the Minute Order (Comment 08-91 from Preserve Alpine's Heritage on November 15, 2021) is included below for reference.

Western Spadefoot Life History and Ecological Requirements
A recently published telemetry study of Western Spadefoots in southern California provides important current information on the species' life history and ecological requirements (Halstead et al. 2021), following on earlier telemetry studies in the same region (Baumberger 2013, Baumberger et al. 2019).

Movements of Adult Spadefoots Between Breeding Pools and Aestivation Sites Western Spadefoots spend large parts of the year aestivating underground, often well away from their breeding ponds. As observed by Halstead et al. (2021:1385).

The distance that western spadefoots move from breeding pools is a key metric for western spadefoot conservation. Distance from the breeding pool indicates how much terrestrial habitat around a breeding pool might be used by western spadefoots and provides a direct link to the effective reserve sizes needed to preserve western spadefoot populations.

The need for core terrestrial habitats around amphibian breeding sites is documented (Semlitsch 1998, Semlitsch and Jensen 2001, Semlitsch and Bodie 2003, Harper et al. 2008, Searcy et al. 2013), as are the negative consequences of roads separating adult habitat from breeding pools (Becker et al. 2007, Brehme et al. 2018). Ensuring that enough terrestrial habitat exists to provide the life cycle needs for western spadefoots is best measured by the predictive distribution of distance from breeding pools. The 95th percentile of the posterior predictive distribution for western spadefoot asymptotic distance from the breeding pool was 486 m at Crystal Cove. This predicted value encompassed the maximum distance from the breeding pool of all but 1 of the spadefoots at the site.

Baumberger et al. (2019:6) found the maximum distance the spadefoots were found from the pools ranged from 16 to 262 m (Table 1, S1 Table), with a mean maximum distance of 69 m ± 61.48. The spadefoots used a mean of 13 burrows (SD ± 8.5), and the mean distance between burrow locations was 18 m (SD ± 24.2). They used 4–31 unique burrow sites (mean 11 ± 7.8) during the study. Nine of the 15 spadefoots (60%) reused one or more burrows at least once after moving to a different burrow. Outside of their aestivation period, the spadefoots shifted their burrow location an average of every 8 ± 7 days, and 147 of 194 (~76%) movements between burrows were ≤ 25 m.

In order to mitigate potential adverse effects associated with development edge upon Western Spadefoots, and to accommodate the movement of the toads between breeding ponds and upland aestivation sites, the USGS (Rochester et al. 2017) recommended that the City of Santee protect an ***undeveloped buffer measuring 300 to 400 meters*** *around Western Spadefoot breeding ponds. This range is consistent with conservation recommendations for the Western Spadefoot contained in the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (US Fish and Wildlife Service 2005:II-231).*

Based on calculations from upland habitat use data analyzed by Semlitsch and Brodie (2003), a minimum conservation area to preserve the ecological processes required for the conservation of amphibians may fall within a distance of approximately 368 meters (1,207 feet) from suitable breeding wetlands.

Note that even the larger recommended buffer distance of 400 meters falls far short of the 602-meter movement of an adult spadefoot recorded in coastal Orange County (Halstead et al. 2021), and does not encompass the 486-meter distance that represents "the 95th percentile of the posterior predictive distribution for western spadefoot asymptotic distance from the breeding pool" in coastal Orange County. Figures 1 and 2, on the following page, show what buffer distances of 300 and 400 meters would look like on the project site.

Figure 1 (left) and Figure 2 (right) [Refer to Comment O8-91 in Volume I of the October 2023 FEIR for figures]. *The yellow circle in Figure 1 represents a 300-m buffer around Western Spadefoot breeding pool AP-007, and the yellow circle in Figure 1 represents a 400-m buffer. These are the minimum and maximum undeveloped buffer distances that the USGS recommended around spadefoot breeding ponds in Santee, San Diego County (Rochester et al. 2017). Aerial Source: Google Earth Pro.*

Response Provided in the FEIR (Volume 1, Chapter 3, Section 3.3.1)

Master Response MR-1 (Western Spadefoot Recirculation)
*Commenters noted that western spadefoot (*Spea hammondii*) is known to occur on Wright's Field and an egg mass for this species was observed during the project's 2019 fairy shrimp surveys within the proposed Alpine Park footprint. The Draft EIR did not discuss impacts on western spadefoot. Since the public comment period closed for the Draft EIR, the County of San Diego (County) has conducted focused surveys for western spadefoot within its property, as well as within the known population on the Wright's Field Preserve. The results of these surveys and a complete impact analysis have been provided in the Recirculated Sections of the Draft EIR (RS-Draft EIR). Specifically, Section 4.4 of the Draft EIR and the Biological Resources Report (BRR)*

were revised to include this analysis. A western spadefoot survey report was also prepared and included in the RS-Draft EIR. Because impacts on western spadefoot from the project are anticipated to be significant absent mitigation, ***MM-BIO-4*** *would reduce impacts on this species to less-than-significant levels.*

Response to Writ

The Writ directs the County to address, providing reasoned analysis supported by substantial evidence in the record, comments submitted by Petitioners' expert stating that western spadefoot can travel up to 602 meters from their breeding pools and noting that the USGS recommended an undeveloped buffer of 300 to 400 meters around breeding pools.

The County's proposed 262-meter buffer around western spadefoot breeding pools is based on a recent Orange County study (Baumberger et al. 2019) that determined that the mean distance of burrows from breeding pools was 40 meters with a range from 1 to 262 meters. The County acknowledges that western spadefoot has been documented to travel up to 602 meters from their breeding pools in one instance in a different Orange County study (Halstead et al. 2021). Although western spadefoots are capable of traveling varying distances, this is not necessarily correlated with where they spend most of their time. The Halstead study concludes that most western spadefoot home range areas, or the location where they spend the majority of their time, are less than one hectare (a linear travel range of approximately 56 meters,[1] assuming the home range area is a circle around a pool). This range of 56 meters represents the linear distance a western spadefoot individual could travel from the breeding pool at the center of its one-hectare home range area in any given direction. The 262-meter buffer proposed by the project provides far more habitat than even the largest individual home range observed during the Halstead study, which was up to 6 hectares, or approximately 138 meters (again assuming the home range area is a circle around a pool). The observation of a western spadefoot traveling up to 602 meters from its breeding pool in the Halstead study does not invalidate the County's 262-meter buffer, as the same study confirms that the largest observed home range for the species is over 100 meters smaller than the County's buffer. The intent of the mitigation measure is to protect the western spadefoot from development. The 262-meter buffer adequately protects the home range of the western spadefoot, while the design of the project allows for dispersal of the western spadefoot to the north and east for distances greater than 602 meters, into the Wright's Field Preserve and the County's Alpine Park Preserve.

Halstead et al. (2021) found variations between the distances toads were found to travel in relation to breeding pools. For example, 95 percent of the toads were found within 486 meters of their breeding pool at one site, and 95 percent of the toads were within 187 meters at another site. This shows there is a wide variation in the distances that spadefoots will travel in relation to their breeding pools. This spatial variation was found with most western spadefoot populations, and this context-dependent behavior suggests that site-specific management is necessary for western spadefoot.

Further, the commenters cited Baumberger et al. (2019) in comments on western spadefoot. Baumberger et al. (2019) found that the mean distance of burrows from the breeding pools was 40

[1] The area of a circle is calculated as $A=\pi r^2$, where A is area; π is pi, a mathematical constant approximately equal to 3.14; and r is the radius of the circle, which is the distance from the center of the circle to any point on its circumference. Solving for the radius of circle with an area of one hectare (equivalent to 10,000 square meters) yields a distance of approximately 56 meters.

meters, with a range of 1 to 262 meters. The maximum distance from the breeding pool ranged from 262 meters down to a minimum of 16 meters. Outside of their aestivation period, the spadefoots shifted their burrow location an average of every eight days, and 147 of 194 (approximately 76 percent) movements between burrows were less than or equal to 25 meters (Baumberger et al. 2019). The average distance moved between burrow locations was 18 meters with a range of 1 to 204 meters (Baumberger et al. 2019). By using a 262-meter buffer, the County conservatively selected the outermost limit of toad movement from the Baumberger et al. study, 6.5 times the mean distance found in the study.

The County also acknowledges that the USGS recommended an undeveloped buffer of 300 to 400 meters around breeding pools for the City of Santee Subarea Plan (Rochester et al. 2017). However, this recommendation was due to site-specific characteristics where a larger buffer was necessary to connect pools to habitat outside of the Plan area. The Rochester study acknowledges Baumberger's documentation that western spadefoot travel as far as 262 meters from breeding pool sites and uses this finding to draft the buffers considered for the City of Santee Subarea Plan, as discussed on pages 5 through 7 of that study (Rochester et al. 2017). The decision to use larger buffers in the City of Santee's Subarea Plan does not invalidate the County's buffer, which was determined for the project site using the same research consulted for the City of Santee's Subarea Plan, both of which take into account the availability of adjacent habitat.

What's more, the 262-meter buffer is only the proposed distance between the breeding pools and the project's construction limits. There is a much larger buffer to the west (600 meters to the nearest development) and north (850 meters to the nearest development) of the occupied pool because of the location of Wright's Field Preserve, which provides additional western spadefoot habitat. As discussed in the BRR (Appendix D to the RS-DEIR), most of the pools occupied by western spadefoot were on the adjacent Wright's Field site, not within the project site. The distribution of western spadefoot locations shows that Wright's Field is more suitable than the project site, meaning that spadefoots would be more likely to move west and out of the project site than east toward the proposed park site. This behavior by spadefoots can be expected in existing conditions (no project) as well as future proposed conditions (developed park). Wright's Field is preserved, which adds 230 acres (or 930,000 square meters) to the western spadefoot territory identified within the 262-meter buffer on-site. This is a key site-specific difference between the project site and the City of Santee Subarea Plan; a buffer of 300 to 400 meters is not required because the project's 262-meter buffer is more than sufficient to connect breeding pools to additional western spadefoot habitat.

Finally, the County coordinated closely with the U.S. Fish and Wildlife Service (USFWS) to determine an appropriate buffer for the project site. The USFWS exercised their own expert judgement and determined a 262-meter buffer was sufficient in the Biological Opinion they issued for the project, which also concludes that any spadefoots potentially injured or killed by the project (though unlikely) would not have a meaningful effect to the population given the comparatively high density of spadefoots in adjacent, protected habitat (Attachment A, *Biological Opinion 2022-0004852-S7-F-SD*). The USFWS further concluded that the protection and management of spadefoot habitat within the Preserve, combined with restoration of breeding habitat, will fully offset impacts from construction of the recreational park such that the population trajectory will be equal to or better over time compared to a no project alternative. The following conservation measures, as required by the permit for the project (No. ESPER22013883), will be implemented to protect western spadefoot. This is in addition to the

requirements of the FEIR. If any measures are in conflict, the permit requirements supersede the mitigation measures.

CM 3. Spadefoot Avoidance Measures
To minimize impacts to spadefoot within the recreation park, spadefoot exclusionary fencing will be installed around the Park. Prior to construction, at least three spadefoot surveys will be conducted within the exclusionary fence, and all spadefoot observed will be relocated outside of the fencing. Surveys will continue until no spadefoot are observed. Exclusionary fencing will remain in place surrounding the Park following construction to prevent spadefoot from entering the area and subjecting themselves to impacts. During ongoing management of the Preserve, spadefoot will be surveyed prior to trail and road maintenance when water is ponding. Work will be halted if adults, eggs, tadpoles, or juveniles are observed within the proposed impact areas.

CM 4. Spadefoot Habitat Conservation and Creation
The County will create three permanent basins encompassing at least 471 square feet to support spadefoot breeding. The basins will be within dispersal distance (860 feet) to existing breeding sites within Wright's Field, and they will be sited as far away from access roads as possible to minimize road mortality. These basins will avoid Quino habitat enhancement areas. Details of the breeding habitat creation project are in the Habitat Restoration and Enhancement Plan (HREP). Long-term management of the Preserve will include spadefoot-specific measures, including maintenance of breeding pools and monitoring.

CM 5. General Minimization Measures During Construction

a. *Employees and contractors will strictly limit their activities, vehicles, equipment, and construction materials to the Park.*

b. *No pets will be allowed in the Park during construction activities.*

c. *The Project will include watering, pursuant to a Stormwater Pollution Prevention Plan, to minimize dust generation throughout the project construction.*

d. *All equipment maintenance, staging, and dispensing of fuel, oil, or coolant will occur within the Park site.*

e. *Contractor equipment will be checked for leaks prior to operation and repaired, as necessary.*

f. *No night lighting will occur within or adjacent to the construction area at any time during construction.*

g. *Signage will be installed to prevent unauthorized access to the Preserve.*

PALLID BAT

Writ

The language included in the Writ regarding pallid bat is included below:

> *Pallid bat. Prior to making any finding that the 200-foot avoidance buffer from potential pallid bat roost sites, as set forth in mitigation measure MM-BIO-8, will avoid or substantially reduce a significant impact, Respondent shall support such a finding with substantial evidence in the record.*

Minute Order

The language included in the Minute Order regarding pallid bat is included below:

> *The pallid bat species is known to roost in San Diego County and the bats rely on grasslands for foraging. AR 2575-78. Petitioners argue the EIR's proposed mitigation measures under MM-BIO-7 to install bat boxes before removing vegetation and commencing construction, and MM-BIO-8 requiring construction occur at least 200 feet from potential roost sites, lack substantial evidence to show these measures are effective to reduce the project's impact to less than significant. OB at p.18-19.*
>
> *The EIR provides substantial evidence that the bat boxes will be included with other measures to mitigate impacts to less than significant. Oppo. at p.18, citing AR 1948–49 and AR 1955 (discusses restoration of native grassland and preservation of property in addition to active management on-site for the proposed preserve land, plus implementing mitigation measures of pallid bat boxes, bat roost avoidance, native grassland restoration, preservation of sensitive habituates; and construction is expected to occur during daytime hours and it is not expected to alter bats' natural nocturnal behaviors), AR 2593–95. The EIR also contains substantial evidence to show consideration will be given regarding temperature and monitoring of the bat boxes. AR 2593 (County will work with a bat expert to design and install the bat boxes; and design and placement will be considered for how to best maintain proper roost temperature; monitoring will be conducted quarterly for first 2 years and twice-yearly for years 3 through 5 after installation).*
>
> *However, as for the sound buffer distance to potential roosting sites – the County's expert recommended that mitigation "preclude[] construction activities within a minimum 500 feet of potential roost sites during the pupping season." Reply at p.13, citing AR 12249. The County does not show that mitigation efforts of requiring construction occur at least 200 feet from the nearest potential roosting spot (AR 2593) is supported by substantial evidence. Accordingly, the petitioners have shown no substantial evidence supports the EIR's proposed mitigation of only a 200-foot buffer construction zone.*
>
> *At the hearing, the County argued that no known potential roost sites have been identified on the project site. This argument appears to have been raised for the first time at the hearing. The petitioners do not appear to cite to the administrative record or other authority on this point. Even assuming no pallid bats have been spotted, this does not change the analysis, as the record shows that pallid bats are very difficult to detect and the EIR identified pallid bat impacts that requires mitigation measures. AR 2578.*

Technical Reports

The following information related to pallid bats (*Antrozous pallidus*) was included in the 2022 BRR (Appendix D of the FEIR) and summarized in the DEIR and the FEIR.

Excerpt from Biological Resources Report (FEIR Appendix D) Section 1.4.13.5

> *During the 2019 and 2022 surveys, 15 of the 22 known bat species in San Diego County were detected. The bats detected were big brown bat, big free-tailed bat, California myotis, canyon bat, hoary bat, Mexican free-tailed bat, pallid bat, pocketed free-tailed bat, Townsend's big-eared bat, western long-eared myotis, western mastiff bat, western red bat, western small-footed myotis, western yellow bat, and Yuma myotis.*
>
> *Seven of the observed bats are listed as California Species of Special Concern: pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, pocketed free-tailed bat, and big free-tailed bat. All of these species, except western yellow bat, are also listed as San Diego County Group 2 species. Suitable roosting and foraging habitat for these species can be found on-site.*

Excerpt from Biological Resources Report (FEIR Appendix D) Section 2.2.3.4

> *During the 2019 and 2022 bat surveys, 15 of the 22 known bat species in San Diego County were detected. [Of these, t]he [special status] bats detected are big-free tailed bat, a County Group 2 species; pallid bat, a County Group 2 species; pocketed free-tailed bat, a County Group 2 species; Townsend's big-eared bat, a County Group 2 species; western long-eared myotis, western mastiff bat, a County Group 2 species; western red bat, a County Group 2 species; western small-footed myotis, a County Group 2 species; western yellow bat; and Yuma myotis, a County Group 2 species. Seven of these species are listed as California Species of Special Concern: pallid bat, Townsend's big-eared bat, western red bat, western yellow bat, western mastiff bat, pocketed free-tailed bat, and big free-tailed bat. Permanent direct and temporary indirect impacts on these species are expected to occur.*
>
> *The bat species were observed foraging over most of the native habitats in the BSA, especially within the open Engelmann oak woodland, flat-topped buckwheat, and native and non-native grasslands within the project footprint. Direct impacts on sensitive habitats would remove foraging habitat for these bat species during vegetation clearing associated with construction of Alpine County Park. However, the County is proposing restoration of native grassland and permanent preservation of a portion of the County property, in addition to active management on-site for the proposed preserve land and Alpine Park. The restoration efforts and active management of the proposed preserve portion of the project would assist in preventing the spread of invasive plants and benefit the native habitats some of these species rely on for foraging. Signs would be posted and the public would be subject to park rules within the proposed preserve land and Alpine Park to prevent impacts from domestic and horses within sensitive habitats. Ranger-led hikes would also assist the public in learning further about the resources the County proposes to protect in perpetuity and the importance of staying on designated trails and picking up after domestic animals. Impacts would potentially be significant. However, through the design measures and on-site management through implementation of the Project, in addition to implementation of mitigation measures MM-BIO-6, pallid bat boxes; MM-BIO-7, bat roost avoidance; MM-BIO-9, native grassland restoration; and MM-BIO-10, preservation of sensitive habitat types, as well as through the establishment of the Alpine Park Preserve (APM-BIO-1), which would protect the remaining habitat for these species in perpetuity, the impact would less than significant.*

Implementation of the project would not directly affect any known roosting habitat or maternal colony sites; however, roost sites are difficult to detect and can shift from year to year. It is presumed that the bats present in the Biological Study Area (BSA) are utilizing oak woodlands and/or grasslands as foraging or roosting sites, but there also may be some potential for bats to use the rock outcrops or crevices within boulders as roost sites. No large rock outcrops or trees would be removed as part of construction of the project. However, construction would occur directly adjacent to oaks and in the vicinity of rock outcrops/boulders where bats could be roosting. These construction activities have the potential to disrupt the breeding success of pregnant females and their pups, potentially causing direct mortality in some instances. These potential effects are discussed further in Section 3.2, below, and would be mitigated to less than significant through MM-BIO-8, requiring bat roost avoidance.

Indirect impacts on bat species, such as disruption of foraging behavior, could occur if construction takes place during evening hours. Because bats are nocturnal species and construction is expected to occur during daytime hours, indirect impacts on these species due to construction activities are not expected to alter natural behaviors. Maintenance of existing trails near or within oak woodlands is not expected to alter the quality of forage or affect roosting habitat for these species because these trails occur within disturbed, bare-ground areas already, and trail maintenance would occur during daytime hours.

Excerpt from Biological Resources Report (FEIR Appendix D) Section 3.2

The following state Species of Special Concern mammal species were documented within the BSA or have moderate or high potential to occur and, therefore, could be affected by the proposed Project: big free-tailed bat, Northwestern San Diego pocket mouse, pallid bat, pocketed free-tailed bat, San Diego black-tailed jackrabbit, San Diego desert (Bryant's) woodrat, Townsend's big-eared bat, western mastiff bat, western red bat, and western yellow bat. The loss of approximately 22.4 acres of habitat for these species would result in a significant impact. Impacts would be reduced to less-than-significant through the establishment of the Alpine Park Preserve (APM-BIO-1), which would protect the habitat within the County's parcel (and potentially in some off-site locations) for these species in perpetuity. Furthermore, impacts on habitat would be mitigated in accordance with MM-BIO-9, which would require compensatory mitigation be provided.

There are only two known pallid bat colony sites in San Diego County (Stokes 2018). The pallid bat individuals observed during focused bat surveys are believed to belong to the maternal colony that roosts in Viejas on a private residence. This species has very specific foraging strategy and utilizes grasslands and open oak woodlands as its main foraging habitat. In addition, this species has characteristics that affect its success with increased urbanization. This includes its tendency to fly at low altitude, its inability to fly over prolonged distances, and its specialized foraging strategies. The loss of approximately 22.4 acres of pallid bat foraging habitat would result in a significant impact that would be mitigated through the establishment of the Alpine Park Preserve (APM-BIO-1) and compensatory mitigation provided under MM-BIO-9, which would protect habitat for pallid bat within the County's parcel (and potentially in some off-site locations) for this species in perpetuity. Furthermore, impacts on pallid bat would be further reduced through implementation of MM-BIO-7, which would require the County to further support pallid bat populations through the installation of bat boxes.

Bat species are particularly vulnerable to impacts on maternal roost sites, such as within oaks or rock crevices. As mentioned in Chapter 2, impacts on maternal roost sites may occur during construction activities that occur in proximity to these sites. These impacts would cause direct impacts on California Species of Special Concern, including the potential for direct mortality, especially of pregnant females or pups. These impacts would be significant under the County's guidelines (County of San Diego 2010b), absent mitigation. Impacts on roosting special-status bat species would be reduced through implementation of ***MM-BIO-8****, which would require bat roost sites to be avoided during construction to the extent possible.*

These significant impacts would be reduced to less-than-significant levels through implementation of ***APM-BIO-1****, which would protect the species' habitat in perpetuity, in addition to* ***MM-BIO-2****, which would implement Engelmann oak tree avoidance and minimization measures;* ***MM-BIO-6****, which would install and monitor bat boxes;* ***MM-BIO-7,*** *which would avoid bat roosts;* ***MM-BIO-8****, which would restore non-native grassland to native grassland within the proposed preserve portion of the Project and a portion of Wright's Field; and* ***MM-BIO-9****, which would require habitat-based mitigation and preserve sensitive habitats in perpetuity.*

The following County Group 2 mammal species were documented within the BSA or have moderate or high potential to occur within the BSA and are already analyzed in Threshold 3.B., above: big free-tailed bat, Northwestern San Diego pocket mouse, pallid bat, pocketed free-tailed bat, Townsend's big-eared bat, San Diego black-tailed jackrabbit, San Diego desert (Bryant's) woodrat, western mastiff bat, and western red bat.

The western long-eared myotis, western small-footed myotis, and Yuma myotis are County Group II bat species not previously discussed. The impacts on these three bats would be similar to those disclosed for the bats described in Threshold 3.B. Although it is less clear that these impacts would affect the long-term local survival of these species, the loss of approximately 22.4 acres of habitat could result in a significant impact. These significant impacts would be reduced to less-than-significant levels through implementation of ***APM-BIO-1****, which would protect the species habitat in perpetuity, and* ***MM-BIO-9****, which would require habitat-based mitigation and preserve sensitive habitats in perpetuity. Impacts on maternal bat roosts of these species may occur during construction, which would be significant. Impacts on roosting special-status bat species would be reduced through implementation of* ***MM-BIO-8****, which would require bat roost sites to be avoided during construction to the extent possible.*

Implementation of the Project would have the potential to affect the nesting success of sensitive animals if vegetation clearing for initial construction of the park or any subsequent fuel modification activities are conducted during the breeding season for avian species or the roosting/pupping season for bat species. Impacts on the nesting success of sensitive animals would be a potentially significant impact. Implementation of ***MM-BIO-5*** *would reduce impacts on avian species to less-than-significant levels. Implementation of* ***MM-BIO-8*** *would reduce impacts on roosting bats.*

Response to Writ

No specific comments were raised on the buffer issue during public review, but the section below is included to comply with the Writ. Pallid bats were found nearby, but no known roost sites occur on site. However, the County is taking a conservative approach to protect pallid bats.

The Writ instructs the County—prior to making any finding that the 200-foot avoidance buffer from potential pallid bat roost sites, as set forth in mitigation measure MM-BIO-8, will avoid or substantially reduce a significant impact—to support such a finding with substantial evidence in the record.

Pallid bats were acoustically detected five times within the preserve portion of the project site during the September 2019 passive survey (ICF 2022). This is outside of the maternity season (April 1 – August 31) for the species. Therefore, the detections made were likely foraging, as opposed to roosting, individuals. Additionally, four of the five detections were in the northern portion of the preserved area more than 2,000 feet away from the proposed project impacts where the developed park will be. The closest detection of pallid bat was more than 500 feet west of proposed project impacts, also in the preserved area of the project site. The pallid bat individuals observed during focused bat surveys are believed to belong to the maternal colony that roosts in the Viejas Reservation, on a private residence. The roost is within an occupied house, indicating that pallid bats will withstand some level of disturbance and noise associated with human disturbance.

A 200-foot construction avoidance~~survey~~ buffer around the roost~~project~~ site is sufficient to protect roosting pallid bats, if present. Several studies have documented smaller construction avoidance buffers for several different species of roosting bats, some as small as 39 feet, as being effective for protecting maternity roosts of sensitive bat species in the U.S. (O'Keefe 2009). Because studies specific to pallid bats are limited and very little is known about the pallid bat, studies on North American bat species in general have been included herein to illustrate effective avoidance buffers for protecting roosting (including maternity and non-maternity roosts) bats in addition to available literature specific to pallid bats. Studies reviewed to determine adequate avoidance buffers include studies on the northern long-eared bat, Indiana bat, little brown bat, tricolored bat, and big brown bat, among others. These bat species were chosen as comparisons because in-depth scientific research has been conducted on them. However, it should be noted that none is a perfect comparison given that the others are not within the same genus as the pallid bat and there are no other bat species within the same genus as the pallid bat to use as a comparison. Therefore, species with similar size, roost locations, and habitat were chosen.

The USFWS recommends a 150-foot avoidance buffer for ~~avoiding~~ tree removal during the maternity season for northern long-eared bat (*Myotis septentrionalis*), a federally endangered species of bat (USFWS 2022). Although this is a different species of bat, it is a federally listed species, giving it a higher level of protection compared to the pallid bat. Like the pallid bat, this species is known to roost in trees. Additionally, both species are insectivorous medium-sized bats with large ears. These characteristics indicate a similar life cycle, diet, and roosting sensitivity level. The 4(d) Rule for Northern Long-Eared Bat is housed in 50 Code of Federal Regulations Part 17, in which the USFWS states:

> "O'Keefe (2009 p. 42) documented that a 39-foot (12-meter) buffer around a maternity roost tree during a harvest in May allowed the roost to be successfully used through late July and that one buffered tree was used 2 years in a row. We have adopted a standard for exception of take that is almost four times that which proved effective in this example, in order to better account for the

> variation in forest types used by the northern long-eared bat and a variety of slopes that might influence how large a buffer may need to be in order to prove effective."

As described above, the 150-foot distance was selected to ensure sufficient protection of the northern long-eared bat under a variety of possible development scenarios, though the USFWS acknowledges that a smaller avoidance buffer has proven effective to protect roosting sites.

Like the USFWS, the U.S. Forest Service (USFS) calls for a 150-foot primary avoidance buffer for northern long-eared bat and three additional species of forest-dwelling bats, including Indiana bat (*Myotis sodalis*), little brown bat (*M. lucifugus*), and tricolored bat (*Perimyotis subflavus*; USFS 2024). They require a 150-foot primary roost avoidance buffer centered on all known suitable roosts (including maternity and non-maternity roosts), which protects the integrity and function of the roost and avoids impacts to roosting bats. The primary 150-foot avoidance buffer around a suitable roost safeguards the roost and its current condition, characteristics, and associated microclimate from direct effects (USFWS 2016). A 150-foot avoidance buffer will protect known roosts from intentional damage or destruction (e.g., felling, burning, girdling, etc.) at all times of the year. The USFS also designates a 'secondary' species-specific avoidance buffer of variable size around a known active maternity roost. The secondary avoidance buffer typically includes multiple known and undocumented primary and alternate roost trees used by the maternity colony. These known and unknown roosts collectively comprise the core maternal roosting area (USFS 2024). The construction avoidance buffer determined by the bat biologist in accordance with MM-BIO-8 will be large enough to protect the primary and secondary roosts, if present.

Specific to sites occupied by pallid bats in the northwest, timber harvest has been prohibited within 250 feet of the roost site. The 250-foot avoidance buffer originates with the *Standards and Guidelines for Survey and Manage, Certain Cavity-Nesting Birds, Canada Lynx and Some Bat Roosts* (USFS 2001), which was developed under the Northwest Forest Plan (NWFP) Survey and Manage Program to protect sensitive species in Washington, Oregon, and northern California. Like the 150-foot avoidance buffer established by the USFWS, the 250-foot avoidance buffer is a conservative standard designed to ensure bat protection under a variety of development scenarios. The ultimate intent of the 250-foot avoidance buffer is to protect sites from vandalism, disturbance from road construction or blasting, and any activity that could change cave temperatures or drainage patterns, thus interfering with bat activity. The NWFP Guidelines state that "the size of the buffer, and types of activities allowed within the buffer, may be modified through the management direction developed for the specific site." (USFS 2001). The forests that are targeted for timber harvest in the northwest support tall, dense tree growth, which could result in a dramatic temperature shift when removed. The height of the trees also creates more disturbance from tree fall when they are cut. By contrast, the project site supports lower-growing, more open vegetation, reducing the potential for temperature shifts from clearing or damage from falling trees. The project site is also located in an urbanized area, such that the potential for human access and vandalism would not change dramatically with park construction. Therefore, park construction on-site warrants ~~requires~~ a smaller construction avoidance buffer than the 250-foot avoidance buffer recommended for timber harvest.

At a city park in Santa Clara County, an acoustic monitoring study of a maternity colony of big brown bats found that there was no difference in their egress and ingress patterns on the nights after chainsaws and earthmovers were operated (H. T. Harvey & Associates 2006). The equipment was used approximately 100 feet from the roost, which was the limit of the construction avoidance buffer zone

around the construction area, and the bat colony did not abandon their roost. The noise levels recorded during the operation of the chainsaws and earthmovers were 80 decibels (dB) and 87 dB, respectively. Bats' hearing is not as sensitive at lower frequencies compared to human hearing, so the sound frequencies that disturb humans do not necessarily have a corresponding effect on most bat species, and vice versa. Humans may not be able to hear frequencies detected by bats. This study indicates that a~~n~~ construction avoidance buffer of 100 feet was sufficient to protect an active maternity roost for a common bat species that occurs on-site.

The California Department of Transportation (Caltrans) recommends a survey area that includes the entire project site plus a 100-foot-wide buffer for potential bat roosting habitat (H. T. Harvey & Associates 2019). Within the Caltrans report, Johnston et al. (2004) recommends a generalized construction avoidance buffer distance of 100 feet between work activities and active roosts. Caltrans also recommends different avoidance buffers for day and night roosts depending on the activity that will occur. For pallid bats, the following avoidance buffers are recommended by Caltrans between the active roost and the activity: construction trucks and heavy equipment, 120 feet; small vehicles, 90 feet; drilling, trenching, and small equipment, 150 feet; light source without shielding, 400 feet; pedestrian traffic, 65 feet; and stationary diesel/gasoline exhaust sources greater than 2 minutes, 250 feet. The project will comply with these avoidance buffers through MM-BIO-8 (below), and the avoidance buffers may be expanded as needed to protect identified roosts from these activities at the discretion of the bat biologist. To ensure that roosts requiring avoidance buffers from stationary sources and light sources without shielding are identified and subsequently protected, the County has updated mitigation measure MM-BIO-8 to clarify that the pre-construction survey will cover the entire project impact area plus a 400-foot survey buffer if construction must occur during the pupping season.

As described above, there is no agreed-upon construction avoidance buffer for bat maternity sites, and guidance from federal agencies acknowledges that management requirements are site-specific. The two studies discussed above (O'Keefe 2009 and H. T. Harvey & Associates 2006) indicate that avoidance buffers of 39 to 100 feet can be successful for bat roost protection. Although there are varying recommendations for avoidance buffer size around bat maternity colonies, the County has suggested a construction avoidance~~survey~~ buffer of at least 200 feet, which is documented to have provided successful protection of bat maternity roosts of many bat species during a variety of projects, as described above. ~~The County has updated mitigation measure MM-BIO-8 (below) to clarify that the pre-construction survey will cover the entire project impact area plus a 200-foot buffer if construction must occur during the maternity season.~~ An avoidance buffer of at least 200 feet around the roost (greater for the activities in the Caltrans guidance above) will be established if any active maternity roosts are found, and it will be established according to the Bat Roost Management, Monitoring, and Mitigation Plan, as directed by an experienced bat biologist. The mitigation measure also includes monitoring to confirm the adequacy of the avoidance buffers and increasing the buffers if needed.

As shown below, mitigation measure MM-BIO-8 has been revised herein to clarify that if any maternal roost sites within the project site and a ~~200~~400-foot survey buffer are identified, an appropriate construction avoidance buffer of at least 200 feet shall be established around that roost site in accordance with the requirements established in the Bat Roost Management, Monitoring, and Mitigation Plan. This language provides a construction avoidance buffer that a bat expert deems necessary to protect the well-being of a roosting bat during the maternity season, depending upon what work activities are proposed to occur within the construction avoidance buffer. For example, if the bat expert retained to ~~complete the survey~~implement the Bat Roost Management, Monitoring, and

Mitigation Plan recommends a 500-foot construction avoidance buffer, the mitigation measure would require it to be implemented.

Mitigation

The following mitigation measures will be undertaken to protect the pallid bat. MM-BIO-7, MM-BIO-9, and APM-BIO-1 were presented in the 2023 version of Section 4.4 of the EIR as shown below. As described above, changes made after public review of the 2026 RDEIR are shown in ~~double strike-out~~/underline and are shaded light gray for the ease of reader review. Consistent with the approach of the 2026 Recirculated Draft EIR (RDEIR), revisions to MM-BIO-8 that were made for the 2026 RDEIR are shown in double ~~strike-out~~/underline ~~for the ease of reader review~~. Single ~~strike-out~~/underline indicates changes that were made to the mitigation measures between the 2022 RDEIR and the 2023 FEIR ~~and are not new revisions made for the 2026 RDEIR~~.

MM-BIO-7: Support Pallid Bat. ~~The~~ County DPR shall work with a bat expert to design and install bat boxes that attract pallid bat prior to vegetation removal activities commencing on the site. These bat boxes should be designed to accommodate both solitary individuals and maternal roost sites. Bat box design should reflect the best practices at the time of installation and be specific to larger-sized bats like pallid bat with respect to roost chamber sizes, etc. Design and placement of bat boxes should also consider how to best maintain proper roost temperature. When possible, the bat boxes should be placed along the edges of the wooded areas on the site. Final design, numbers, and placement of bat boxes will be determined by the bat expert in consultation with County DPR using the best practices known at the time.

Monitoring of the bat boxes shall be conducted quarterly for the first 2 years and twice-yearly during years 3 through 5 after installation. Any problems that are noted (e.g., mortality, predation) shall be addressed in consultation with the bat expert. Occupancy status, including species, numbers, etc., shall be documented to the extent possible without disturbing the occupants. If, after the first 2 years, a bat box remains unoccupied by any bat species, ~~the~~ County DPR and bat expert will discuss if the bat box needs to be repositioned on the site or redesigned. An annual report shall be prepared by the bat expert or designee to document the findings of the monitoring visits. The County will provide copies of this annual report to the CDFW and also include updates on the bat box monitoring on the site in the County's annual report for the MSCP.

MM-BIO-8: Bat Roost Avoidance. Because of the difficulty in detecting all potentially occurring roosting bats (e.g., the western red bat within the Engelmann oaks, pallid bats within rock crevices), no construction activities that could disturb a maternal roost site will occur during the pupping season (typically April 1 through August 31). This measure specifically precludes high-frequency surveying as well as intensive noise-generating activities (e.g., jack-hammering, etc.) anywhere on the project construction footprint as well as a 200-foot buffer around the project construction footprint~~within 200 feet of any Engelmann oaks or rock outcrops~~ during the pupping season.

If construction activities must occur ~~within this 200-foot avoidance buffer~~ during the pupping season, the County will conduct definitive bat roost surveys to determine the presence or absence of maternal day-roost and/or night-roost locations ~~within the 200-foot avoidance buffer that overlaps the construction footprint~~. These surveys will be conducted throughout the entirety of the project construction footprint as well as a 400~~200~~ foot buffer around the project construction footprint. The bat

biologist(s) who conduct these surveys shall have the appropriate education, training, and experience. The bat roost survey methodology will be described in a Bat Roost Management, Monitoring, and Mitigation Plan, which will be prepared at least 30 days prior to the start of construction and provided to CDFW.

Bat roost survey methods may include mist netting and tracking individual bats using telemetry and/or additional acoustic surveys that are timed to determine if individual Engelmann oaks or rock outcrops on or within 400~~200~~ feet~~the 200-foot~~ of the project construction footprint~~avoidance buffer are~~ support~~ing~~ bat roost sites. Surveys will be conducted for at least one hour after sunset to monitor for emergence. If any maternal roost sites~~within the 200-foot avoidance buffer~~ are identified, an appropriate construction avoidance buffer of at least 200 feet shall be established around that roost site in accordance with the requirements established in the Bat Roost Management, Monitoring, and Mitigation Plan. Avoidance buffer distances will account for the ability of that individual bat species to tolerate specific types of low- and high- frequency construction noise and other human disturbance associated with the project. No construction activities that could disrupt the roost site will be permitted within the established construction avoidance buffer. Additionally, any roost identified during the bat roost survey~~occurring on site~~ will have at least a 400-foot buffer from light sources without shields and at least a 250-foot buffer from any stationary exhaust source present for more than two minutes.

Bat biologists will monitor construction activities occurring adjacent to the avoidance areas for the bat roost sites in accordance with the Bat Roost Management, Monitoring, and Mitigation Plan. Monitoring frequency and duration also will conform to the Bat Roost Management, Monitoring, and Mitigation Plan and be used to determine that the established bat roost avoidance buffers are large enough to prevent maternal roost site impacts, including, but not limited to, roost site abandonment. Avoidance buffers will be expanded if any stress or disturbance to the maternal roost site is observed during monitoring. In years 1, 3, and 5 following construction completion, the County will conduct bat surveys, including maternal bat roost surveys, within the areas originally surveyed prior to construction.

If the maternal bat roost sites previously observed prior to and during construction are still observed during these monitoring surveys, no additional mitigation will be required. If any maternal roost sites observed prior to or during construction are no longer present (i.e., are not observed in any of the three post-construction surveys), the County will mitigate for the loss of the maternal roost site at a 2:1 ratio using methods agreed upon in the Bat Roost Management, Monitoring, and Mitigation Plan. This may include planting additional Engelmann oaks within the proposed ~~preserve~~open space if the affected maternal roost site utilized Engelmann oak trees or by building artificial bat roosts specifically for the affected bat species.

MM-BIO-9: Provide Compensatory Habitat-Based Mitigation. To mitigate for potentially significant impacts on Tier I, Tier II, and Tier III habitats, the County will provide compensatory mitigation consistent with its BMO ~~to reduce significant impacts on sensitive vegetation communities. Mitigation will be provided within open space preserve and/or within offsite location(s), as summarized below~~mitigation ratios. Mitigation will be provided commensurate with the acres of impacts incurred during each phase of construction and will be provided through the following: 1) on-site preservation within the open space, 2) on-site restoration of non-native grassland (Tier III) to native grassland (Tier I) and 3) off-site restoration of non-native (Tier III) to native grassland (Tier I) within Wright's Field, anticipated only as a result of Phase 2 implementation and 4) off-site mitigation for non-native grasslands, anticipated only as a result of Phase 2 implementation.

Table 4.4-5~~.~~ summarizes the maximum mitigation requirements if both Phase 1 and Phase 2 are implemented.

Table 4.4-5. Maximum Mitigation Requirements

Tier[a]	Total Impacts	Mitigation Ratio	Maximum Mitigation Requirement	On-site Mitigation[b]	Off-site Mitigation (Phase 2 Only)
Tier I	14.86	2:1	29.73	17.48 acres of preservation plus 4.84 acres of restoration (see **MM-BIO-10**)	7.41 acres of restoration on Wright's Field Preserve (see **MM-BIO-10**)
Tier II	3.97	1.5:1	5.95	5.95	None
Tier III	3.57	1:1	3.57	None	3.57[b]

a. Tiers correspond to those described in the County's BMO.
b. Habitat-based mitigation for permanent direct impacts on non-native grassland during Phase 2 implementation will be satisfied through purchase of credits and/or land acquisition of a similar high-quality non-native grassland in an off-site location.

APM-BIO-1: Establishment of the Open Space Preserve: As required under the County's MSCP Subarea Plan, Alpine Park Preserve will be managed in perpetuity in accordance with an RMP. This plan will outline management activities to be carried out by the County. The activities that are likely to be included in the RMP would enhance and preserve the affected sensitive natural communities. These activities include long-term monitoring of on-site preservation areas, non-native and invasive species vegetation management, and habitat restoration in the ~~preserve~~open space, as applicable. Through these strategic measures to mitigate for impacts, the preserved sensitive natural communities will be managed to maintain high-quality and functioning habitat and ~~the~~ County DPR will demonstrate its long-term commitment to species conservation within the open space~~/preserve~~.

ATTACHMENTS

A. Biological Opinion 2022-0004852-S7-F-SD

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Attachment A

Biological Opinion

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer To:
2022-0004852-S7-F-SD

August 11, 2025
Sent Electronically

Memorandum

To: Field Supervisor, Carlsbad Fish and Wildlife Office
Carlsbad, California

From: Division Supervisor, Carlsbad Fish and Wildlife Office
Carlsbad, California

Subject: Intra-Service Formal Section 7 Consultation and Conference on the Issuance of a Section 10(a)(1)(B) Permit for the Incidental Take of Quino Checkerspot Butterfly and Western Spadefoot in Conjunction with the Alpine Park Project, San Diego County, California

This document provides the U.S. Fish and Wildlife Service's (Service) biological opinion in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*), based on our review of the County of San Diego's (County or Applicant) July 2024, *Habitat Conservation Plan for the Alpine Park Project, San Diego County, California* (HCP). The HCP was prepared by the County in support of an application to the Service for a section 10(a)(1)(B) permit for the incidental take of the federally endangered Quino checkerspot butterfly (*Euphydryas editha quino*; Quino) and the federally proposed threatened western spadefoot (*Spea hammondii*; spadefoot). The biological opinion addresses the effects of the HCP on these species and critical habitat for the Hermes copper butterfly (*Lycaena hermes*; Hermes).

This biological opinion is based on information provided in the HCP; Quino, spadefoot, and Hermes listing documents; survey reports for Quino, spadefoot, and Hermes; the *Draft Environmental Impact Report for the Alpine County Park Project* dated September 2021; *Habitat Restoration and Enhancement Plan for the Alpine Park Project* dated July 2024; telephone conversations, in-person meetings, and email messages with the Applicant; and other sources of information available in our files. The complete project file addressing this consultation is maintained at the Service's Carlsbad Fish and Wildlife Office (CFWO).

CONSULTATION HISTORY

July 11, 2019: County presented project and discussed potential biological constraints at monthly meeting with the Service.

September 24, 2019: Site visit conducted with Back Country Land Trust, the County, the California Department of Fish and Wildlife (Department), and the Service.

October 10, 2019: The Service and the County discussed the site visit and the relevance of the site to Quino recovery.

February 13, 2020: At monthly meeting with the Service, the County presented data regarding presence of Quino and Hermes and determined that Quino should be addressed in an HCP, but that Hermes could be avoided.

May 14, 2020: At monthly meeting, the Service and County discussed covered activities and impact estimates.

August 20, 2020: The County provided the Service with the initial draft HCP.

November 30, 2021: The County published the Draft Environmental Impact Report under the California Environmental Quality Act.

May 13, 2022: The County provided the Service with a revised draft HCP.

May 27, 2022: The Service provided comments on draft HCP, including a recommendation to cover spadefoot.

November 23, 2022: The County provided the Service with an updated draft HCP.

December 8, 2022: The County and Service discussed spadefoot impacts and mitigation at the monthly meeting.

December 21, 2022: The Service provided comments on the November 23, 2022, draft HCP.

January 12, 2023: The Service and County discussed spadefoot incidental take limits at the monthly meeting.

March 9, 2023: The County submitted to the Service their approach to estimate incidental take of Quino.

March 20, 2023: The County provided a draft Habitat Restoration and Enhancement Plan to the Service describing mitigation for Quino and spadefoot.

August 21, 2023: The County presented to the Service a conceptual proposal for spadefoot mitigation.

November 22, 2023: The County announced publication of the Final Environmental Impact Report for the proposed project under the California Environmental Quality Act (CEQA).

February 29, 2024: The County provided the Service with an updated draft HCP.

March 25, 2024: The Service provided comments on the latest draft HCP to the County.

May 1, 2024: The Service provided comments on the draft HREP to the County.

June 12, 2024: The County provided an updated draft HCP and HREP to the Service.

July 31, 2024: The County provided the Service with the draft HCP used for the Federal Register notice.

January 21, 2025: A Notice of Availability (NOA) for the proposed HCP and Environmental Assessment pursuant to the National Environmental Policy Act was published in the Federal Register.

February 20, 2025: The comment period for the NOA closed. We received 23 comments from the public.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed Federal action is the issuance to the County of an incidental take permit (permit) under section 10(a)(1)(B) of the Act for a period of 25 years. The permit will authorize the incidental take of Quino and spadefoot during construction and operation of an active recreation park (Park) and incidental take associated with habitat restoration and management.

The property is adjacent to the Back Country Land Trust's Wright's Field Preserve (Wright's Field), located to the north of South Grade Road and east of Tavern Road in the unincorporated community of Alpine, San Diego County, California. The County proposes to establish the 25-acre Park with turf areas, a baseball field, an all-wheel area, a bicycle skills area, recreation courts, fitness stations, a leash-free dog area, restroom facilities, an administrative facility, an equestrian staging area, a nature play area, a community garden, a volunteer pad, picnic areas, a game table plaza, and trails. Infrastructure supporting the Park will include parking for 240 vehicles, a septic system, and stormwater retention basins. Park construction will be done in two phases. Phase 1 (8.7 acres) will include utilities and construction of the northern facilities while the remainder of the site will be constructed in Phase 2 (14.4 acres).

As mitigation for the proposed impacts, the County will establish the 67.5-acre Alpine Park Preserve (Preserve). Phase 1 of the project will include long-term protection of the Preserve, initiation of Preserve management, habitat restoration and enhancement, and fire prevention measures. Habitat restoration and enhancement will focus on Quino and spadefoot habitat and restoration and enhancement of native grasslands.

The following activities have potential to impact covered species and are addressed in the permit: vegetation clearing for the Park; indirect construction impacts such as noise and dust; operations and maintenance; trail access and road maintenance; future trail realignment; trail closures; Preserve management, restoration, and enhancement; and fire prevention.

Conservation Measures

The County will implement the following conservation measures (CM) as described in the HCP to avoid, minimize, and mitigate adverse effects to Quino and spadefoot:

CM 1. Quino Avoidance Measures

The County will minimize ground-disturbing activities during the Quino flight season, defined as February 15 to May 15. If the flight season cannot be avoided, biologists familiar with Quino will be on site during construction activities and will halt activities if a Quino adult is observed. If 5 or fewer Quino larvae are observed, they will be moved to suitable habitat nearby, and if more than 5 larvae are observed, the Service will be notified and consulted for relocation of larvae.

CM 2. Quino Habitat Conservation and Enhancement

The proposed Preserve includes 57.8 acres of occupied Quino habitat with approximately 32,542 host plants. Habitat enhancement will add Quino larval habitat to the Preserve with the goal of replacing impacts to Quino host plants at a minimum of a 1:1 ratio. A total of 3 acres of habitat will be enhanced to augment the Preserve with at least 17,695 host plants. For context, the adjacent Wright's Field MSCP Preserve has approximately 1,117,046 host plants. The details of the habitat enhancement plan are within the Habitat Restoration and Enhancement Plan (HREP) referenced in the HCP.

The County will include invasive plant control and other Quino-specific habitat management measures in the long-term management of the Preserve. In addition, Quino monitoring will be implemented within the Preserve consistent with the HCP or future regional monitoring plans.

CM 3. Spadefoot Avoidance Measures

To minimize impacts to spadefoot within the recreation park, spadefoot exclusionary fencing will be installed around the Park. Prior to construction, at least three spadefoot surveys will be conducted within the exclusionary fence, and all spadefoot observed will be relocated outside of the fencing. Surveys will continue until no spadefoot are observed. Exclusionary fencing will remain in place surrounding the Park following construction to prevent spadefoot from entering the area and subjecting themselves to impacts. During ongoing management of the Preserve, spadefoot will be surveyed prior to trail and road maintenance when water is ponding. Work will be halted if adults, eggs, tadpoles, or juveniles are observed within proposed impact areas.

CM 4. Spadefoot Habitat Conservation and Creation

The County will create three permanent basins encompassing at least 471 square feet to support spadefoot breeding. The basins will be within dispersal distance (860 feet) to existing breeding sites within Wright's Field, and they will be sited as far away from access roads as possible to minimize road mortality. These basins will avoid Quino habitat enhancement areas. Details of the breeding habitat creation project are in the HREP. Long-term management of the Preserve will include spadefoot-specific measures, including maintenance of breeding pools and monitoring.

CM 5. General Minimization Measures During Construction

a. Employees and contractors will strictly limit their activities, vehicles, equipment, and construction materials to the Park.

b. No pets will be allowed in the Park during construction activities.

c. The Project will include watering, pursuant to a Stormwater Pollution Prevention Plan to minimize dust generation throughout the project construction.

d. All equipment maintenance, staging, and dispensing of fuel, oil, or coolant will occur within the Park site.

e. Contractor equipment will be checked for leaks prior to operation and repaired as necessary.

f. No night lighting will occur within or adjacent to the construction area at any time during construction.

g. Signage will be installed to prevent unauthorized access to the Preserve.

CM 6. Habitat-Based Mitigation

The County will restore 12.25 acres of exotic annual grassland to native perennial grassland, including 4.84 acres in the Preserve and 7.41 acres in Wright's Field. Quino were observed in native grassland habitat within both the proposed Preserve site and Wright's Field, and we expect this grassland restoration will benefit Quino. Native grassland restoration details are in the HREP.

Action Area

Regulations implementing the Act (50 CFR § 402.02) describe the action area as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For purposes of this consultation, we define the action area as the 67.5-acre

proposed Preserve area, the 25-acre Park, and the 7.41 acres within Wright's Field that will be subject to native grassland restoration as shown in Figure 3 of the HCP. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area as determined by the Service.

ANALYTICAL FRAMEWORK FOR THE SECTION 7(A)(2) DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the species, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which are all consequences to listed species caused by the proposed action that are reasonably certain to occur; and (4) the Cumulative Effects, which evaluate the effects of future, non-Federal activities in the action area on the species.

For the section 7(a)(2) determination regarding jeopardizing the continued existence of the species, the Service begins by evaluating the effects of the proposed Federal action and the cumulative effects. The Service then examines those effects against the current status of the species to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the species in the wild.

Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. "Destruction or adverse modification" of critical habitat means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species (50 CFR § 402.02).

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) the status of critical habitat, which describes the condition of all designated critical habitat in terms of its physical and biological features, the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the environmental baseline, which analyzes the condition of the designated critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the effects of the action, which analyze all consequences to critical

habitat caused by the proposed action that are reasonably certain to occur and their influence on the recovery role of the affected designated critical habitat units; and (4) cumulative effects, which evaluate the effects of future non-Federal activities in the action area on the physical and biological features of critical habitat and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the designated critical habitat are evaluated in the context of the condition of all designated critical habitat, taking into account any cumulative effects, to determine if the consequences of the proposed action are likely to appreciably reduce the value of critical habitat as a whole for the conservation of the species.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Quino Checkerspot Butterfly

The status of Quino is described in detail in the 5-year reviews for the species (Service 2009a; 2023a). More detailed information on Quino life history, threats, and conservation needs are described in the Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*) (Service 2003) and the Amendment to the Quino Checkerspot Butterfly Recovery Plan (Service 2019). Please refer to these documents for detailed information on Quino's life history, threats, and conservation needs.

Summary of Species' Distribution and Numbers Rangewide

Quino are found in open areas and ecotones within a variety of plant communities, including grasslands, chaparral, and coastal sage scrub from western Riverside County south into Baja California, with highest remaining concentrations in southwestern Riverside County and southern San Diego County. Habitat patch suitability is determined primarily by larval host plant density, topographic diversity, nectar resource availability, and climatic conditions (Service 2003). Quino was listed as endangered in 1997 (Service 1997), and critical habitat was designated in 2002 (Service 2002) and revised in 2009 (Service 2009b). The action area is not within designated Quino critical habitat.

Status of Quino in the Vicinity of the Action Area

Although the action area is not within a Quino recovery unit, the site is located within the Alpine Occurrence Complex, which falls within the possible future Central San Diego Recovery Unit described in the recovery plan (Service 2003). Possible future recovery units are identified in the recovery plan as potentially important areas for recovery pending information unavailable at the time the plan was written. Wright's Field and the action area have most of the known Quino habitat in the Alpine Occurrence Complex and based on a 2020 habitat assessment (ICF 2020), there are 172.8 acres of Quino habitat on Wright's Field abutting the 84.4 acres of Quino habitat in the proposed Park and Preserve. As an assessment of larval habitat quality, the County mapped Quino host plants in both the action area and Wright's Field and counted 1.1 million host plants in Wright's Field and over 50,000 host plants within the proposed Park and Preserve.

The closest Quino recovery unit to the action area is the Southwest San Diego Recovery Unit, and the closest offsite core occurrence complexes are the Otay Core Occurrence Complex and West Barrett Lake Core Occurrence Complex, located approximately 10 miles to the south and southeast, respectively (Service 2003, 2009a). The closest non-core occurrence complexes are Willits Road, Sycuan Peak, and Dehesa, which are located between 2 to 5 miles to the southwest of the Alpine Park Occurrence Complex. Areas to the north of the action area, east of El Capitan Reservoir, are consistently modeled as high-quality Quino habitat, but no focused surveys have been conducted to assess occupancy in this area. Quino occupancy in this area is likely but uncertain.

Landscape connectivity among core occurrence complexes is recognized as key to the long-term persistence of the Quino within the region (Service 2003). Because connectivity among core occurrence complexes in the northern and eastern portion of the Southwest San Diego Recovery Unit and the future Central San Diego County Recovery Unit is constrained by intervening mountains, development, and agriculture (Service 2003), maintenance and long-term management of even isolated Quino occurrence complexes are important to support dispersal and connectivity among populations.

Western Spadefoot

The status of spadefoot is described in detail in the Species Status Assessment Report for Western Spadefoot (*Spea hammondii*) Version 1.1 (Service 2023b). The Service proposed to list the northern and southern distinct population segments (DPS) as threatened in 2023 (Service 2023c). No critical habitat was proposed in the listing rule. Please refer to these documents for detailed information on the spadefoot's listing status, life history, threats, and conservation needs.

Summary of Species' Distribution and Numbers Rangewide

Spadefoot are found in grasslands, scrub, or mixed woodland and grassland areas where aquatic breeding habitat is available (Stebbins and McGinnis 2012). Spadefoot eggs and larvae inhabit a variety of permanent and temporary wetlands, both natural and altered, including rivers, creeks, artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Service 2023b). Throughout most of the year, spadefoots aestivate in underground burrows in upland areas surrounding their aquatic (breeding) habitat. Baumberger *et al*. (2019) determined that most aestivation burrows are within 860 feet of breeding ponds. The southern DPS includes areas in southern California from Santa Barbara County south through Ensenada, Baja California. The southern DPS extends east to San Bernardino, Riverside counties in California and to Tecate in Baja California (Service 2023c).

Status of the Species in the Vicinity of the Action Area

In San Diego County, spadefoots occur from the Mexican border north to Camp Pendleton along the coast and east to the mountainous areas of eastern San Diego County at approximately 4,500 feet in elevation. Known locations are fragmented by urban development with limited viable connectivity. The proposed Park and Preserve site and adjacent Wright's Field likely represent the only location of this species in the Alpine area or within common dispersal distance. Most other sites in the vicinity lack the flat topography, soils, and ponding water

needed to support the species. Other spadefoot occurrences in the vicinity include one approximately 5 miles to the northwest, near the El Capitan Reservoir Dam in the Cleveland National Forest, one approximately 7 miles to the southeast, in Horsethief Canyon in the Cleveland National Forest, and one approximately 13 miles to the southwest, near Singing Hills Golf Course (SDMMP 2022).

Hermes Copper Critical Habitat

The Service listed Hermes as threatened and designated critical habitat in December 2021 (Service 2021). The current Hermes distribution is restricted to San Diego County and northern Baja California. The range of Hermes is greatly reduced since 2003, and the species is now only known to occur on the southeastern margin of its historic range (Marschalek *et al*. 2024). The latest estimates show 26 Hermes occurrences categorized as known or presumed extant, 56 presumed extirpated, and 16 as permanently extirpated (Service 2022).

Hermes occurs in coastal sage scrub and southern mixed chaparral where its larval host plant, spiny redberry (*Rhamnus crocea*), is available. Presence of spiny redberry and California buckwheat (*Eriogonum fasciculatum*), the most common nectar plant, is the strongest predictor of the presence of Hermes. Hermes are found as adults from mid-May to mid-July with a flight season of approximately 30 days. Wildfire, drought, habitat loss, and habitat fragmentation from urbanization are the primary threats to Hermes. Wildfires in 2003 and 2007 led to the extirpation of many populations throughout the County (Service 2021).

The physical or biological features identified as essential for Hermes critical habitat are the presence of spiny redberry and nectar sources. The Park and Preserve sites are within a core area for Hermes due to historical Hermes sightings in the northwestern portion of Wright's Field and on a private parcel directly west of Wright's Field. No Hermes have been documented from the area since June 2011, when six sightings were reported by Deutschman *et al*. (2011).

The proposed Park and Preserve, Wright's Field, and adjacent habitat to the north, west, and south are within Unit 3 of designated Hermes critical habitat. Hermes critical habitat Unit 3 (Southeast San Diego) is 27,525 acres. These parcels make up one of 24 subunits within Unit 3, and the total area of the subunit is roughly 350 acres.

ENVIRONMENTAL BASELINE

The regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR § 402.02).

Status of the Species in the Action Area

Quino Checkerspot Butterfly

Quino were observed in the action area during focused surveys in 2019 and 2020 as well as incidentally in 2010 (Klein 2010, pers. obs.; ICF 2019a, 2020). Quino were observed along the southern boundary of the proposed Preserve and within the Park site. Quino were also observed in a central location within Wright's Field during the 2020 focused surveys. Based on these observations, we estimate there are 84.4 acres of Quino-occupied habitat within the action area. Quino host plants were mapped within the action area and the remainder of Wright's Field in 2020, and 95 percent of the individual host plants (84,944 of 104,863) were found Wright's Field (Figure 5 in the HCP). Within the project site, 32,542 host plants were found in the proposed Preserve, and 17,695 were found in the proposed Park.

Western Spadefoot

A spadefoot egg mass was observed in basin AP-7 during focused fairy shrimp surveys within the proposed Park area in 2019 (ICF 2019b). Basin AP-7 and all other basins within the Park and Preserve sites were determined to be unsuitable for spadefoot development because they do not hold water long enough. Focused spadefoot surveys were conducted within 48 ponded areas, including 35 in the action area and 13 in Wright's Field, and no spadefoot were observed (ICF 2022). Most of the ponded areas in the action area are associated with the trail along the northern boundary of the proposed Park. The County's biologists determined that the primary spadefoot breeding area in the vicinity is located centrally within Wright's Field (Figure 7 in the HCP). We expect that spadefoot aestivation and foraging is concentrated within 860 feet of the breeding pools in Wright's Field, defined as the spadefoot use area in Figure 7 of the HCP. The entire Park and Preserve sites are suitable for spadefoot foraging and aestivating.

Status of Critical Habitat of the Species in the Action Area

Eighty-nine acres in the Park and Preserve are within designated Hermes critical habitat, and we estimate that 6 acres in the Park and 50.7 acres in the Preserve contain physical and biological features of critical habitat. We include all coastal sage scrub and chapparal vegetation in this estimate, both disturbed and intact. The remaining land within the action area is dominated by grassland or oak woodland habitat. Spiny redberry is found scattered throughout the northern portion of the proposed Preserve, and no spiny redberry is found within the proposed Park. Hermes have not been observed within or near the action area since 2011 despite focused surveys within the Park and Preserve in 2019 and in the both the action area and the remainder of Wright's Field in 2020. All recorded Hermes observations in the project vicinity have been within the western portion of Wright's Field or the adjacent property to the west, all a minimum of 2,000 feet from the proposed Park.

EFFECTS OF THE ACTION

Regulations implementing the Act (50 CFR § 402.02) define the effects of the action as all consequences to listed species or critical habitat that are caused by the proposed action, including

the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR § 402.02).

Quino Checkerspot Butterfly

Effects from Park Construction

We worked with the County biologists to develop the concept of a Quino adult equivalent to assess population-level impacts from loss of individual Quino. Immature Quino life history stages (eggs, larvae, and pupae) have low survivorship, meaning that the loss of an egg, larva, or pupa has less impact to the Quino population than loss of an adult female. Murphy *et al*. (1983) estimated that total egg production for bay checkerspot butterfly (*Euphydryas editha editha*), a species to closely related to Quino, was 400–800 eggs per season, and we use the upper limit of that estimate for our Quino formula. We estimate take as adult equivalents whereby females lay up to 800 eggs with 25 percent hatch rate to larvae, and 1 percent rate of survival from larva to adult. This approach assumes a 50:50 sex ratio and population stasis such that one adult female produces 1 male and 1 female (800 eggs × 0.25 × 0.01 = 2). By this logic, 100 larvae are functionally equal to 1 Quino adult equivalent.

Construction of the recreation park will impact 22.4 acres of occupied Quino habitat, including two locations where Quino adults were observed in surveys. Because plant abundance likely tracks Quino abundance in occupied habitat, we can estimate impacts based on loss of host plants. A total of 17,695 host plants were recorded within the 22.4 acres that will be impacted by construction of the recreation park. Assuming the 2 adult Quino observed in the Park site were female, the adult equivalent formula works out to four Quino adult equivalents harmed, killed, or injured with removal of habitat within the Park site (each adult female is expected to produce one male and one female). The impacts could be to any life history stage, using the conversion formula above to calculate the estimated impacts to individuals. Because of the difficulty observing and quantifying impacts to Quino, particularly in the early life history stages, the limits to impacts will be based on the amount of habitat impacted as opposed to number of individuals observed dead or injured.

The County intends to avoid the Quino flight season (February 15 to May 15) during project construction. In the unlikely event that construction must proceed during the flight season, Quino surveys will be conducted ahead of construction, and direct impacts to any adult Quino observed will be avoided. We expect that Quino adults will be able to escape direct impacts. If up to five Quino larvae are observed during construction, they will be relocated to suitable habitat within the Preserve by project biologists. If more than five Quino larvae are observed, construction will be halted, and the County will consult with the Service prior to relocating the larvae. Although CM 1 requires the County to notify and coordinate with the Service if five Quino larvae are observed during construction, additional larvae could be moved under the County's permit if the Service agrees that no additional avoidance and minimization measures are needed. As described above, the total limit for impacts to Quino is based on the amount of habitat impacted as opposed to the number of individuals captured or observed dead or injured.

Effects from Habitat Restoration and Enhancement

Direct impacts to Quino may occur in the Preserve and Wright's Field during habitat restoration and enhancement described in the HREP. The County estimates that approximately 15.3 acres will be impacted for habitat restoration and enhancement; however, we will assume that up to 17 acres in total will be impacted in order to provide flexibility for unforeseen circumstances during this process Impacts to adults will be minimized by avoiding the flight season to the extent practicable. During the initial phases of Quino habitat restoration, the Quino host plant density is expected to be too low to attract oviposition, and immature stages of Quino are unlikely to be present. With habitat restoration and enhancement, host plant density will increase over time, and Quino may begin laying eggs within the restoration and enhancement areas. At this stage, Quino habitat restoration and enhancement activities have potential to cause loss of Quino eggs, larvae, or pupae. Although it is difficult to estimate the specific number of Quino that will be impacted during habitat restoration and enhancement, as with the initial construction, we use our best professional judgement to estimate that these activities will result in the loss of up two adult equivalents based on the oviposition and survivorship rates defined above (i.e., 2 adults = 800 eggs = 200 larvae). Although the take could occur at any Quino life stage, larvae are the most likely life stage to be killed or injured because they are present most of the year and are unable to escape. As with the effects from Park construction, limits on impacts to Quino are based on the amount/location of proposed restoration and enhancement activities as opposed to number of individuals observed dead or injured.

Effects from Long-Term Management and Fuel Reduction

During long-term management, which will be described in a Resource Management Plan (RMP) for the Preserve, there may be additional loss of Quino individuals through trampling, weed control, or other management activities within the 67.5-acre Preserve. The RMP will include Quino avoidance and minimization measures, including avoidance of all areas with known Quino host plants, but some impacts may still occur. Similar to impacts from construction activities and habitat restoration and enhancement, we estimate up to two Quino adult equivalents will be impacted every 5 years from implementation of the RMP. Thus, we estimate that RMP implementation will impact a total of up to 10 Quino adult equivalents during the 25-year Permit Term, although the impacts will be limited based on the location/amount of habitat affected by proposed long-term management and fuel reduction activities.

Fuel reduction activities have potential to directly crush Quino eggs, larvae, and pupae and indirectly impact larvae by removing food resources (host plants). The County estimates that 3.1 acres will need to be mowed for fuel reduction, and we assume up to 3.5 acres will be impacted in case additional area will need to be mowed in practice. No host plants have been observed within proposed fuel reductions areas, but routine mowing and trimming may introduce Quino host plants because they are known to invade disturbed areas. There are nectar plants in these areas; however, these plants will be permanently removed as part of fire fuel-reduction activities, which will reduce habitat quality for Quino. Thus, some direct impacts would be anticipated either from mowing or crushing if eggs, larvae, or pupae are present. Because fuel reduction will affect a smaller area of lower quality habitat than the RMP, we anticipate that fewer Quino will be killed or injured by this

activity. Over the course of the 25-year permit term, we estimate that fuel reduction will affect up to two adult equivalents.

Effects from Non-Native Plant Species and Dust

Indirect effects to Quino could result from disturbance associated with construction and habitat manipulation by opening habitat for invasive plants that outcompete Quino host and nectar plants or reduce availability of basking sites. The County will avoid invasive species in their landscaping pallets and will focus on restoration, enhancement, and management of native vegetation throughout the Preserve. Based on these measures, we do not anticipate an increase in invasive plants as a result of the project. Dust from construction has potential to inhibit photosynthesis and reduce plant vigor as well as clog spiracles (breathing holes) of Quino directly. The County will water area with potential dust to minimize impacts away from the construction site. With these measures, it is unlikely that dust will have a measurable impact to Quino outside of the construction site, where direct impacts to Quino would be unavoidable. Overall, indirect effects are unlikely to result in incidental take of Quino beyond that described in the direct effects section.

Proposed Conservation

The objective of the Quino conservation strategy for this project is to maintain the ecological function of the population within Wright's Field and the action area. We assume that this population is small enough to be subject to extirpation and recolonization events through typical demographic fluctuations at a time scale of decades. This area is isolated to a degree from other populations but may serve as a steppingstone for rare but important dispersal events that support genetic and demographic connectivity. There are known populations to the southwest and likely population(s) to the north in unsurveyed areas that may be within dispersal distance.

To meet this objective, the County proposes to restore and enhance habitat within the Preserve to mitigate the loss of larval habitat within the Park. Specifically, the County will offset host plant impacts by replacing the number of individual host plants lost (17,695). The Preserve already has 56.2 acres of Quino habitat with 32,542 host plants. An equal or greater number of host plants will be added to the Preserve through habitat enhancement. In addition, 12.25 acres of grassland will be restored to promote native grasslands with native, perennial grasses and native forbs. We expect that native grassland restoration will increase nectar and basking site availability for Quino. Overall, we anticipate the carrying capacity (maximum sustainable population size) for Quino will be unchanged or increased as a result of the project, and the ecological function of the population for connectivity will be equal or better.

Effects on Recovery

As described above, the action area supports a Quino population that may periodically become extirpated and recolonized, and it may have a role in connectivity between the Southwest San Diego Recovery Unit and a future proposed recovery unit to the northwest. The possible future recovery units were identified as being potentially necessary for recovery depending on information unavailable at the time the recovery plan was written, and the importance of the possible future Central San Diego recovery unit remains uncertain. By maintaining or improving the current

ecological function for Quino in the action area, we expect that the project will have no effect or a potential positive effect on Quino recovery.

Western Spadefoot

Because breeding habitat will be removed during the dry season, there is effectively no chance immature spadefoots will be impacted directly. In the unlikely event that basins do fill during construction, ponded areas will be surveyed, and if spadefoot eggs or larvae are observed, occupied basins will be avoided until they have dried. Therefore, project construction will not directly impact spadefoot breeding within the action area.

Spadefoots can forage or aestivate in burrows within 23.1 acres of spadefoot habitat within the Park footprint. Three active spadefoots were observed during nocturnal surveys within the proposed Preserve, but none were observed in the proposed Park. While no spadefoots were observed during surveys, the presence of egg masses within the proposed Park demonstrates that they can be present in the Park site, at least part of the time. We expect that aestivating and foraging spadefoots are concentrated near suitable breeding habitat, which is primarily in a central area within Wright's Field. Given the distance to this breeding habitat, we expect low numbers of spadefoots within the Park site. Spadefoot fencing will be installed around the perimeter of the Park site, and spadefoots will be trapped and relocated to adjacent habitat prior to grading or vegetation clearing. Based on the 2022 surveys, we estimate arroyo toad density to be about 1 spadefoot per 5 acres. Thus, we anticipate no more than five spadefoot adults or juveniles to be present in the 23.1 acres of spadefoot habitat in the Park footprint. All of these individuals could be trapped and relocated, and any individuals that are not relocated will be injured or killed during Park construction. A fraction of those trapped (we estimate no more than one) may be injured or killed during trapping and relocation. Because any individuals remaining in the project footprint are likely to be buried and difficult to detect, we anticipate that only a fraction (no more than one) will be observed dead or injured during Park construction.

As described in the HCP, impacts to spadefoots during habitat restoration and trail maintenance were estimated within a 63.5-acre spadefoot use area identified using a radius of 860 feet around known breeding ponds. We assume a density of 1 spadefoot per 5 acres and estimate 4.33 acres of habitat restoration and 0.53 acre of habitat management (e.g. trail maintenance) every 5 years in the spadefoot use area. Using these assumptions, an estimated one spadefoot would be harmed during habitat restoration. Impacts from habitat restoration are only anticipated during initial project work when relatively large patches of vegetation will be impacted. Thus, we anticipate that no more than one spadefoot will be injured or killed during habitat restoration over the 25-year permit term. Given the small estimated impacts to habitat from management activities in any given year, we do not anticipate harm to more than one spadefoot over the 25-year permit. We anticipate no more than two individuals will be injured or killed over the permit term from habitat restoration and management and no more than one injured or killed individual will be observed.

Proposed Conservation

Because the spadefoot population within the action area and its surroundings is likely not within frequent dispersal distance of other populations, the goal of the spadefoot conservation is to maintain a self-sustaining population. We assume that breeding habitat is the limiting factor for spadefoot population, and the conservation proposal is to create additional breeding habitat while maintaining foraging and aestivation habitat within the proposed Preserve. As described in the HCP and in more detail within the HREP, the County will construct three basins in clay soil that total at least 471 square feet and will ensure that the basins are deep enough to hold water for the duration of typical spadefoot development in average precipitation years. This will result in a net increase of 471 square feet of spadefoot breeding habitat. These basins will be sited away from the Park and from any maintenance roads that may incur road mortality to the extent feasible.

We expect that the creation of spadefoot breeding habitat will result in a population increase and increase the likelihood that the population remains self-sustaining. Although project construction will eliminate 23.1 acres of habitat that spadefoot could use for foraging and aestivation, we do not anticipate that these habitat functions will limit the spadefoot population size given the remaining habitat within the Preserve and Wright's Field.

Hermes Copper Butterfly Critical Habitat

The fact that all Hermes observations have been on the western edge of Wright's Field, or the adjacent property suggests that the Hermes habitat quality within the critical habitat subunit is highest on the western side and declines to the east, where the Park is proposed. Park construction will impact 22.5 acres of designated Hermes critical habitat of which 6 acres have the physical and biological characteristics of critical habitat. There are no spiny redberry within the Park site, but 6 acres have California buckwheat, which is considered a physical or biological feature of Hermes critical habitat. Loss of 22.5 acres of Hermes critical habitat, including 6 acres with physical and biological features of critical habitat, represents a minor impact within the 454-acre critical habitat subunit and a smaller impact within the 27,525-acre Unit 3.

The Preserve has 50.7 acres with the physical and biological features of critical habitat including 68 spiny redberry individuals. The County will avoid impacts to any spiny redberry during project construction and through ongoing management of the Preserve. If Hermes are observed within the Preserve, the County will also avoid impacts to California buckwheat. These minimization measures will limit impacts to physical and biological features to the 6 acres lost within the Park. Despite the anticipated impacts to 6 acres of critical habitat with nectar resources, the remaining habitat, including habitat within the Preserve and Wright's Field, contain sufficient flower resources to be meet the nectar requirements of a Hermes population.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section

because they require separate consultation pursuant to section 7 of the Act. We have not identified any State, Tribal, local, or private actions within the action area that should be considered in this biological opinion.

CONCLUSION

After reviewing the current status of the Quino checkerspot butterfly, western spadefoot and critical habitat for the Hermes copper butterfly; the environmental baseline for the action area; the effects of the action; and the cumulative effects, it is the Service's biological opinion that issuance of an incidental take permit for implementation of the HCP, as proposed, is not likely to jeopardize the continued existence of the Quino checkerspot butterfly or western spadefoot, and it is not likely to adversely modify Hermes copper butterfly critical habitat. We reached this conclusion by considering the following:

1. With the conservation measures proposed, no more than 22.4 acres of occupied Quino habitat will be lost, and no more than 18 Quino checkerspot butterfly adult equivalents will be killed as a direct result of project construction, Preserve management, fuel reduction, and habitat restoration and enhancement over the 25-year permit term. This amount of impact, when combined with the proposed conservation measures, is not anticipated to substantially impact the size or long-term persistence of the Quino population in the action area.

2. Protection and management of Quino habitat within the Preserve combined with enhancement of larval habitat and native grassland restoration will fully offset impacts from construction of the recreational park such that the population size and long-term persistence are likely to be similar to or greater when compared to a no project alternative.

3. The potential recovery function of the Quino population within and surrounding the action area will continue because the likelihood of a population persisting on the site to augment population connectivity will be improved or unchanged.

4. With the conservation measures proposed, including trapping and relocation within the Park site, no more than 23.1 acres of occupied spadefoot habitat and seven spadefoots will be injured or killed as a result of project construction, Preserve management, and habitat restoration. This number will not have a meaningful effect to the population given the comparatively high density of spadefoots in adjacent, protected habitat.

5. Protection and management of spadefoot habitat within the Preserve combined with restoration of breeding habitat will fully offset impacts from construction of the recreational park such that the population trajectory will be equal or better over time compared to a no project alternative.

6. Based on the acreage and physical and biological features affected, in combination with the proposed conservation measures, including the protection of 50.7 acres of Hermes critical habitat in the Preserve, the project is not anticipated to substantially affect the function of the subunit within Unit 3.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat reduction or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The proposed HCP, its associated documents, and this biological opinion clearly identify anticipated impacts to Quino checkerspot butterfly and western spadefoot which are likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed HCP, together with the terms and conditions described in any section 10(a)(1)(B) permit issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permit is issued, and the permittee fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are as described in the HCP and its accompanying section 10(a)(1)(B) permit.

AMOUNT OR EXTENT OF TAKE

As described in the effects of the action, we use Quino adult equivalents to account for differential impacts of loss of different life stages. Quino may be killed during project construction, Preserve maintenance, fuel reduction, and habitat restoration and enhancement.

The regulations for section 7(a)(2) clarify that the Service may use surrogates to express the amount or extent of anticipated take when “exact numerical limits on the amount of anticipated incidental take may be difficult” (80 FR 26832). The implementing regulations [50 CFR § 402.14(i)(1)(i)] require that the Service meet three conditions for the use of a surrogate. To use a surrogate, the Service must describe the causal link between the surrogate and take of the listed species, describe why it is not practical to express the amount of anticipated take or to monitor take-related impacts in terms of individuals of the listed species, and set a clear standard to determine when the proposed action has exceeded the anticipated amount or extent of the taking.

For Quino, we use impacts to habitat as a surrogate for impacts to individuals. Quino use host plants and nectar sources within the action area to support feeding of all life history stages, so the

amount of habitat impacted is correlated with the number of individuals that will be impacted. In addition, in the "Effects of the Action" section of the document, we provide our best estimate of the number of individuals (adult equivalents) that will be impacted by covered activities in the HCP. Although we have provided estimates of impacts to Quino based on anticipated impacts to adult equivalents, the observation and documentation of injury or mortality of immature Quino will be very difficult because eggs, larvae, and pupae are relatively small and cryptic. Therefore, we have set clear limits for take based on the amount of habitat impacted, as described in more detail below.

Take of Quino checkerspot butterflies is exempted as follows for the duration of the permit:

IT 1. Death or injury of an estimated four Quino checkerspot butterfly adult equivalents within 22.4 acres of habitat during project construction. The amount or extent of incidental take will be exceeded if more than 22.4 acres are impacted.

IT 2. Death or injury of an estimated two Quino checkerspot adult equivalents during habitat restoration and enhancement activities. The amount or extent of incidental take will be exceeded if more than 17 acres are impacted during restoration and enhancement activities as described in the HREP. These activities will be in both the Alpine Park Preserve and Wright's Field.

IT 3. Death or injury of an estimated 10 Quino checkerspot adult equivalents during habitat management activities. The amount or extent of incidental take will be exceeded if habitat management activities exceed the 67.5-acre Alpine Park Preserve.

IT 4. Death or injury of an estimated two Quino checkerspot adult equivalents during fuel reduction activities. The amount or extent of incidental take will be exceeded if more than 3.5 acres are impacted annually by fuel reduction activities.

IT 5. Capture, handling, and release of Quino checkerspot butterfly larvae within the 22.4-acre construction area if project construction occurs between February 15 and May 15.

Aestivating western spadefoots may be killed during project construction, habitat restoration, and Preserve maintenance but may not be observed because they are relatively small and may be concealed underground. Therefore, we anticipate that no more than two western spadefoots remaining in the construction site following pre-project trapping and relocation will be observed dead or injured.

Take of western spadefoots is exempted as follows for the duration of the permit:

IT 6. Death or injury of five western spadefoots within the 23.1 acres of habitat in the project footprint. The amount or extent of incidental take will be exceeded if more than 23.1 acres of spadefoot habitat are impacted or more than one dead or injured western spadefoot is observed as a likely result of project construction.

IT 7. Death or injury of an estimated two western spadefoots during habitat restoration and Preserve management activities combined. The amount or extent of incidental

take will be exceeded if more than one dead or injured western spadefoot is observed as a likely result of restoration or maintenance activities.

IT 8. Death or injury of one western spadefoot during trapping within the exclusion fence prior to project construction.

IT 9. Capture, handling, and release of up to five western spadefoots within the exclusionary fencing prior to project construction.

REASONABLE AND PRUDENT MEASURES

No reasonable and prudent measures beyond those included in the proposed HCP have been identified to minimize and mitigate the effects of incidental take.

TERMS AND CONDITIONS

No terms and conditions are necessary because no additional reasonable and prudent measures have been identified.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans or to develop information. We have no conservation recommendations related to the proposed project.

REINITIATION NOTICE

This concludes formal consultation on the proposed issuance of the Applicant's requested incidental take permit for implementation of the Santa Maria Wastewater Treatment Plant Expansion Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions or concerns about this biological opinion, please contact Eric Porter[1] of this office at 760-431-9440.

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Appendix E

Phase I Cultural Resources Survey and Phase II Testing and Evaluation of the 98-acre Alpine Park Project

PHASE I CULTURAL RESOURCES SURVEY AND PHASE II TESTING AND EVALUATION OF THE 98-ACRE ALPINE PARK PROJECT, SAN DIEGO COUNTY, CALIFORNIA

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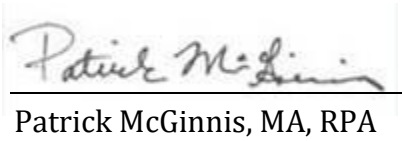

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Principal Investigator

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NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

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Acreage:	98 acres (92 acres intensively surveyed; 6 acres visually inspected)
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Acronyms and Abbreviations

B.P.	before present
ca.	circa
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
cimuL	consanguineal kin group
CRHR	California Register of Historical Resources
DPR	County of San Diego Department of Parks and Recreation
GPS	Global Positioning System
NAHC	Native American Heritage Commission
NHPA	National Historical Preservation Act
NRHP	National Register of Historic Places
Property	Assessor's Parcel Number 404-170-61-00
RMP	Resource Management Plan
SCIC	South Coastal Information Center
SLF	Sacred Lands File
USGS	United States Geological Survey

Executive Summary

ICF has completed a Phase I cultural resources survey and inventory of Assessor's Parcel Number 404-170-61-00 (Property), totaling approximately 98 acres in support of the effort to create a community park tentatively called Alpine Park within the community of Alpine in east San Diego County (Project). The Property is adjacent to the Back Country Land Trust's Wright Field Preserve on South Grade Road. The County acquired the Property in early 2019. The current cultural resource survey was completed to identify and map existing resources within the Property and to provide the County of San Diego's Department of Parks and Recreation (DPR) with management information for handling potentially significant cultural resources. These measures include preservation recommendations, protective measures, and potential interpretive and educational opportunities.

The Phase I inventory and Phase II test and evaluation was conducted in compliance with the California Environmental Quality Act (CEQA) and guidance from the County of San Diego's *Cultural Resources Report Format and Guidelines for Determining Significance* (2007). The purpose of this report is to provide an inventory of cultural resources located within the Property and to provide future management considerations for potentially significant cultural resources. The Phase I inventory involved a records search, literature review, archival research, Native American consultation, historic map checks, field surveys, and resource documentation. Areas exceeding 20 percent slope were surveyed based on professional judgment; accordingly, the areas principally surveyed were those with a slope gradient of less than 20 percent. Only the 5.83 acres at the northeast corner of the property were too steep to safely survey on foot. Field notes and digital photographs detailing conditions and survey results are on file at the San Diego office of ICF.

ICF conducted a cultural resources records search at the South Coastal Information Center (SCIC) at San Diego State University on April 24, 2019. The SCIC cultural resources records search indicated that 26 cultural resources have been recorded within 0.25 mile of the Property, 4 of which are plotted within the Property. Of these 26 resources, 20 are prehistoric resources, 5 are historic period resource, and 1 is a multicomponent resource.

The survey of the property relocated the four previously recorded cultural resources and did not identify any new cultural resources. The four resources reported within the Property consist of three prehistoric resources—bedrock milling sites (CA-SDI-5199, CA-SDI-19332 and CA-SDI-19333)—and one historic house complex archaeological site (CA-SDI-12236). One of the prehistoric resources (CA-SDI-5199) has been previously tested and determined to be ineligible for the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR). The remaining two (CA-SDI-19332 and CA-SDI-19333) were tested and evaluated to determine whether subsurface deposits are present, to define site boundaries and assess resource significance. No subsurface deposits or other related artifacts or features were identified during testing and the resources are evaluated as not eligible for the NRHP, CRHR or Local Register of Historical Resources (Local Register). Historic site CA-SDI-12236 was relocated and found to be in poor condition. The presence and nature of any subsurface component of the site CA-SDI-12236 is unknown; therefore, their potential significance is unknown until testing is conducted at the site. Field notes and photographs are on file at ICF. No artifacts were collected during this survey. DPR forms for each resource, documented in Appendix D of this report, will be submitted to the SCIC of the California Historical Resources Information System (CHRIS) at San Diego State University when the report is finalized.

Chapter 1
Introduction

1.1 Project Description

ICF has completed a Phase I cultural resources survey and Phase II test and evaluation of Assessor's Parcel Number 404-170-61-00 (Property), totaling approximately 98 acres, in support of an effort to create a community park, tentatively called Alpine Park, within the community of Alpine in east San Diego County (Project). The Property is adjacent to the Back Country Land Trust's Wright Field Preserve on South Grade Road. The County acquired the Property in early 2019.

The Property is located within the Alpine 7.5 minute United States Geological Survey (USGS) quadrangle in Township 15 South, Range 2 East, in section 34.

The Phase I study consisted of archival research, Native American consultation, and archaeological field surveys. ICF archaeologists were able to survey a total of 92 acres (approximately 94 percent) of the Property. By contract agreement, attempts to survey areas exceeding 20 percent slope were based on professional judgment that considered safety issues and the probability that resources would not be present on steep slopes. Approximately 6 acres (5.8 percent) of the Property have slopes greater than 20 percent. However, some of these areas were included in the survey to gain access to other areas with less than 20 percent slope. Identified resources were recorded, and previously recorded sites were updated using State of California Department of Parks and Recreation 523 Primary Record and Location Map forms, as stipulated by the contract. The Phase II test and evaluation conducted test excavations to evaluate the potential significance of two prehistoric resources for their eligibility for the NRHP, CRHR, and Local Register.

Four previously recorded resources were identified within the Property, and they were all relocated during the current survey. No new or previously unidentified cultural resources were found during the current survey. Significance testing was not performed on any of the identified resources because at this time it is not known if any sites will be impacted because of property improvements or management decisions. However, this report contains management guidelines for potentially significant cultural resources, including preservation recommendations, protective measures, and potential interpretive and educational opportunities.

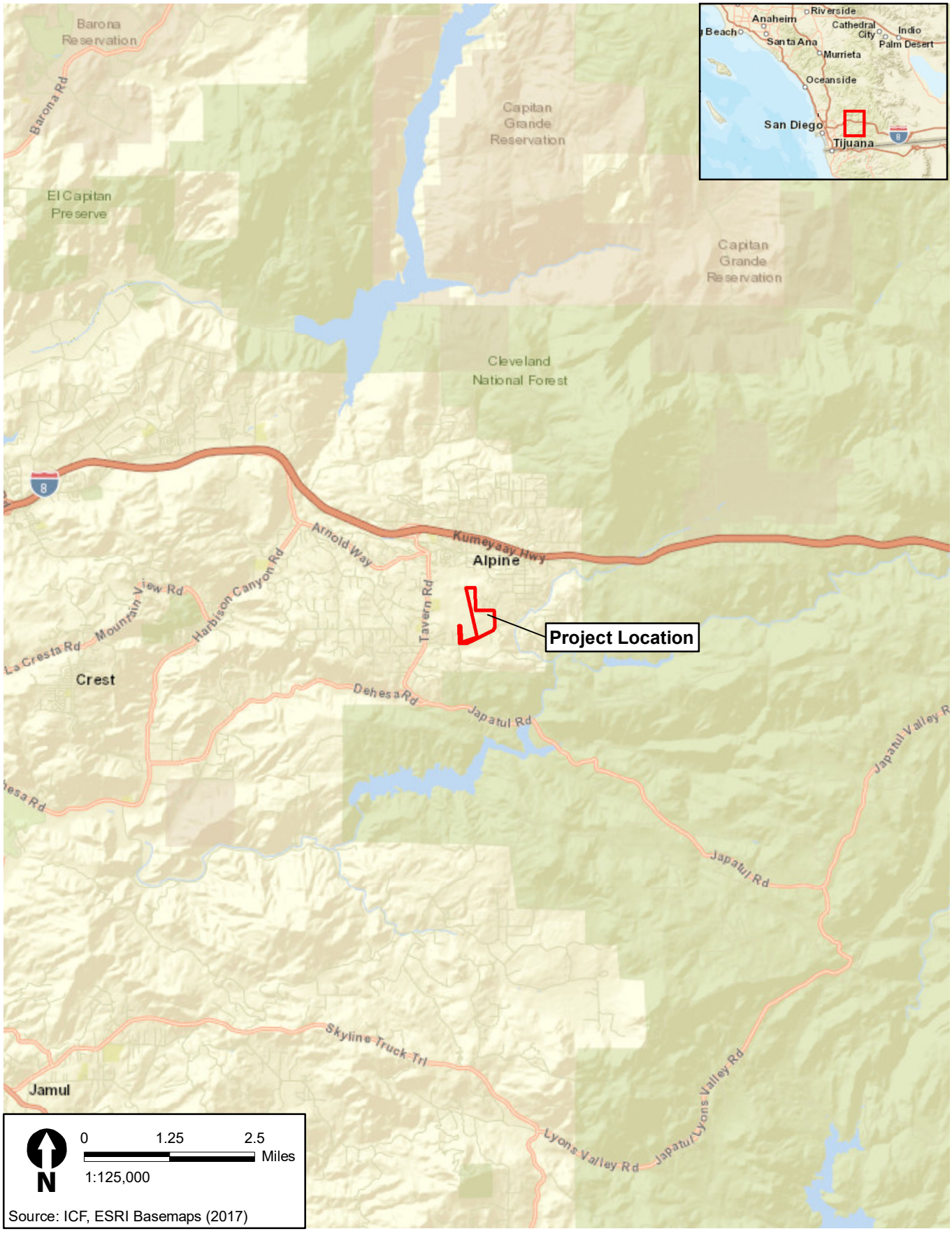

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Figure 1
Regional Location Map
Alpine Park Project

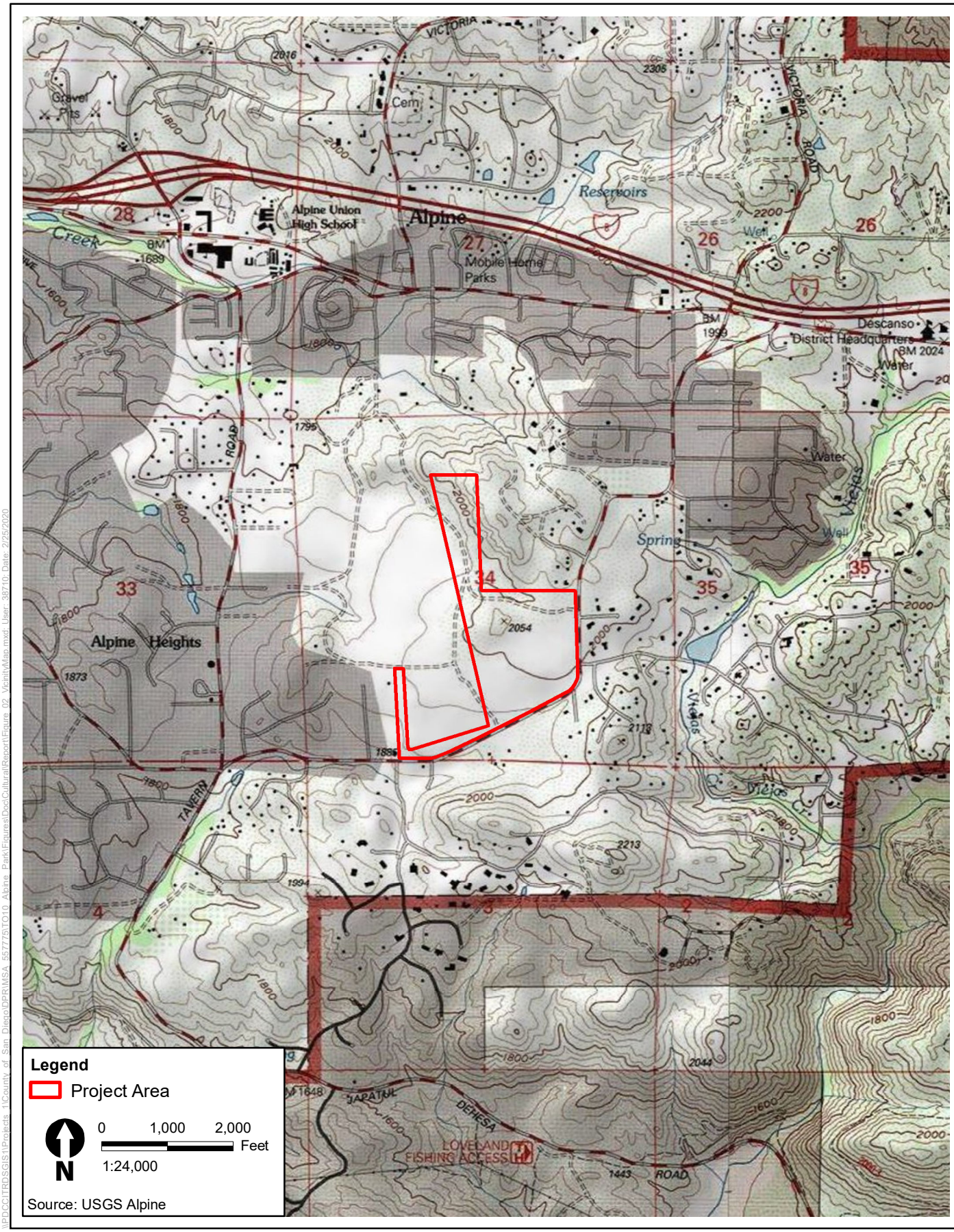

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Figure 2
Project Vicinity Map
Alpine Park Project

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Chapter 2
Background

2.1 Existing Conditions

2.1.1 Geography

The Property is located at elevations ranging from approximately 1,886 to 2,054 feet above mean sea level. The geography of the Property includes steep hills with rolling knoll tops on the eastern half and abundant bedrock outcrops (Figures 2 and 3). The Property also includes rolling grasslands, and openings in coastal sage scrub and Engelmann oak woodlands.

2.1.2 Geology and Soils

The Property lies within the Peninsular Ranges geomorphic province of California, a region characterized by northwest-trending faults and structural blocks with intervening valleys. Regional geologic maps for the area indicate that bedrock underlying the Property is situated atop three distinct geologic categories: pre-Cretaceous metamorphic rocks, Cretaceous granitic rocks, and Eocene sedimentary rocks. The pre-Cretaceous rocks consist of various metamorphic types. The granitic rocks, consisting of granite, granodiorite, and gabbro, are part of the southern California batholith in the area.

The Project is within a small area of Eocene non-marine sedimentary rock (e.g., Poway conglomerate), surrounded by Mesozoic basic intrusive rock (gabbro and diorite) and Mesozoic granitic rocks (Kennedy and Larson 1975). The soils mapped for the Property are Bosanko stony clay, 5 to 9 percent slopes; Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded; Cienaba very rocky coarse sandy loam, 30 to 75 percent slopes; and Cienaba-Fallbrook rock sandy loams, 9 to 30 percent slopes, eroded (USDA 1973). These soils generally support annual grasses and forbs, flattop buckwheat, chamise, California sagebrush, and oak or broadleaf chaparral (USDA 1973).

2.1.3 Biology

As noted above, the Property includes rolling grasslands, and openings in coastal sage scrub and Engelmann oak woodlands. Prehistorically, animal life in and within the vicinity of the Property likely included large to medium mammals, such as grizzly bear (*Ursus arctos horribilis*) and black bear (*Ursus americanus*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxidea taxus*), ringtail (*Bassariscus asutus*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Numerous species of smaller mammals were also present, including jack rabbit (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), cottontail rabbit (*Sylvilagus audubonii*), ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), and several species of mice and rats (Burt and Grossenheider 1976). Other animals included numerous predatory bird species, such as red-tailed hawks (*Buteo jamaicensis*) and golden eagles (*Aquila chrysaetos*), as well as western pond turtles (*Clemmys marmorata*) and several species of lizards and snakes (Peterson 1961;

Stebbins 1966). During the current survey, ground squirrels (Marmotini sp.) and several red-tailed hawk and other bird species were observed.

2.2 Cultural Setting

The following cultural history outlines and briefly describes the area's known prehistoric cultural traditions, its historic occupation and land use, and an historic overview of the Property.

2.2.1 Prehistoric Period

The approximately 10,000 years of documented prehistory of the San Diego region has often been divided into three periods: the Early Prehistoric Period (San Dieguito complex), Archaic Period (Millingstone Horizon, Encinitas tradition, La Jolla and Pauma complexes), and Late Prehistoric Period (Cuyamaca and San Luis Rey complexes).

Early Prehistoric Period Complexes

The Early Prehistoric Period encompasses the earliest documented human habitation in the region; the San Dieguito complex is the earliest reliably dated occupation of the area. The assemblage of artifacts associated with this complex has been studied and elaborated upon extensively (Rogers 1939, 1945, 1966; Warren and True (1961), Warren (1967); Moriarty (1969, 1987). The complex correlates with Wallace's (1955) Early Man Horizon, and Warren subsequently defined a broader San Dieguito tradition (1968). The earliest component of the Harris Site (CA-SDI-149/316/4935B) is located along the San Dieguito River northwest of the Property and is characteristic of the San Dieguito complex (Warren 1966, 1967; Warren and True 1961). Artifacts from the lower levels of the site include leaf-shaped knives, ovoid bifaces, flake tools, choppers, core, and pebble hammerstones, and several types of scrapers, crescents, and short-bladed shouldered points (Warren and True 1961, Warren 1966). Little evidence for the San Dieguito Complex/Early Man Horizon has been discovered north of San Diego County.

Some researchers interpret the San Dieguito complex as having a primarily, but not exclusively, hunting subsistence orientation (Warren 1967, 1968, 1987; Warren et al. 1998). Others see a more diversified San Dieguito subsistence system as possibly ancestral to, or as a developmental stage for, the subsequent, predominantly gathering-oriented complex denoted as the La Jolla/Pauma complex (cf. Bull 1983; Ezell 1987; Gallegos 1985, 1987, 1991; Koerper et al. 1991).

Archaic Period Complexes

In the southern coastal region of California, the Archaic Period dates from circa (ca.) 8600 years before present (BP) to ca. 1300 BP (Warren et al. 1998). Archaic Period La Jolla/Pauma complexes have been identified from the content of archaeological site assemblages found dating to this period. These assemblages occur at a range of coastal and inland sites and appear to indicate that a relatively stable and sedentary hunting and gathering complex, possibly associated with one people, was present in the coastal and immediately inland areas of San Diego County for more than 7,000 years. La Jolla/Pauma complex sites are considered to be part of Warren's (1968) Encinitas tradition and Wallace's (1955) Millingstone Horizon. The inland, or Pauma complex, aspect of this culture lacks shellfish remains, but is otherwise similar to the coastal La Jolla complex and may, therefore,

simply represent a non-coastal expression of the La Jolla complex (True 1958, 1980; True and Beemer 1982).

The content of Archaic Period La Jolla/Pauma site assemblages is characterized by manos and metates, shell middens, terrestrial and marine mammal remains, burials, rock features, cobble-based tools at coastal sites, and the increased presence of hunting equipment and quarry-based tools at inland sites. Artifact assemblages can also include bone tools, doughnut stones, discoidals, stone balls, plummets, biface points/knives, Elko-eared dart points, and beads made of stone, bone, and shell. Beginning approximately 5500 BP and continuing during the latter half of the Archaic Period, evidence of hunting and the gathering and processing of acorns gradually increases through the area. The evidence in the archaeological record consists of artifacts such as dart points and the mortar and pestle, which are essentially absent during the early Archaic Period. The initial and subsequent increasing use of these technologies during the middle and late Archaic Period constitutes a major transition in how the prehistoric populations interacted with their environment in the southern coastal region. The period of this shift, from ca. 4000 to 1300 BP, has been designated as the Final Archaic Period (Warren et al. 1998).

Late Prehistoric Period Complexes

In the San Diego area, the Late Prehistoric Period has been described as a time characterized by an increased number of sites, as well as "many technological innovations, and new patterns in material culture and belief systems" (McDonald and Eighmey 1998:III-1). This description, in fact, aptly describes the period for the entire San Diego County area. The archaeological record documents changes in tool and ornament types, burial practices, and site location choices that vary from those documented for the earlier periods, as described below.

As with the earlier periods, archaeologists have defined distinctive complexes for the Late Prehistoric Period prehistoric cultures of the area. Two complexes have been defined for the protohistoric occupants of the area: San Luis Rey is identified in the southern Orange, western Riverside, and northern San Diego Counties area; the Cuyamaca is identified in southern San Diego County (Meighan 1954; True 1966, 1970; True et al. 1974). The San Luis Rey complex is believed to be the progenitor of the Shoshonean-speaking peoples (Luiseño/Juaneño culture) living in the area at the time of historic contact in northern San Diego County, referred to as San Luis Rey of Shoshonean origin (Koerper 1979). Peoples of southern San Diego County (Cuyamaca, Yuman) are believed to be the ancestors of the Hokan-speaking Diegueño or Kumeyaay (Ipai/Tipai) occupying southern San Diego County at contact. The demarcation line between the San Luis Rey complex and the Cuyamaca complex is believed to be near the historic separation of the tribal territories of the Luiseño/Juaneño and Diegueño. It is highly unlikely, however, that the boundary remained static over time. During late prehistoric times, the Property would have been within the area commonly associated with the archaeologically defined Cuyamaca complex.

2.2.2 Historic Period

By common convention, prehistory ended and historic cultural activities began within what is now San Diego County between the late 1500s and mid-1770s. These cultural activities provide a record of Spanish, Mexican, and American rule, occupation, and land use. An abbreviated history of this area is presented to provide a background on the presence, chronological significance, and historical relationship of cultural resources within the Property.

Spanish Period

The historic period in California began with the early explorations of Juan Cabrillo in 1542. Cabrillo came ashore on what is now Point Loma to claim the land for Spain and gave it the name San Miguel. Sixty years passed before another European, Sebastían Vizcaíno, entered the bay on November 10, 1602, and gave it the name San Diego (Pourade 1960:49, 66). Although both expeditions encountered native inhabitants, there appears to have been little or no interaction. Kumeyaay oral tradition does not offer a native perspective on these encounters.

The Spanish period extended from 1769 to 1821. It encompassed early exploration and subsequent establishment of the Presidio of San Diego and Mission San Diego (1769), Mission San Juan Capistrano (1776), and Mission San Luis Rey (1798). During this period, Spanish colonists introduced horses, cattle, sheep, pigs, corn, wheat, olives, and other agricultural goods and implements, as well as new architecture and methods of building construction. Located on Presidio Hill, San Diego's original Spanish settlement consisted of a presidio (fort) and a chapel that also served as Alta California's first mission. In 1769 an expedition headed by Gaspar de Portolá traveled north from the Presidio de San Diego to extend the Spanish Empire from Baja California into Alta California by seeking out locations for a chain of presidios and missions in the area. From its original outpost on what is now Presidio Hill, Mission San Diego de Alcalá was moved to roughly its current site in Mission Valley in 1774. In November 1774, the mission was attacked by Tipay warriors from south of the San Diego River who razed the mission and killed Father Luis Jayme and two others. The mission was rebuilt in 1775, and although it was one of the least successful missions in the chain of California missions, it firmly established Spain's presence in the region (Sandos 2004:42–43, 56–68).

Despite such expansion, and amid the growing wealth accumulated by the missions, Spanish colonists maintained an ultimately tenuous grip on the region. While missions such as San Diego and San Luis Rey flourished economically, threats from within and without increasingly undermined political stability. Indigenous populations declined dramatically due to disease, overwork, and the missions' campaigns to end native ways of life. Instances of native resistance to Spanish authority multiplied across Alta California. Mariners with allegiances to competing colonial powers and trapper-explorers from the east and north increasingly challenged the authority of officials and priests whose problems were of little interest to officials in Spain, which was embroiled in European conflict and declining as a major power. (Pourade 1961:176-177; Bean and Rawls 2003:48–52, 54–56.)

Mexican Period

The Mexican Period in San Diego began with Mexico's independence from Spain in 1821 and ended in 1848 with the conclusion of the Mexican-American War and the signing of the Treaty of Guadalupe Hidalgo. During this period, most Spanish laws and practices continued until shortly before secularization of the missions in the mid-1830s. Former Presidio soldiers became civilian residents who populated the Pueblo of San Diego, which was established during this period. Transportation routes were expanded. Economic activity centered upon agriculture and livestock-raising for subsistence and localized markets, as well as hide and tallow production for the international market. (Pourade 1961:171,182–186; Pourade 1963:11–16; Sherman 2001:23.)

Approximately 500 private rancho land grants were made under Mexican rule by Governors Juan Batista Alvarado, Manuel Micheltorena, and Pío Pico, mostly after secularization of the missions.

Although many Native Americans were forced to work on Mexican ranchos they lived near, those living farther inland and away from the ranchos were able to maintain their way of life longer. Some former mission neophytes organized pueblos and attempted to live within Mexican law and society. The most successful of these was the Pueblo of San Pasqual, established in the San Pasqual Valley, south of the Project area, by Kumeyaay who were no longer able to live at the Mission San Diego de Alcalá (Farris 1997; Bean and Rawls 2003:58–63). Two ranchos were established south of the Property, including the 12,653-acre El Rincón del Diablo Rancho, which appears to have been granted in 1843 to Don Juan Batista Alvarado, a prominent government official, and Rancho Los Vallecitos De San Marcos, granted in 1840 to Don José María Alvarado (Moyer 1969:22, 44).

American Period

In principle, the Treaty of Guadalupe Hidalgo protected the rights of the Hispanic population of Californios who owned property during the Mexican period. In practice, however, the legal process for vetting land claims that was set into motion by the Land Commission established in 1851, combined with the mounting debts of many rancho owners, allowed American and other newcomers to take possession of nearly all the rancho lands originally granted to Californios (Bean and Rawls 2003:142–147).

The first reservations in San Diego County, the San Pasqual, and Pala Reservations, were established in the 1870s and served to offset encroachment by an increasing number of Anglo-American settlers who fenced land for farms and ranches that Native Americans had traditionally used for hunting and gathering. As an alternative to moving to reservations, some of the region's native peoples acculturated to Anglo-Americans' comparatively sedentary and increasingly dominant agricultural way of life (Carrico 2008).

The Viejas Reservation is located 3 miles northeast of the Property and the Sycuan Reservation is located 4 miles to the southwest. The Sycuan Reservation was established by Executive Order in 1875 on a 1-square-mile tract in Dehesa Valley west of the Property. The Viejas Reservation was established in 1934 on the former Baron Long Ranch after the Kumeyaay were evicted from the Capitan Grande Reservation (est. 1875) after politicians from San Diego successfully lobbied Congress to remove the people to create El Capitan Reservoir for the City of San Diego. Viejas was one of two reservations established for the former Capitan Grande people, the other being Barona Reservation (Carrico 2008).

2.2.3 Historic Overview of the Property

Research yielded no evidence of substantial built-environment resource development within the Property area during the historic period. The first historic ownership of the Property was when it was incorporated into the mission lands of Mission San Diego Alcala. Mission lands were appropriated for use as grazing land and growing crops. A map of the area from 1846 indicates the Property was at that time being used for growing grain. After the secularization of the missions in the 1830s, the mission lands were divided among those favored by the Mexican Governors of California. In 1846 a land grant that included all of Alpine was granted to Ramon and Leandro Osuna as part of a 13,000-acre rancho called Rancho Valle de las Viejas y Mesa del Arroz. However, the Osunas were absentee landholders and unable to establish their claim, and 8,877 acres were sold to Don Jose Antonio Aguirre, who retained ownership until 1862. The land went through several owners in the years afterwards, and settlement in Alpine did not become seriously established until the arrival of German and Swiss immigrants in the1880s. The Property remained undeveloped until

it was purchased as part of a larger farm by Sydney and Anna Wright in 1920. The Wrights lived on the property until 1957. The remains of their home are in the northwest corner of the Property. Since that time the Property has been subject to a variety of proposed development plans that were never brought to fruition. The Property remains undeveloped and has been used for years as unofficial recreational open space by nearby residents.

2.3 Ethnography

2.3.1 Kumeyaay

The Property is situated in the traditional territory of the people known to the Spaniards as the Diegueño, a term derived from the San Diego Mission Alcalá, with which these people came to be associated. This term was later adopted by anthropologists (Kroeber 1925) and further divided into the southern and northern Diegueño. Shipek (1982) initiated use of a Yuman language term, "Kumeyaay," for the people formerly designated as the Diegueño. The Kumeyaay are traditionally considered to be a collector/hunting society characterized by central-based nomadism.

The linguistic and language boundaries, as seen by Shipek (1982), subsume the Yuman speakers into a single nomenclature, the Kumeyaay, a name applied previously to the mountain Tipai or Southern Diegueño by Lee (1937), while Almstedt (1974:1) noted that Ipai applied to the Northern Diegueño with Tipai and Kumeyaay for the Southern Diegueño. However, Luomala (1978:592) has suggested that while these groups consisted of over 30 patrilineal clans, no singular tribal name was used, and thus referred to the Yuman-speaking people as Ipai/Tipai (Carrico 1998:V-3–V-7).

As with most hunting-gathering societies (Service 1966:33), Kumeyaay social organization was formed in terms of kinship. More specifically, the Kumeyaay possessed a patrilocal type of band organization with band exogamy (marriage outside of one's band) and virilocal marital residence (the married couple integrates into the male's band). The band is often considered as synonymous with a village or ranchería, which is a political entity. Following White (1963), Almstedt (1980:45) has suggested that the term ranchería be applied to both a social and geographical unit, as well as to the particular population and territory held in common by a native group or band. She also stressed that the territory for a ranchería might comprise a 30-square-mile area. Many households would constitute a village or ranchería, and several villages were part of a much larger social system, usually referred to as a consanguineal kin group (cimuL). The cimuL is typically an exogamous, multilocal, patrilineal descent unit, often widely dispersed in local lineage. The members of the cimuL do not intermarry because of their presumed common ancestry, but they maintain close relations and often share territory and resources (Sahlins 1968:23; Service 1971:105–106; Luomala 1963:287–289).

Other researchers have designated the San Diego River as a natural feature that divides the Kumeyaay between those people living north of it, the Ipai (Northern Diegueño), and those south of it and into Baja California, the Tipai (Southern Diegueño) (Langdon 1975:64–70; Hedges 1975:71–83). With a history stretching back at least 2,000 years, the Kumeyaay, at the point of contact, were, as described by Carrico, settled in permanent villages or rancherías with strong alliances. Carrico has indicated the possible locations for a number of these villages in the San Diego County area (Carrico 1998).

Although the Kumeyaay exploited a large variety of terrestrial and marine food sources, emphasis was placed on acorn procurement and processing, as well as the capture of rabbit and deer. Shipek (1989) has strongly suggested that the Kumeyaay, or at least some bands of the Kumeyaay, were practicing proto-agriculture at the time of Spanish contact. While Shipek's evidence is difficult to verify, the Kumeyaay were certainly adept land and resource managers, with a history of intensive plant husbandry.

The Kumeyaay practiced many forms of spiritualism with the assistance of shamans (kuessay) and cimuL leaders. Spiritual leaders were not elected, nor did they inherit their position; they achieved status because they knew all the songs involved in ceremonies (Shipek 1991) and had an inclination toward the supernatural. Important Kumeyaay ceremonies included male and female puberty rites, the fire ceremony, the whirling dance, the eclipse ceremony, the eagle dance, and the cremation ceremony, as well as the yearly mourning ceremony (Spier 1923:311–326). The primary ceremonial direction among the Kumeyaay is east, with rock art and entrances to ceremonial enclosures usually facing this direction (Kroeber 1925:717). The Kumeyaay are the only California tribe known to possess a color-direction system, with white representing the east, green-blue the south, black the west, and red the north (Kroeber 1925:717).

2.4 Previous Research in the Area

2.4.1 Prominent Studies

Previous research in the area has included both archaeological and historical studies. In addition to early historical accounts, several of which were cited above in Section 2.2, *Cultural Setting*, cultural resources studies associated with regulatory compliance for CEQA and/or for federal regulations, such as the National Historical Preservation Act (NHPA), have been conducted on, or in the vicinity of, the Property.

The results from these local studies indicate a temporary occupation of the local area over a long period of time. It seems probable that the prehistoric sites and isolates already recorded within the Property represent elements of a settlement pattern connected with the repeated occupation, through time, of the areas of the Property and the surrounding vicinity, from the Archaic Period through the Late Prehistoric Period.

2.4.2 Research Context

Previous research conducted in the local area, as well as in the San Diego region in general, provides a basis for understanding the cultural resources present within the Property. It also provides criteria for assessing the significance of these resources relative to the value of the scientific information they contain and the answers they may be able to provide to unresolved historical and archaeological research questions. To this end, this previous research allows for the delineation of particular research topic areas or "realms." For prehistoric resources, these topic realms often focus on categories of research such as settlement patterning or trade. Patterns of prehistoric subsistence and settlement have, for example, been a topic area of particular focus by several researchers. Regionally, Christenson (1990) has proposed and implemented a systems approach for the analysis of settlement and subsistence patterns in the San Diego County area during the Late Prehistoric period. In her study, Christenson made use of various environmental and cultural variables, many of

which are frequently contained within topic areas or realms often proposed for assessing a site's potential to provide important research information. Laylander (2006) has discussed and critiqued the use of some settlement systems approaches in analyzing the prehistoric hunter-gatherers of the San Diego region. He proposed an alternative approach, like that used by Christenson, utilizing the correlation of archaeological variables, at the regional, site, and artifact/ecofact/feature levels, with settlement system dimensions.

Recently, several researchers have defined and discussed research topic areas considered relevant to the prehistory of the area (e.g., Laylander 2006), both regionally (San Diego County) and locally. Specifically, in the northern County area, for a large survey of the lower Santa Margarita River Valley, Schroth et al. (1996: Section 2, pp. 10–21) proposed five general topic areas considered applicable for the investigation of the prehistory of their study area: (1) prehistoric time-depth and chronology, (2) subsistence strategies, (3) settlement patterning, (4) trade and travel, and (5) tool technology. These topic areas are relative to sites throughout San Diego County and these same topic areas or realms were also used to assess the research value of sites encountered in large surveys in the southern County, in the Otay Mesa area (Gallegos et al. 1998). In the Ramona area, Carrico and Cooley (2005) have previously described four similarly broad research topic areas: chronology, settlement, lithic raw material procurement, and technological/environmental change.

Such broad topic realms allow for site type and content to be understood and evaluated in the broader context of both the region and the local area, providing the basis for site content to be translated into research questions that can help explain the nature of past life ways. How, for example, do sites fit, or not fit, into the prehistoric settlement pattern as it is currently understood? How are they located relative to their environmental setting? Do any of the sites represent more substantial habitation locations, such as villages or major campsites? Such sites often contain the greatest variety of associated cultural materials, thereby providing the context with which to better explain their function and relevance to each other. Can sites with ceremonial and/or ritual content be identified? Are special-use sites present, such as quarries, lithic workshops, milling stations, and seed storage locations? Do any sites contain exotic artifacts or materials that may indicate trade with other areas? Are the raw lithic or food material remains observed at the sites indicative of having been locally obtained, or do they indicate procurement from greater distance? Do the sites contain elements that can be used to ascertain their age, either by radiometric dating or by the presence of time sensitive artifacts?

The previous prehistoric research studies detail some of the information that has already been obtained from the area. Results from the current survey, should they yield new information about sites discovered on the Property, could then be used in conjunction with the existing data to expand current knowledge within some or all the topic realms described.

Chapter 3
Records Search Results

ICF staff archaeologist, Nara Cox, BA conducted a cultural resources records search at the South Coastal Information Center (SCIC) at San Diego State University on April 24, 2019. The purpose of the search was to identify any previously recorded cultural resources inside or within 0.25 mile of the Property and to assess the potential for certain resource types within the Property. Also included in the search were those cultural resources studies that have been conducted inside or within 0.25 mile of the Property. The records search results can be found in Appendix A. Details on the records search results are presented below.

3.1 Previous Studies

In addition to the three reports requested by the County of San Diego Department of Parks and Recreation (DPR), 27 cultural resources studies are on record at the SCIC as having occurred inside or within 0.25 mile of the Property (see Table 1, below). Twenty-two reports were designated as unmappable but were identified as a result of the record search and are not listed below. Six of the mapped reports covered a portion of the Property, including three (Cook 1977; McIntyre 1993; Robbins-Wade and Giletti 2008) that covered the Property in its entirety (marked by an asterisk, see shaded studies in Table 1).

Table 1. Previous Studies Inside or Within a 0.25-mile Radius of the Property

Report #	Date	Author	Report Title
SD-00583	1978	Carrico, Richard L. and Keith D. Rhodes	Archaeological Investigations at Palo Verde Ranch, Units 1 and 2, Alpine California.
SD-01298	1982	Phillips, Roxana	Phase I Archaeological Investigation for Palo Verde Ranch Developments Units 2 Through 10.
SD-01713	1979	Quillen, Dennis K. and Richard L. Carrico	Archaeological Investigations for the Reimetz Lot Split at W-1856 Alpine, California
SD-02023	1978	Advance Planning & Research Associates	Alpine Ranch Subdivision TM #3796, EAD Log # 77-14-280 Alpine, California
SD-02228	1991	Smith, Brian F.	An Archaeological Survey of the Victoria Ranch Estates Projects
SD-02717*	1977	Cook, John	An Archaeological Reconnaissance of the Proposed Alpine Ranch Subdivision
SD-03310	1998	Schaefer, Jerry	Alpine School District Middle School - Cultural Resources Constraints Assessment
SD-03386*	1993	McIntyre, M. Bruce	Environmental Impact Report for the Proposed Stagecoach Ranch Specific Plan SP 91-002, TM 4974 LOG No. 91-14-13
SD-03463	1997	Smith, Brian F. and Alex N Kirkish	An Archaeological Survey of the Boulder Oaks Project, Alpine, County of San Diego
SD-06425	1990	Carrico, Richard, Susan H. Carrico,	Historic Resources Inventory Sweetwater Valley

Report #	Date	Author	Report Title
		Kathleen A. Crawford, and S. Kathleen Flanigan	
SD-07544	1990	Robbins-Wade, Mary	Cultural Resources Inventory for the Eltinge Drive Lot Split Alpine, San Diego County
SD-07582	1999	Wade, Sue and Stephen Van Wormer	Alpine Estates Subdivision an Inventory and Evaluation of Prehistoric and Historic Resources Alpine, Ca
SD-08500	2000	Robbins-Wade, Mary	Cultural Resources Report for the Gonya Property Grading Permit L1400 Alpine, San Diego County, California
SD-10454	1994	Gross, Timothy G., Mary Robbins-Wade, and Ruth C. Atter	Confidential Appendices to Archaeological Survey and Assessment for the South Grade Road Parcel Alpine, San Diego County, California
SD-10482	1978	Van Horn, David M.	Surface Collection and Test Excavation at the Alpine Sites SDI 5199, 5200 Archaeological Associates
SD-10486	1984	Banks, Thomas J.	TPM 18201, LOG 84-14-23
SD-10551	2006	Arrington, Cindy	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California
SD-10555	1989	Roth, Linda	Results of Archaeological Survey and Initial Test Excavations of 12 Acre Mosiman Project, Alpine, San Diego County, California
SD-10997	2003	Carrico, Richard L., Theodore G. Cooley, and Laura J. Barrie	Final Archaeological Overview for the Cleveland National Forest California
SD-11758*	2008	Robbins-Wade, Mary and Andrew Giletti	Archaeological Resources Study, Park Alpine, Alpine, San Diego County, California, TM 5433
SD-13016	2006	Robbins-Wade, Mary	Cultural Resources Assessment for Alpine Oaks Estates (TM 5330), Alpine, San Diego County, California
SD-13391	2011	Whitaker, James E.	ETS #21744, Cultural Resources Monitoring for the Wood Pole Intrusive Inspections, 45 Poles, Alpine Project, San Diego, California (HDR #168414)
SD-13748	2011	Bowden-Renna, Cheryl	Letter Report: ETS 21763- Cultural Resources Survey for the Replacement of Pole P273807, Alpine, San Diego County, California- IO7011102
SD-14206	2011	Bowden-Renna, Cheryl	Letter Report: ETS 21763- Cultural Resources Monitoring for the Replacement of Pole P273807, Alpine, San Diego County, California- IO 7011102
SD-15291	2014	Tennesen, Kristin	ETS #26491, Cultural Resources Survey P373230 Replace Damaged Pole, San Diego County, California
SD-16812	2016	Pigniolo, Andrew R., Serr, Carol, And James, Del	Cultural Resource Survey for the San Diego Back Country Fuel Reduction Project, Alpine, San Diego County, California
SD-17338	2017	Robbins-Wade, Mary and Nicole Falvey	Cultural Resources Inventory and Evaluation Update: Rancho Sierra Alpine, San Diego County, California

Note: Shaded resources are located within or directly adjacent to the Property.

3.2 Previous Recorded Resources Inside or Adjacent to the Study Area

The SCIC cultural resources records search indicated that 26 cultural resources have been recorded within 0.25 mile of the Property, four of which are plotted within the Property (see Table 2, below). Of these 26 resources, 20 are prehistoric resources, 5 are historic period resource, 1 is a multicomponent resource.

The four resources reported within the Property consist of three prehistoric resources—bedrock milling sites (CA-SDI-5199, CA-SDI-19332, and CA-SDI-19333)—and one historic house complex archaeological site (CA-SDI-12236).

Table 2. Previously Recorded Sites Inside or Within a 0.25-mile Radius of the Property

P Number	Trinomial	Type	Dimensions	Reference
P-37-004290	CA-SDI-004290	Bedrock milling site	60 m x 25 m	Berryman 1975
P-37-004656	CA-SDI-004656	Bedrock milling site	130 m x 120 m	Elmore 1974
P-37-005199	CA-SDI-005199	Bedrock milling site	320 m x 255 m	Roth 1991
P-37-005200	CA-SDI-005200	Prehistoric temporary campsite	320 m x 125 m	Affinis 2008
P-37-005840	CA-SDI-005840	Prehistoric temporary campsite	330 m x 35 m	May 1978
P-37-005876	CA-SDI-005876	Bedrock milling site	80 m x 40 m	Rhodes 1978
P-37-011209	CA-SDI-011209	Lithic scatter	90 m x 30 m	Roth 1989
P-37-012230	CA-SDI-012230	Bedrock milling site	146 m x 85 m	Roth 1991
P-37-012235	CA-SDI-012235	Historic rock corral	740 ft x 600 ft	Roth 1991
P-37-012236	CA-SDI-012236	Historic house complex	85 ft x 70 ft	Roth 1991
P-37-012237	CA-SDI-012237	Historic house complex	300 ft x 150 ft	Roth 1991
P-37-012238	CA-SDI-012238	Historic stacked rock feature	55 ft x 10 ft	Roth 1991
P-37-012239	CA-SDI-012239	Bedrock milling site	4 m x 2 m	Roth 1991
P-37-013242	CA-SDI-013242	Multicomponent site	200 m x 120 m	Affinis 1992
P-37-013243	CA-SDI-013243	Sparse lithic scatter	32 m x 24 m	Affinis 1992
P-37-013244	CA-SDI-013244	Bedrock milling site	35 m x 45 m	Affinis 1992

P Number	Trinomial	Type	Dimensions	Reference
P-37-013245	CA-SDI-013245	Historic refuse deposit	20 ft x 50 ft	Affinis 1992
P-37-013246	CA-SDI-013246	Historic homestead site	400 ft x 240 ft	Affinis 1992
P-37-028099	CA-SDI-018284	Bedrock milling site	30 m x 20 m	James 2016
P-37-028100	CA-SDI-018285	Bedrock milling site with midden	10 m x 20 m	Hector 2006
P-37-028101	CA-SDI-018286	Bedrock milling site	10 m x 10 m	Hector 2006
P-37-028102	CA-SDI-018287	Bedrock milling site	10 m x 10 m	Hector 2006
P-37-028103	CA-SDI-018288	Bedrock milling site	5 m x 5 m	Hector 2006
P-37-030429	CA-SDI-019332	Bedrock milling site	3 m x 3 m	Cooley 2006
P-37-030430	CA-SDI-019333	Bedrock milling site	3 m x 3 m	Cooley 2006
P-37-036106	N/A	Isolate pot sherd	N/A	James 2016

Note: Shaded resources are located within or directly adjacent to the Property.
ft = feet; m = meters

3.3 Other Historical Research

Historical research was also conducted for this study. Information on the earliest property owners was gathered using the 1912 County Plat Book and the document search portal at the webpage of the General Land Office, Bureau of Land Management, U.S. Department of the Interior. Historic topographic maps were gathered at the USGS Topoview website. ICF cultural resources staff gathered historic aerial photographs from the National Environmental Title Research, LLC, historicaerials.com website. Digital historical newspaper searches for individuals who owned land in the study area and historical themes pertaining to the Project site were conducted using two database services to which ICF subscribes: Newspapers.com and Genealogybank.com.

Chapter 4
Field Methods

Patrick McGinnis, MA, RPA, of ICF, served as principal investigator for the Project. ICF archaeologist Nara Cox, BA, served as archaeological field director, and ICF archaeologist Jordan Menvielle, BA, participated as crew in the archaeological survey. Justin Linton of Red Tail Monitoring, Inc. acted as the Native American monitor, representing the Kumeyaay, during the archaeological survey. This document was co-authored by Patrick McGinnis and Nara Cox with contributions from Karolina Chmiel and Rachel Droessler.

4.1 Field Surveys and Test and Evaluation Methods

A formal pedestrian survey was conducted by a team of archaeologists on August 22 and 23, 2019. The field survey methods for this Project consisted of either systematic intensive pedestrian survey or reconnaissance survey. Intensive pedestrian survey was the preferred method and was utilized in all areas where feasible. Intensive pedestrian survey methods consisted of a team of three people (two ICF archaeologists and one Native American monitor) walking in 15-meter transects in any areas where slope, vegetation, and/or terrain would allow transects to be maintained. Team members checked all bedrock outcrops and areas cleared of vegetation or disturbed by rodents along and between the transect lines.

Intensive survey methods utilizing transects were not suitable for some of the Property. Instead, reconnaissance survey methods were used where transect coverage was precluded by the presence of dense vegetation, large boulder outcrops, or steep, rugged terrain. Consequently, such areas could not be covered consistently using a 15-meter transect methodology. Reconnaissance survey methods consisted of surveying the visible areas where present and/or accessible. Bedrock outcrops within all surveyed areas were examined thoroughly for evidence of prehistoric milling activity or other discernible human modification. Within the reconnaissance survey areas, if bedrock outcrops were identified that had a potential to contain bedrock milling features, rock shelters, or rock art, specific attempts were made to reach these outcrops to determine if such resources were present.

Testing was be conducted within the boundaries of two sites to determine the vertical and horizontal boundaries of the site and assist in the determination of its significance. A combination of surface collection and subsurface testing methods was employed at each site dependent upon the site's individual characteristics. The sites were intensively surveyed; however, no surface artifacts were identified at either site. After surface mapping, shovel test units (STUs) were placed across each site. The number of STUs excavated were determined by site size and complexity. Each STU measured approximately 40 centimeters by 40 centimeters and was carried out to determine if the sites contained subsurface deposits. All material from the STUs was screened through 1/8-inch mesh.

An Apple iPad using a Global Positioning System (GPS) receiver with submeter accuracy was used to track the survey transects and coverage and record cultural resources that were identified within the Property. Notes on resource details were collected to meet or exceed site recordation guidelines based on the California Office of Historic Preservation's 1995 *California Archaeological Inventory Handbook for Completing an Archaeological Site Record* and the SCIC recommendations.

ICF archaeologists were able to survey most of the Property. By contract agreement, attempts to survey areas exceeding 20 percent slope were based on professional judgment that considered safety issues and the probability that resources would not be present on steep slopes. Only the 5.83 acres at the northeast corner of the property were too steep to safely survey on foot. This area was visually inspected while surveying the area at the base of the slope. See Figure 3.

Ground visibility was fair to poor throughout most of the Property, ranging from 10–90 percent (averaging 50 percent) in the uplands, 0–20 percent (averaging 15 percent) in the chaparral along the drainages and slopes, and 10–40 percent (averaging 25 percent) in grassy meadows.

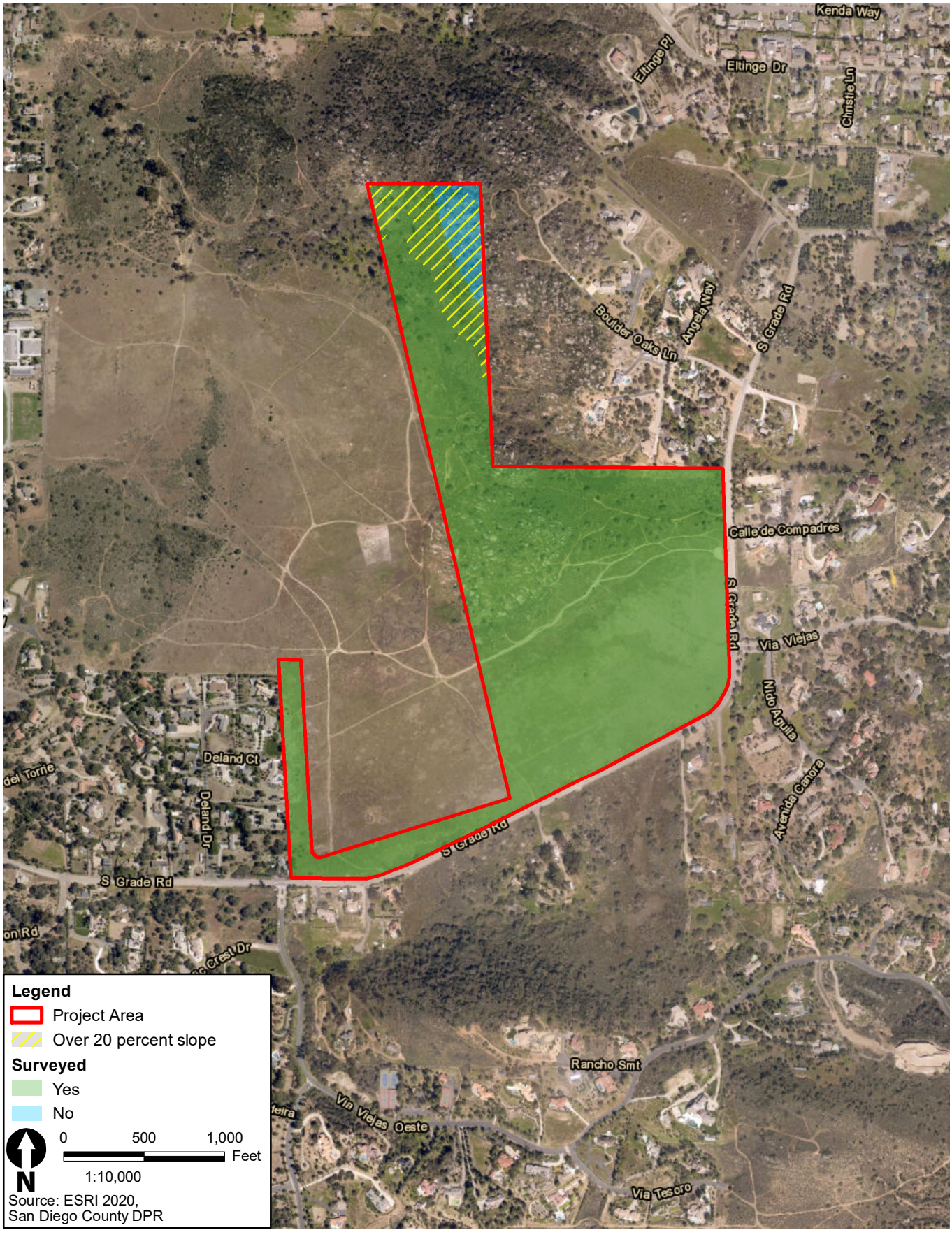

Figure 3
Survey Coverage
Alpine Park Project

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Chapter 5
Archaeological Resources

Four archaeological resources were identified during the current survey. The sites include three prehistoric sites—two bedrock milling sites without associated surface artifacts, and one large bedrock milling site with associated lithic and ground stone artifacts. The lone historic-era archaeological site is the remains of a house and associated features. All four sites were previously recorded, and no newly identified cultural resources were discovered during the survey. Details on each identified resource are presented below and their locations are shown on Figure 4 in Confidential Appendix B.

5.1 Prehistoric Archaeological Sites

During the survey, no previously unrecorded prehistoric resources were identified, and the locations of the three previously recorded prehistoric resources were visited and updated. Below are descriptions of the prehistoric sites identified during the survey.

5.1.1 Previously Recorded Prehistoric Archaeological Resources

P-37-005199/CA-SDI-005199

This resource consists of a knoll/outcrop containing at least 15–22 bedrock milling features with at least 42 milling elements: 7 basins and 35 milling slicks. Bedrock is granitic rock; granodiorite and tonalite. The site also contains a thin scatter of ceramics and lithic debitage. The site was originally recorded in 1977 by Cook and described as two knolls with over 100 milling elements and an extensive low density lithic scatter with approximately 75 artifacts. In 1978 the site was excavated by Van Horn. The site was cleared of vegetation and the artifacts surface collected, resulting in the recovery of 321 artifacts including a single mano, four cores, six scrapers, a blade, a drill point, and a small amount of faunal bone. Three pottery sherds were also recovered. Eight 1- by 1-meter units were excavated, resulting in the recovery of 120 artifacts, most within the top 10 centimeters of the soil.

Roth and Berryman evaluated the site in 1990, excavating two 1- by 1-meter units and 24 shovel test pits, resulting in the recovery of few artifacts (1 pottery fragment and 15 flakes). The study led to a reduction in the size of the site's boundaries. Based on the limited number of artifacts recovered during excavation and disturbance since 1978 the site was considered to have no further research potential and recommended as not significant.

The site was updated and evaluated in 2008 by Robbins-Wade and Giletti for a proposed residential development and found to be in the same condition as the 1990 excavations, with nothing found to contradict the conclusion that the research potential of the site has been fulfilled by the previous work conducted by Cook, Van Horn, and Roth and Berryman.

The current survey found the site in similar condition to the survey conducted in 2009. The site is fairly disturbed by several bike and pedestrian trails. Much of the bedrock milling surfaces were found to be in poor condition due to heavy exfoliation. Over 100 flakes and two tools of metavolcanic material were identified within the site's previously recorded boundaries, mostly in disturbed pathways on the southeast side of the site. The sites boundaries were not expanded and appear to be consistent with the site as recorded when updated in 2009 rather than with the larger area identified in 1978.

P-37-030429/CA-SDI-019332

This resource consists of one bedrock milling feature with one slick. The bedrock is dark granitic rock; tonalite or gabbro. The current effort found the resource to be in poor condition, the milling surface has undergone severe exfoliation. An additional milling feature was found on a small boulder (1 meter [m] by 0.5 m) approximately 5 m from the originally recorded milling feature (Photo 1). This new milling feature contains a slick that measures approximately 17 centimeters (cm) x 6 cm. The milling features are now referred to as MF#1 and MF #2. No artifacts or midden soils were identified in the vicinity of the resource.

P-37-030430/CA-SDI-019333

This resource consists of one granitic bedrock milling feature with one slick. The current survey relocated the resource—40 meters due south of the location recorded at the SCIC—and found the surface of the rock to be highly exfoliated. The surveyors verified that the identified rock is the same as that recorded in 2006 by comparing the subject (rock) and background of the photo in the 2006 DPR form. One small area, approximately 2 centimeters by 2 centimeters appeared to retain a slick remnant. The originally recorded slick is in very poor condition as of the 2019 survey. No artifacts or midden soils were identified in the vicinity of the resource.

5.1.2 Testing and Evaluation Results P-37-030429/CA-SDI-019332 and P-37-030430/CA-SDI-019333

ICF archaeologists and a Native American monitor conducted subsurface testing at two archaeological sites within the 98-acre Project area in January 2021. The purpose of the testing was to determine if the sites contained subsurface deposits and to evaluate the resources potential to qualify as historical resources or unique archaeological resources under CEQA and the County of San Diego Historical Resources Guidelines.

Prior to commencing subsurface investigation, the areas surrounding the site were intensively surveyed for surface artifacts that might identify potential cultural deposits in addition to the bedrock milling features. Surface visibility was fair to poor, averaging less than 50 percent due to the presence of low grasses. No artifacts were identified on the ground surface near either of the bedrock milling sites when they were originally recorded or during subsequent investigations. Therefore, shovel test pit (STP) locations were selected arbitrarily within 5 m of each milling feature. Five STPs were excavated at site CA-SDI-19333 and four were excavated at site CA-SDI-19332. If the STPs were positive, additional STPs were to be placed radiating outward from the site to establish the site's subsurface boundaries and determine the depth of deposit.

STPs were excavated to a minimum depth of 40 cm and would have been excavated to two sterile levels below the level of the last recovered artifacts had artifacts been recovered. All excavated soil was passed through sifting screens with 1/8-inch mesh.

Soils within the STPs tended to be consistent with an upper layer of loose dark brown loamy, organic, root-matted soil ranging anywhere from 5-10 cm in thickness followed by a layer of compact dark gray-brown silty clay with some gravel and occasional large granitic cobbles. The soil became more compact with depth and some pockets and layers of hard compact decomposing granite were encountered below 30 cm in depth. All nine of the STPs excavated at sites CA-SDI-019332 and CA-SDI-019333 were negative for cultural materials or ecofacts and it is worth noting that no types of stone normally associated with stone tool making were identified in the STPs other than chunks of granite.

Nine STPs were excavated at sites CA-SDI-19333 and CA-SDI-19332. None of the STPs contained artifacts or other cultural materials. Prehistoric bedrock milling sites do not possess the qualities that would make them eligible for the CRHR under Criteria 1-3 or the Local Register under Criteria 1-3. However, bedrock milling sites when associated with deposits that have potential to yield additional information or exist as part of large habitation site or district may be eligible under CRHR Criterion 4 or Local Register Criterion 4. Both CA-SDI-19333 and CA-SDI-19332 are isolated bedrock milling sites with no evidence of additional activities taking place in the immediate vicinity. The sites may be outliers related to the larger bedrock milling complex at CA-SDI-5199 which has been found to not be eligible for the CRHR. These site types are thought to reflect late prehistoric resource collection and processing activities by the Kumeyaay people. These sites occur in an area with abundant evidence of prehistoric land use and are a very common site type in the area. Based on the results of the shovel probe survey, no subsurface components are associated with these sites, and they are unlikely to yield significant information that would warrant consideration for the CRHR under Criterion 4 or Local Register. The recording and testing of CA-SDI-19333 and CA-SDI-19332 has exhausted their research potential and therefore, the Project would have no impact on historical resources.

5.2 Historic Archaeological Sites

During the survey, no previously unrecorded historic resources were identified, and the location of the one previously recorded historic resource was visited and updated. Below is a description of the historic site identified during the survey

5.2.1 Previously Recorded Historic Archaeological Sites

P-37-012236/CA-SDI-012236

This historic house complex recorded in 1991 includes a house foundation, garage, fish pond, and associated modern trash, as well as a cement water storage tank. These may be associated with 1920–1957 Wright family ownership. Recorded artifacts included roofing material, wood, asphalt shingles, brick, cement rubble, cement foundations, rock walls, chimney remains, a concrete water tank, and one highly disturbed trash pit with white ware fragments, blue glass shards, and an iron frying pan. The site was identified during the 2008 study by Robbins-Wade and Giletti in much the same condition and was not evaluated as it was to be placed in open space and left undisturbed.

The far eastern portion of the site was revisited during the current survey. Several concrete and cobble foundations were consistent with the conditions recorded from 2008, although it appears that the site may have been further disturbed by public access to the area, and visibility was poor due to dense grasses. No artifacts were identified within the surveyed portion of the resource.

5.3 Prehistoric Synthesis

Although limited by the relatively few number of prehistoric resources identified, the results of the study do offer some insight into prehistoric settlement patterns and individual site function. The number of artifacts and features, as well as the number of artifact types, suggests that the resources represent a series of campsites or resource-processing stations related to the unnamed drainage that prehistorically would have been a tributary to Alpine Creek. The three identified prehistoric sites are small bedrock milling sites or a large bedrock milling site with associated lithic scatter showing relatively short-term and low intensity use.

The prehistoric sites in the Property appear to represent locations at which special tasks and/or specific resource procurement activities occurred. Based on surface indications alone, the sites do not appear to represent loci of a dispersed village pattern of settlement, such as has been proposed for the Late Prehistoric Kumeyaay in the Ramona area by Carrico and Cooley (2005), but appear to represent more minimal vestiges of remote resource procurement and/or processing activities away from habitation areas.

This pattern may be part of an overall fission/fusion settlement pattern model for the Kumeyaay (Ipai/Tipai), described by Carrico (2003) for the southern San Diego County area during Late Prehistoric times, which reflected seasonal movements by local prehistoric groups to maximize resource utilization. Carrico envisioned a bipolar pattern for a single village group. In the model, fusion involves two large, concentrated sites, located a considerable distance apart with low site densities. Fission involves a few smaller, more densely populated habitation sites distributed over the area between the two large, concentrated sites. The two large-scale habitation sites would have been seasonally occupied, while the smaller sites were inhabited as the village split up and moved in smaller groups between the two major site locations. At these smaller sites, focused activities took place to exploit particular resources in that site vicinity. Carrico proposed that one such village group moved between a main site seasonal location, Pámu near Ramona (summer/fall), to another, Tukumak at Mesa Grande (winter/early spring) some 32 kilometers away. Willey et al. (2002:127) speculate that site CA-SDI-122 and the complex of smaller sites in proximity to it in the San Vicente Creek Valley may represent a similar main site location for another bipolar village arrangement similar to that proposed by Carrico for Pámu/Tukumak. If so, then the site loci located on the Property may represent either part of the dispersed main village, or fusion point, in the pattern, with the smaller, more intensely occupied resource exploitation sites representing the fission part of the pattern.

Based on the limited survey data in the Property, it appears that future archaeological investigations at the sites could possibly contribute data to better define Late Prehistoric Period settlement and subsistence patterns, not only for the East County area, but also for southern San Diego County in general. Data recovered from the sites on the Property could be analyzed in conjunction with those from surrounding known sites to test whether Carrico's postulated fission/fusion pattern is an adequate model for the region's Late Prehistoric settlement and subsistence patterns (Carrico 2003).

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Chapter 6
Native American Participation/Consultation

Letters were sent to the Native American Heritage Commission (NAHC) by ICF and on behalf of the DPR on April 19, 2019, requesting a review of the Sacred Lands File (SLF) and a list of contacts. A response letter from Steven Quinn of the NAHC, dated May 3, 2019, was received, and noted that the SLF search was positive and recommended contacting the Sycuan Band of Kumeyaay Nation and the Viejas Band of Kumeyaay Indians (Viejas Band) in addition to 17 other contacts. Letters requesting information and comment were sent to the listed contacts by ICF on May 21, 2019. A response by Clint Linton of the Iipay Nation of Santa Ysabel was received via email on May 22, 2019. Mr. Linton deferred comment to the Viejas Band and supports any comments or requests made by them. The Viejas Band responded by letter on June 5, 2019, stating that the Project site has cultural significance to the Tribe and requested that a Kumeyaay monitor be present on site for ground-disturbing activities and to be informed of any new developments such as inadvertent discoveries. No other responses were received. Native American correspondence is located Appendix C.

DPR staff responded to a request to consult under AB 52 from the Viejas Band of Kumeyaay Indians (Viejas Band). During consultation on March 10, 2021, Viejas Band requested a Kumeyaay Cultural Monitor be on-site for ground-disturbing activities and to be informed of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains. Lorrie Bradley of DPR sent an email on July 11, 2021 following up to see if consultation could be concluded and stating the project would have cultural monitors, including a Kumeyaay monitor, on-site during disturbance of native soil. AB-52 was concluded with Viejas on July 28, 2021, with the following request that the County agrees to, “Viejas requested that any ground disturbance and not just native soils have monitoring. With this inclusion in project conditioning, Viejas agreed to conclude consultation.”

Justin Linton of Red Tail Monitoring, Inc. acted as the Native American monitor, representing the Kumeyaay, during the archaeological survey and Caesar Welch of the Viejas Band of Kumeyaay Indians served as Native American monitor during test excavations.

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Chapter 7
Impacts, Significance, and Management Recommendations

There are four cultural resources within or directly adjacent to the Property. It is anticipated that the County is to include the Property baseline information and management directives in preparation of executing a Resource Management Plan (RMP). The present study, including both historical context for the Property and the cultural resource inventory, provides the County with a framework for the development of an RMP. Although staging areas and potential trail development are anticipated, no other development is currently proposed. When trails, staging areas, and any potential future development or other construction are proposed in the future, these activities may have a significant impact on potentially significant resources documented within the Property. Additionally, vegetation management efforts and future public access may cause impacts on archaeological resources through vegetation removal, ground-disturbing activities, and increased potential for the public to encounter and damage significant cultural resources.

The County of San Diego's preferred management of cultural resources is avoidance and preservation incorporated into project design. However, it is recommended that, prior to development of any trails, access roads, staging areas, or other facilities and prior to implementation of revegetation plans, any of the recorded archaeological sites that cannot be preserved through project design and avoidance should be tested and evaluated for significance. As summarized in Table 3, below, four cultural resources were recorded within the Property. One of the prehistoric resources (CA-SDI-5199) has been previously tested and determined to be ineligible for the NRHP or CRHR. The two other prehistoric resources (CA-SDI-19332 and CA-SDI-19333) were tested as part of the current effort and found to lack subsurface deposits or significance that would make them eligible for either the CRHR or the Local Register.

Site CA-SDI-12236 was relocated and found to be in poor condition. However, testing could be undertaken to identify if substantial subsurface deposits are present within the site's boundaries. The presence and nature of any subsurface component of the site is unknown; therefore, its potential significance is unknown until testing is conducted at the site. For the purposes of this inventory, it is assumed that the resource has low to moderate potential for site significance.

Native American representatives should be present to monitor prehistoric archaeological testing activities and be involved in the assessment of prehistoric site significance.

Table 3. Potential Significance of Cultural Resources within the Property

Resource	Type	Description	Potential Significance for NRHP/CRHR	Reasoning
P-37-005199/ CA-SDI-5199	Prehistoric	Bedrock milling temporary campsite	Evaluated, Recommended not eligible	Previously evaluated
P-37-030429/ CA-SDI-19332	Prehistoric	Bedrock milling	Evaluated, Recommended not eligible	Lack of surface artifacts and midden
P-37-030430/ CA-SDI-19333	Prehistoric	Bedrock milling	Evaluated, Recommended not eligible	Lack of surface artifacts and midden
P-37-012236/ CA-SDI-12236	Historic	Historic era home site	Unevaluated, likely ineligible	Structures razed, and surrounding area disturbed

Three of the cultural resources identified during the survey have been tested and evaluated for listing in the CRHR. If testing and evaluation of the single unevaluated resource within the Property is not possible or desired by the County, mitigation measures should be developed to protect or treat this resource. Recommended mitigation measures include site avoidance or, if avoidance is not possible, the development and completion of an archaeological data recovery program for sites that have been evaluated and found eligible for the NRHP or CRHR. The development of recreational activities must take into consideration potential impacts on cultural resources resulting from public access and increased public use at the entire Property. It is recommended that the County avoid as much as possible developing trails, staging areas, or other recreation areas that would allow for an increase in public access to or through sites. Trail development and maintenance activities may impact subsurface deposits, and the increase in traffic and accessibility may create direct impacts through vandalism, looting, or the inadvertent destruction of artifacts and site integrity. Any eligible sites that cannot be avoided in the development of the Property should be capped as a preservation measure.

Drawing the public's attention to sites containing any or substantial subsurface and surface deposits of artifacts is not recommended, as this may encourage site looting and impacts on site integrity. Offsite interpretation would be the preferred means to provide public education while protecting the sites.

It is essential to reiterate that specific potential impacts on significant resources cannot be identified until resource significance has been determined through testing and evaluation. Until evaluation of the identified resources' importance has been completed, mitigation measures and/or design considerations involving impacts on cultural resources cannot be formulated. While the County considers preservation of cultural resources through project design the preferred mitigation strategy to avoid impacts, should avoidance not prove feasible at any site determined to be significant, a data recovery program for archaeological resources, or a documentation program of historic period structures and features, must be developed in coordination with the County of San Diego and executed prior to the proposed activities. The following mitigation measure are recommended to reduce potential impacts to cultural resources to a less than significant level.

MM-CUL-1: Prepare and Implement a Cultural Resources Monitoring and Discovery Plan. Prior to the commencement of any ground-disturbing activities within previously undisturbed soils within the project area, the County DPR shall retain a qualified archaeologist (pre-approved by County DPR) who meets the Secretary of the Interior's Professional Qualification Standards (36 Code of Federal Regulations [CFR], Part 61) to prepare a Cultural Resources Monitoring and Discovery Plan (CRMDP) for the project area. Procedures to follow in the event of an unanticipated discovery apply to all project components. The CRMDP shall be submitted to the County DPR, as applicable based on the jurisdiction wherein the project component is located, and shall be reviewed and approved by County DPR, the relevant agency. If County DPR does not have in-house expertise to review the CRMDP, they shall respectively hire an expert who meets the Secretary of the Interior's Professional Qualification Standards (36 CFR 61) and the County DPR shall pay for said expert prior to the commencement of any ground-disturbing activities within the areas requiring archaeological monitoring.

County DPR's CRMDP review shall ensure that appropriate procedures to monitor construction and treat unanticipated discoveries are in place. County DPR's review and approval of the CRMDP shall occur prior to the commencement of any construction activities subject to the requirements of the CRMDP. The CRMDP shall include required qualifications for archaeological monitors and supervising archaeologists and shall lay out protocols to be followed in relation to cultural resources, including both archaeological and tribal cultural resources. The CRMDP shall provide a summary of sensitivity for buried cultural resources. In addition, it shall describe the roles and responsibilities of archaeological and Native American monitors, County DPR, and construction personnel. The CRMDP shall describe specific field procedures to be followed for archaeological monitoring, including field protocol and methods to be followed should there be an unanticipated archaeological discovery. Evaluation of resources, consultation with Native American individuals, tribes and organizations, treatment of cultural remains and artifacts, curation, and reporting requirements shall also be described. The CRMDP shall also delineate the requirements, procedures, and notification processes in the event that unanticipated human remains are encountered.

The CRMDP shall delineate the area(s) that require archaeological monitoring. Mapping of the area(s) shall be made available to the County DPR, who shall incorporate this information into the respective construction specifications for the project.

MM-CUL-2: Prepare and Implement a Cultural Resources Awareness Training Prior to Project Construction. Prior to, and for the duration of, project-related ground disturbance County DPR shall hire a qualified archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards (36 CFR 61) and approved by County DPR to provide cultural resources awareness training to project construction personnel. The training shall include a discussion of applicable laws and penalties under the law; samples or visual representations of artifacts that might be found in the project vicinity; and the steps that must be taken if cultural resources are encountered during construction, including the authority of archaeological monitors, if required to be on site during the project, to halt construction in the area of a discovery.

The cultural resources awareness training shall be conducted by a qualified archaeologist. A hard copy summary of cultural resources laws, discovery procedures, and contact information

shall be provided to all construction workers. Completion of the training shall be documented for all construction personnel, who shall be required to sign a form confirming they have completed the training. The form shall be retained by County DPR to demonstrate compliance with this mitigation measure.

MM-CUL-3: Conduct Archaeological and Native American Monitoring.

An archaeological monitor or cross-trained archaeological/paleontological monitor and a Native American monitor shall be retained to observe all initial ground-disturbing activities, including brush clearance, vegetation removal, grubbing, grading, and excavation, within the recorded boundaries of P-36-005695. The archaeological monitor shall meet the qualification standards of the California Office of Historic Preservation and will be overseen by an archaeological principal investigator. The Native American monitor shall be selected from amongst the Native American groups identified by the NAHC as having affiliation with the Project area. Prior to start of ground-disturbing activities, the archaeological monitor shall conduct paleontological and cultural resources sensitivity training for all construction personnel. The Native American monitor or a representative shall be given the opportunity to participate. Construction personnel shall be informed of the types of paleontological or archaeological resources that may be encountered, and of the proper procedures to be enacted in the event of an inadvertent discovery of fossils, archaeological resources, or human remains. The County shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.

Archaeological monitoring shall be conducted by an archaeologist familiar with the types of archaeological resources that could be encountered within the Project site and that is cross trained in paleontological resource identification. The qualified archaeologist, in coordination with the County and Native American monitor, may reduce or discontinue monitoring if it is determined that the possibility of encountering buried archaeological deposits is low based on observations of soil stratigraphy or other factors. Both the archaeologist and Native American monitor shall be empowered to halt or redirect ground-disturbing activities away from the vicinity of a discovery until the qualified archaeologist or paleontologist has evaluated the discovery and determined appropriate treatment. If prehistoric archaeological materials are encountered, the Native American monitor shall participate in any discussions involving treatment and subsequent mitigation.

The archaeological monitor shall keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the qualified archaeologist shall prepare a monitoring report that details the results of monitoring. The report shall be submitted to the County any Native American groups who request a copy. A copy of the final report shall be filed at the SCIC. Monitoring actions and procedures shall be completed per the CRMDP described in **MM-CUL-1**.

Chapter 8
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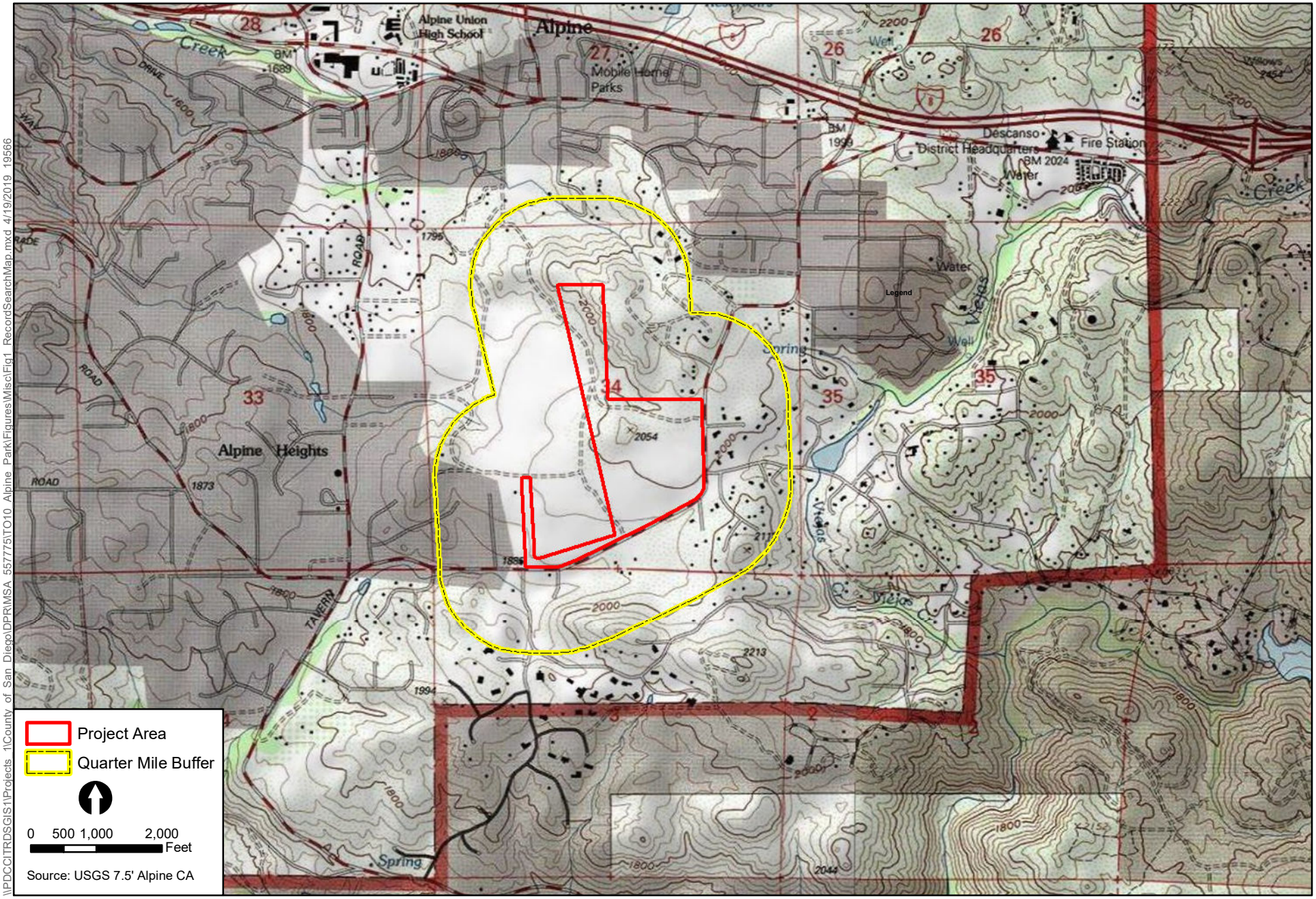
Appendix A

Records Search Confirmation



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ICF

Figure 1
Record Search Map
Alpine Park (676.18)

27 mapped reports within 1/4 mile of project area. 21 unmappable reports returned by search.Studies which encompass all (2023, 2717,3386, 6425, 11758) encompass portions (10482, 10551) or intersect (none). got a copy of 11758, could request 10482 if more info is needed regarding 37-005199.

26 resources within 1/4 mile. resources wthin or partially within (12236, 5199, 30430, and 30429)

PDF ALPINE PARK RECORD SEARCH 4/24/2019

26 RESOURCES

#	PDF	RESOURCES	STUDIES	EXCEL
2	✓	361106	583, 1298	✓ ✓
4	✓	4290	~~1298~~ 1713	✓
6	✓	4656	* 2023, 2717	
17	✓	5199	3463	✓
7	✓	5200	2228	-
6	✓	5840	3310	-
4	✓	5876	* 3386	-
3	✓	11209	• 6425	- SWATH TO S. OF LINE
14	✓	122.30	7544	-
4	✓	12235	7582	-
6	✓	12236	8500, 10454	-
8	✓	12237	• 10482	-
4	✓	12238	10486	-
3	✓	12239	• 10551	-
28	✓	13242 (2 OVERLAPPING POLYS)	10555	-
4	✓	13243	10997	-
4	✓	13244	* ~~11758~~	- 64p.
4	✓	13245	13016	-
4	✓	13246	13891	- NTT MAPPED SEVERAL SMALL POINTS NOT IN PROJ. AREA
6	✓	28099 (2 OVERLAPPING POLYS)	13748, 14206	
3	✓	28100	15291	-
3	✓	28101	17338	-
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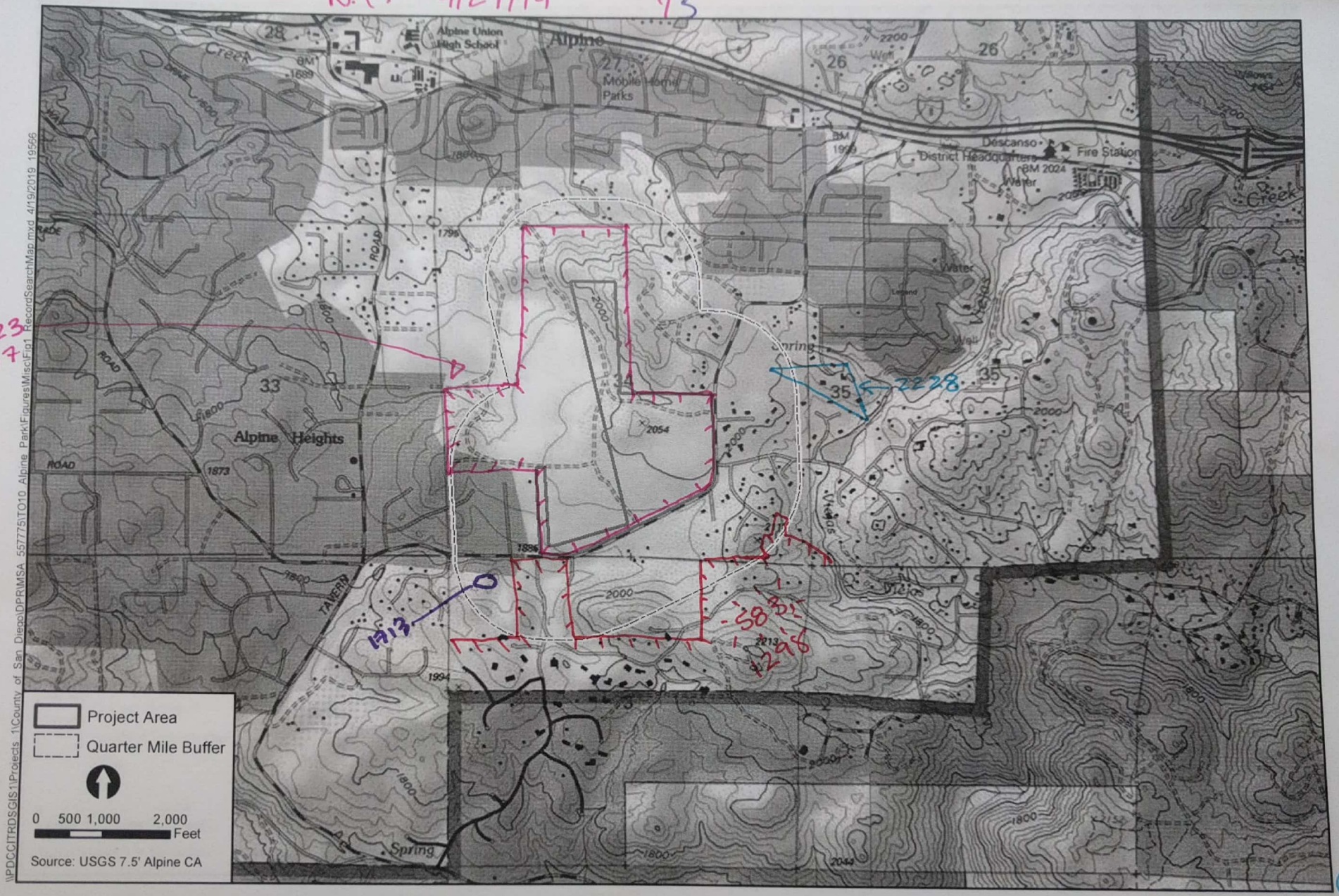

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Figure 1
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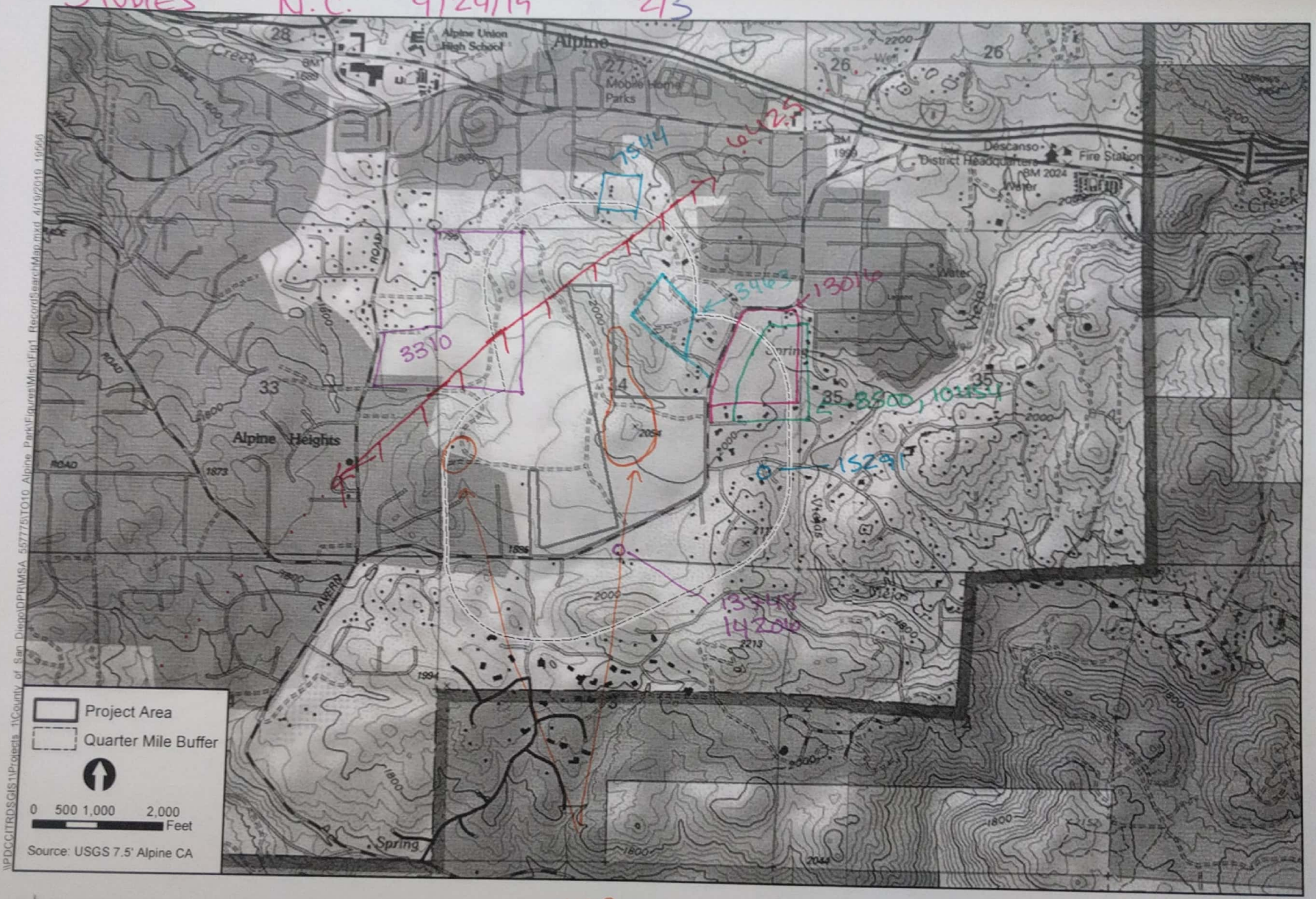

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Figure 1
Record Search Map
Alpine Park (676.18)

STUDIES N.C. 4/25/19 3/5

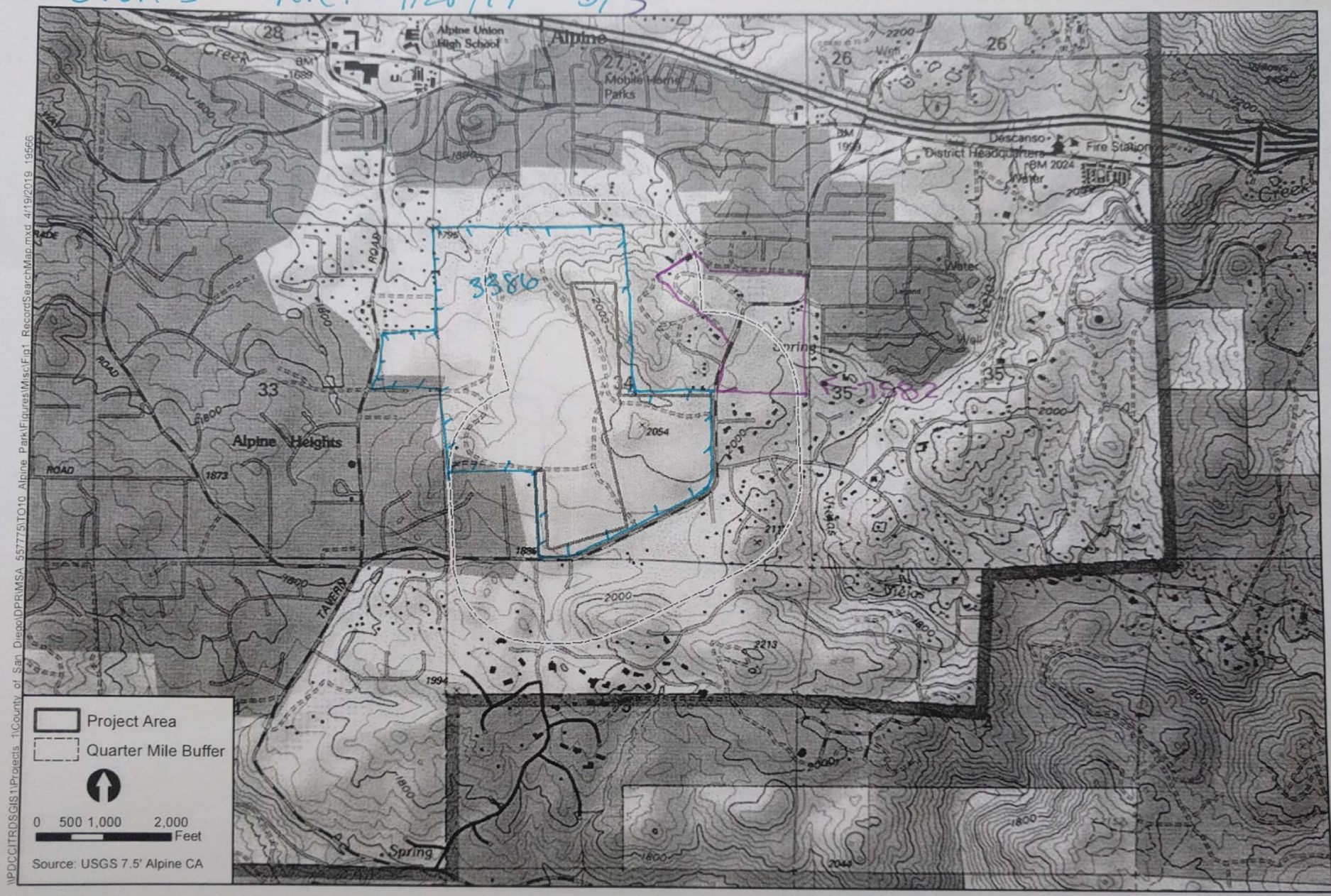

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Figure 1
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Alpine Park (676.18)

STUDIES 4/24/19 N.C. 4/5

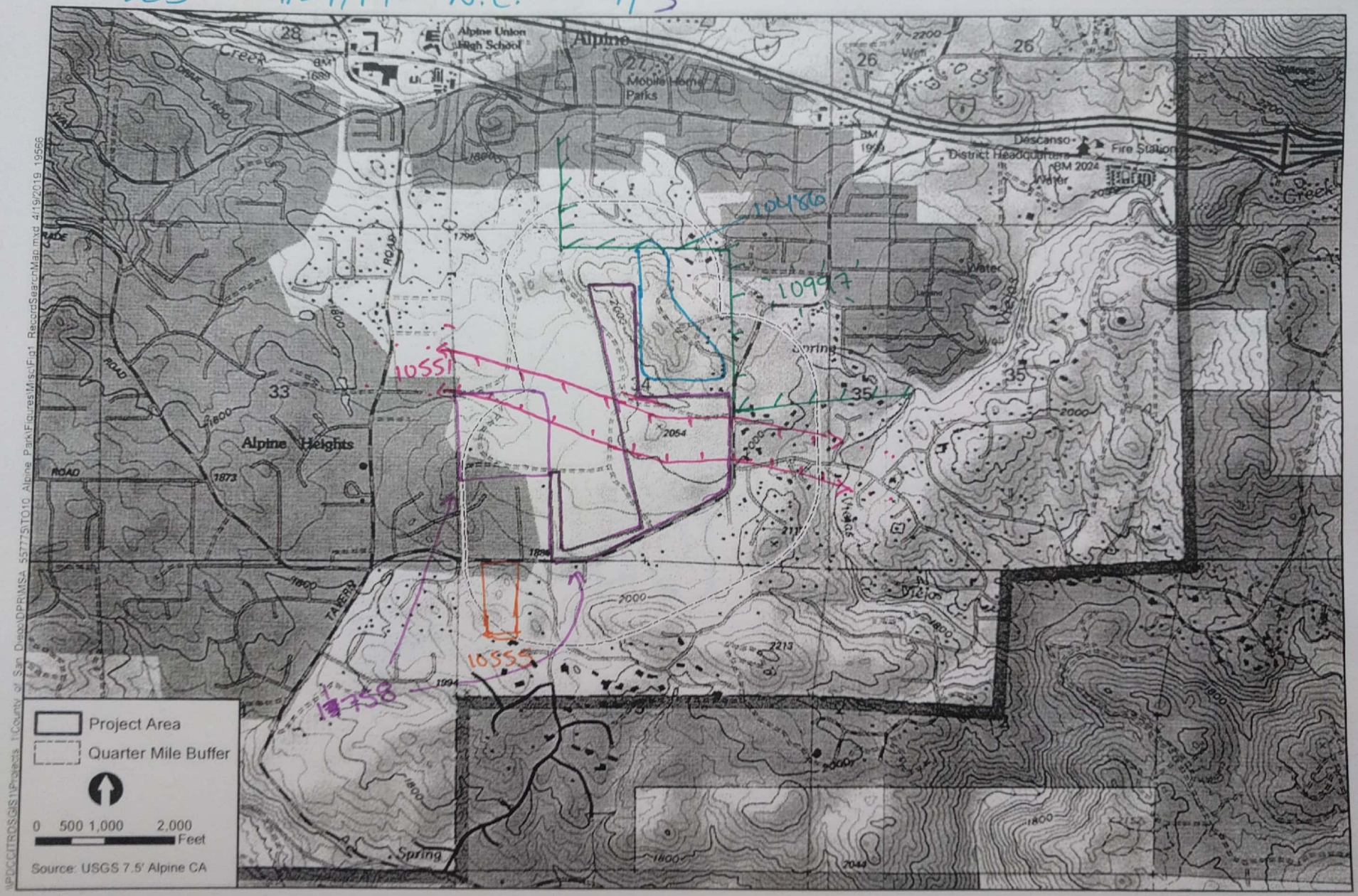

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Figure 1
Record Search Map
Alpine Park (676.18)

STUDIES N.C. 4/24/19 5/3

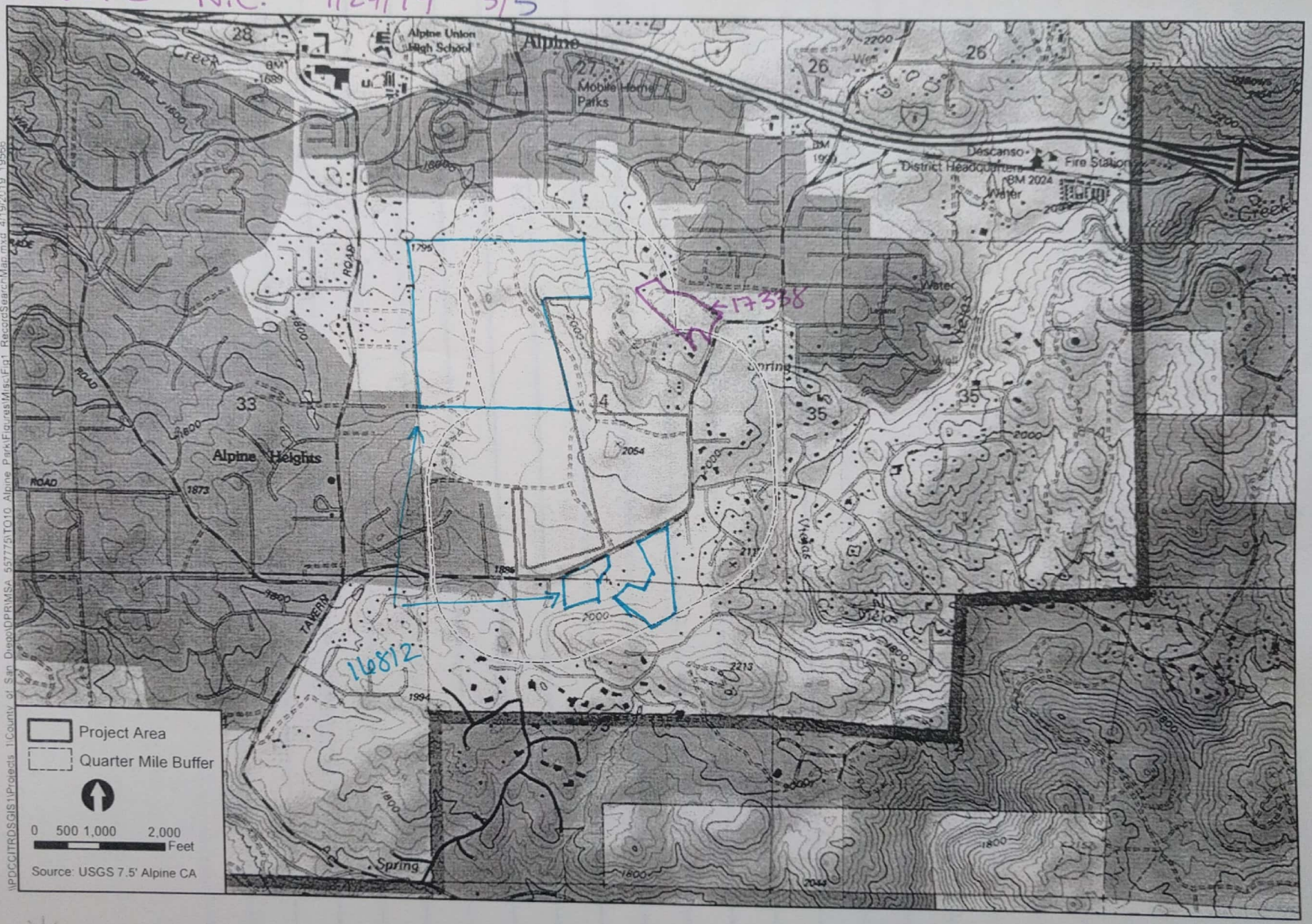

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Figure 1
Record Search Map
Alpine Park (676.18)

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Appendix B

CONFIDENTIAL

Figure 4 – Site Location Map

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Appendix C

Native American Consultation

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95501
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Alpine Park Project – Environmental

County: San Diego

USGS Quadrangle

Name: Alpine

Township: 15 South Range: 2 East Section(s): 34 and 3

Company/Firm/Agency:

ICF

Contact Person: Patrick McGinnis

Street Address: 525 B St. #1700

City: San Diego Zip: 92101

Phone: (858) 444-3947 Extension:

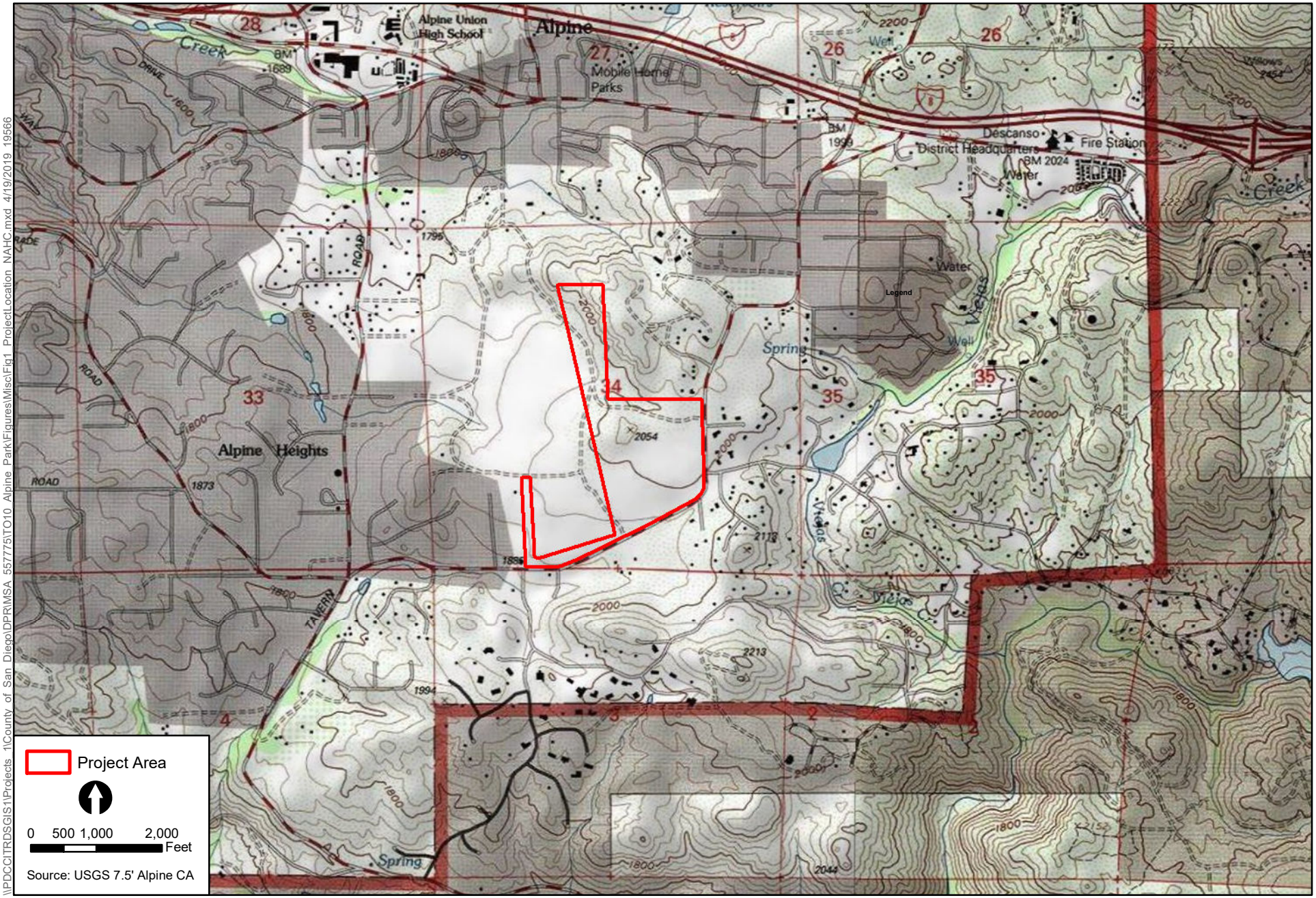
Fax: (858) 578-0573

Email: Patrick.McGinnis@ICF.com

Project Description:

The County of San Diego proposes to develop approximately 102 acres as a public park. ICF has been retained to conduct a Phase I cultural resources inventory, and prepare a memorandum documenting the environmental surveys and CEQA reporting required to develop a park at the site. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The property is located adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine.

☑ Project Location Map is attached



\\PDCCITRDSGIS1\Projects 1\County of San Diego\DPRMSA 557775\TO10 Alpine Park\Figures\Misc\Fig1 ProjectLocation NAHC.mxd 4/19/2019 19566

ICF

Figure 1
Project Location
Alpine Park

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

May 3, 2019

Patrick McGinnis
ICF

VIA Email to: Patrick.mcginnis@icf.com

RE: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Alpine Park Project, San Diego County

Dear Mr. McGinnis:

Pursuant to Public Resources Code section 21080.3.1 (c), attached is a consultation list of tribes that are traditionally and culturally affiliated with the geographic area of the above-listed project. Please note that the intent of the AB 52 amendments to CEQA is to avoid and/or mitigate impacts to tribal cultural resources, (Pub. Resources Code §21084.3 (a)) ("Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.")

Public Resources Code sections 21080.3.1 and 21084.3(c) require CEQA lead agencies to consult with California Native American tribes that have requested notice from such agencies of proposed projects in the geographic area that are traditionally and culturally affiliated with the tribes on projects for which a Notice of Preparation or Notice of Negative Declaration or Mitigated Negative Declaration has been filed on or after July 1, 2015. Specifically, Public Resources Code section 21080.3.1 (d) provides:

> Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The AB 52 amendments to CEQA law does not preclude initiating consultation with the tribes that are culturally and traditionally affiliated within your jurisdiction prior to receiving requests for notification of projects in the tribe's areas of traditional and cultural affiliation. The Native American Heritage Commission (NAHC) recommends, but does not require, early consultation as a best practice to ensure that lead agencies receive sufficient information about cultural resources in a project area to avoid damaging effects to tribal cultural resources.

The NAHC also recommends, but does not require that agencies should also include with their notification letters, information regarding any cultural resources assessment that has been completed on the area of potential effect (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

   - A listing of any and all known cultural resources that have already been recorded on or adjacent to the APE, such as known archaeological sites;

   - Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;

   - Whether the records search indicates a low, moderate, or high probability that unrecorded cultural resources are located in the APE; and

   - If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

   - Any report that may contain site forms, site significance, and suggested mitigation measures.

     All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code section 6254.10.

3. The result of any Sacred Lands File (SLF) check conducted through the NAHC was positive. Please contact the Sycuan Band of Kumeyaay Nation and the Viejas Band of Kumeyaay Indians on the attached list for more information.
4. Any ethnographic studies conducted for any area including all or part of the APE; and
5. Any geotechnical reports regarding all or part of the APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS are not exhaustive and a negative response to these searches does not preclude the existence of a tribal cultural resource. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the event that they do, having the information beforehand will help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our consultation list remains current.

If you have any questions, please contact me at my email address: steven.quinn@nahc.ca.gov.

Sincerely,

Steven Quinn

Steven Quinn
Associate Governmental Program Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Diego County
5/3/2019

Barona Group of the Capitan Grande
Edwin Romero, Chairperson
1095 Barona Road — Diegueno
Lakeside, CA, 92040
Phone: (619) 443 - 6612
Fax: (619) 443-0681
cloyd@barona-nsn.gov

Campo Band of Diegueno Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Diegueno
Campo, CA, 91906
Phone: (619) 478 - 9046
Fax: (619) 478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Tribe
Robert Pinto, Chairperson
4054 Willows Road — Diegueno
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
wmicklin@leaningrock.net

Ewiiaapaayp Tribe
Michael Garcia, Vice Chairperson
4054 Willows Road — Diegueno
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 — Diegueno
Santa Ysabel, CA, 92070
Phone: (760) 765 - 0845
Fax: (760) 765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 — Diegueno
Santa Ysabel, CA, 92070
Phone: (760) 803 - 5694
cjlinton73@aol.com

Inaja-Cosmit Band of Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. — Diegueno
Escondido, CA, 92025
Phone: (760) 737 - 7628
Fax: (760) 747-8568

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 — Diegueno
Jamul, CA, 91935
Phone: (619) 669 - 4785
Fax: (619) 669-4817
epinto@jiv-nsn.gov

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
P.O. Box 775 — Kwaaymii
Pine Valley, CA, 91962 — Diegueno
Phone: (619) 709 - 4207

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Diegueno
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
LP13boots@aol.com

La Posta Band of Diegueno Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Diegueno
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 — Diegueno
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Alpine Park Project, San Diego County.

Native American Heritage Commission
Native American Contact List
San Diego County
5/3/2019

Mesa Grande Band of Diegueno Mission Indians
Michael Linton, Chairperson
P.O Box 270 Diegueno
Santa Ysabel, CA, 92070
Phone: (760) 782 - 3818
Fax: (760) 782-9092
mesagrandeband@msn.com

San Pasqual Band of Diegueno Mission Indians
Allen Lawson, Chairperson
P.O. Box 365 Diegueno
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Diegueno Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 Diegueno
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court Kumeyaay
El Cajon, CA, 92019
Phone: (619) 445 - 2613
Fax: (619) 445-1927
ssilva@sycuan-nsn.gov

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935
lhaws@sycuan-nsn.gov

Viejas Band of Kumeyaay Indians
Robert Welch, Chairperson
1 Viejas Grade Road Diegueno
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337

Viejas Band of Kumeyaay Indians
Ernest Pingleton, Tribal Historic Officer, Resource Management
1 Viejas Grade Road Diegueno
Alpine, CA, 91901
Phone: (619) 659 - 2314
epingleton@viejas-nsn.gov

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Alpine Park Project, San Diego County.

May 21, 2019

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302
Boulevard, CA 91905

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Elliott Santos:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

ICF has been retained to support DPR in further identifying the opportunities and constraints on the subject property. ICF will conduct a Phase I cultural resources inventory, and prepare a memorandum documenting the environmental surveys and CEQA reporting in support of the project. To accomplish this objective, ICF cultural resources personnel performed a records search, archival research, and a Sacred Lands File search. Archival research refers to both written and oral history including record searches at the South Central Information Center (SCIC), the Native American Heritage Commission (NAHC), as well as Native American consultation. Prehistoric sites have been identified directly within the project area as a result the record search.

The NAHC completed a search of the Sacred Lands File which did indicate the presence of Native American sacred lands within the project area. The NAHC identify you as a person who may have concerns or knowledge of cultural resources in the project area. Any information you might be able to share about the project area would greatly enhance the study and would be most appreciated.

If you would like to participate in the consultation process, or if you have any recommendations regarding the Project, please address them to me so that I can incorporate them into our draft report. As required by State law, all site data and other culturally sensitive information will not be released to the general public and will be kept strictly confidential. This outreach is for due diligence and not under AB52 or Section 106. I can be reached at 858-444-3947, or by email at Patrick.McGinnis@icf.com.

Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

San Pasqual Band of Diegueno Mission Indians
John Flores, Environmental Coordinator
P.O. Box 365
Valley Center, CA 92082

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Flores:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Ewiiaapaayp Band of Kumeyaay Indians
Michael Garcia, Vice Chairperson
4054 Willows Road
Alpine, CA 91901

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Garcia:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Campo Band of Diegueno Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1
Campo, CA 91906

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Goff:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Sycuan Band of the Kumeyaay Nation
Kristie Orosco, Cultural Resources Manager
1 Kwaaypaay Court
El Cajon, CA 92019

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Orosco:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

San Pasqual Band of Diegueno Mission Indians
Allen Lawson, Chairperson
P.O. Box 365
Valley Center, CA 92082

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Lawson:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507
Santa Ysabel, CA 92070

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Linton:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Mesa Grande Band of Diegueno Mission Indians
Michael Linton, Chairperson
P.O. Box 270
Santa Ysabel, CA 92070

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Linton:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775
Pine Valley, CA 91962

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Lucas:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court
El Cajon, CA 92019

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Martinez:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

La Posta Band of Diegueno Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road
Boulevard, CA 91905

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Miller:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Inaja-Cosmit Band of Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd.
Escondido, CA 92025

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Osuna:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road
Boulevard, CA 91905

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Parada:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130
Santa Ysabel, CA 92070

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Perez:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Viejas Band of Kumeyaay Indians
Ernest Pingleton, Tribal Historic Officer, Resource Management
1 Viejas Grade Road
Alpine, CA 91901

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Pingleton:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,

Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Ewiiaapaayp Tribal Office
Robert Pinto, Chairperson
4054 Willows Road
Alpine, CA 91901

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Pinto:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612
Jamul, CA 91935

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Ms. Pinto:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Barona Group of the Capitan Grande
Edwin Romero, Chairperson
1095 Barona Road
Lakeside, CA 92040

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Romero:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

May 21, 2019

Viejas Band of Kumeyaay Indians
Robert Welch, Chairperson
1 Viejas Grade Road
Alpine, CA 91901

Subject: Alpine Park Project- Environmental – Due Diligence Outreach

Dear Mr. Welch:

The County of San Diego Department of Parks and Recreation (DPR) has acquired approximately 102 acres adjacent to the Back Country Land Trust's Wright's Field Preserve on South Grade Road in Alpine, and intends to develop a new park facility within its confines. The new park facility would consist of a community park, an open space preserve or a combination of the two. The proposed project is within a parcel identified as Assessor's Parcel Number (APN) 404-170-61-00. The Project is within Sections 34 and 3 of Township 15 South, Range 2 East, and appears on the *Alpine*, California USGS 7.5-minute series topographic map (Figure 1).

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Sincerely,



Patrick McGinnis, MA
Archaeologist

Encl. Figure 1

VIEJAS
TRIBAL GOVERNMENT

P.O Box 908
Alpine, CA 91903
#1 Viejas Grade Road
Alpine, CA 91901

Phone: 6194453810
Fax: 6194455337
viejas.com

June 5, 2019

Patrick McGinnis
Archaeologist
ICF
525 B Street, Suite 1700
San Diego, CA 92101

RE: Alpine Park Project

Dear Mr. McGinnis,

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site has cultural significance or lies to Viejas.

Viejas Band request that a Kumeyaay Cultural Monitor be on site for ground disturbing activities to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains.

Please call me at 619-659-2312 or Ernest Pingleton at 619-659-2314 or email, rteran@viejas-nsn.gov or epingleton@viejas-nsn.gov , for scheduling. Thank you.

Sincerely,

Ray Teran, Resource Management
VIEJAS BAND OF KUMEYAAY INDIANS

From: Cox, Nara
To: Clint Linton
Cc: McGinnis, Patrick
Subject: Re: Alpine Park Project- Environmental – Due Diligence Outreach
Date: Wednesday, May 22, 2019 9:16:55 AM
Attachments: image003.png

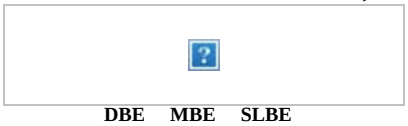
Thanks Clint. We'll make a note of that.

On May 22, 2019 8:04 AM, Clint Linton <clint@redtailenvironmental.com> wrote:
Thanks Nara. For this project i would like to defer to and support the comments and requests of the Viejas Band. Thanks again, clint

On Tue, May 21, 2019 at 2:57 PM Cox, Nara <Nara.Cox@icf.com> wrote:

> Hi Clint-
>
> Please see attached regarding outreach for the Alpine Park Project.
>
> Hope all is well,
>
> 
> **NARA COX** | Archaeologist – Southern California | +1.714.337.0769 mobile | nara.cox@icf.com| icf.com
>
> **ICF** | 525 B Street, Suite 1700, San Diego, CA 92101 USA
>
> Connect with us on social media.

--
Clint Linton, President
Cell: (760) 803-5694
Clint@redtailenvironmental.com
P.O. Box 507 Santa Ysabel, CA 92070



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Appendix D

CONFIDENTIAL
Department of Parks and Recreation 523 Forms

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Appendix E

Alpine Park Cultural Resources Testing Report

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Memorandum

To:	Lorrie Bradley Department of Parks and Recreation County of San Diego 5500 Overland Avenue, Suite 410 San Diego, CA 92123
From:	Patrick McGinnis, M.A., RPA Archaeologist ICF 525 B St. Suite 1700 San Diego CA, 92101
Date:	April 30, 2021
Re:	**Alpine Park Cultural Resources Testing Report**

The County of San Diego Department of Parks and Recreation (DPR) retained ICF to perform as-needed cultural resources services in support of planning efforts for Alpine Park (Project). The Project is being conducted in compliance with the California Environmental Quality Act of 1970 (CEQA) and the County of San Diego Resource Protection Ordinance (RPO). Patrick McGinnis, M.A., RPA served as the Principal Investigator and author of the report for the Project. Kent Smolik and Hector Galvez served as archaeological field crew. A Native American monitor was provided by Red Tail Environmental and present during the field effort.

ICF archaeologists and a Native American monitor conducted subsurface testing at two archaeological sites within the 98-acre Project area. The purpose of the testing was to determine if the sites contained subsurface deposits and to evaluate the resources potential to qualify as historical resources or unique archaeological resources under CEQA and the County of San Diego RPO and Historical Resources Guidelines.

Project Location

The study area is Assessor's Parcel Number 404-170-61-00 (Property), totaling approximately 98 acres. The County plans to create a community park on the Property, tentatively called Alpine Park, within the community of Alpine in east San Diego County. The Property is adjacent to the Back Country Land Trust's Wright Field Preserve on South Grade Road. The County acquired the Property in early 2019.

The Property is located within the Alpine 7.5 minute United States Geological Survey (USGS) quadrangle in Township 15 South, Range 2 East, in section 34 (Figures 1 and 2, attached).

Records Search

ICF staff archaeologist, Nara Cox, B.A. conducted a cultural resources records search at the South Coastal Information Center (SCIC) at San Diego State University on April 24, 2019. The purpose of the search was to identify previously recorded cultural resources inside or within 0.25 mile of the Property and to assess the potential for certain resource types within the Property. Also included in the search were cultural resources studies that have been conducted inside or within 0.25 mile of the Property.

Records Search Results

A total of 30 cultural resources studies are on record at the SCIC as having occurred inside or within 0.25 mile of the Property. Of these, 22 reports were designated as unmappable but were identified because of the record search. Six of the mapped reports covered a portion of the Property, including three that covered the Property in its entirety. The SCIC cultural resources records search indicated that 26 cultural resources have been recorded within 0.25 mile of the Property, four of which are plotted within the Property. Of these 26 resources, 20 are prehistoric resources, five are historic period resource, and one is a multicomponent resource.

The four resources reported within the Property consist of three prehistoric resources—bedrock milling sites (CA-SDI-5199, CA-SDI-19332, and CA-SDI-19333)—and one historic house complex archaeological site (CA-SDI-12236). A survey of the Property was conducted in August 2019. During the survey, four previously recorded cultural resources were relocated, and no new cultural resources were identified.

Two of the three prehistoric sites, CA-SDI-19332, and CA-SDI-19333, have not been previously evaluated for eligibility for the California Register of Historical Resources (CRHR) and are in areas where proposed park construction of landscaped berm screens could impact the sites. Site CA-SDI-5199 consists of a knoll/outcrop containing at least 15–22 bedrock milling features with at least 42 milling elements: 7 basins and 35 milling slicks. Bedrock is granitic rock; granodiorite and tonalite. The site also contains a thin scatter of ceramics and lithic debitage. The site was originally recorded in 1977 and described as two knolls with over 100 milling elements and an extensive low density lithic scatter with approximately 75 artifacts. CA-SDI-5199 was later tested and evaluated multiple times. The site has previously been evaluated and found to lack enough subsurface information to be considered eligible for the CRHR. Most of this site including the bedrock milling elements will be avoided and are outside proposed park improvements. The historic house complex archaeological site, CA-SDI-12236, is in an area proposed to be left as open space and was not evaluated for this current effort. Due to the potential for impacts to sites CA-SDI-19332 and CA-SDI-19333, subsurface testing was conducted at both sites to identify if subsurface deposits were present and in turn evaluate the sites for their eligibility for the CRHR and the San Diego County Local Register of Historical Resources (Local Register). Descriptions of the two tested sites are below.

P-37-030429/CA-SDI-19332

This resource was originally recorded as one bedrock milling feature with one slick. The bedrock is dark granitic rock, possibly tonalite or gabbro. The current effort found the resource to be in poor

condition, the milling surface has undergone severe exfoliation. An additional milling feature was found on a small boulder (1 meter [m] by 0.5 m) approximately 5 m from the originally recorded milling feature (Photo 1). This new milling feature contains a slick that measures approximately 17 centimeters (cm) x 6 cm. The milling features are now referred to as MF#1 and MF #2. No artifacts or midden soils were identified in the vicinity of the resource.



Photo 1. Additional milling feature (MF#2) identified at CA-SDI-19333 with testing excavation in the background near originally recorded milling feature.

P-37-030430/CA-SDI-19333

This resource consists of one granitic bedrock milling feature with one slick. The 2019 survey relocated the resource—40 m due south of the location recorded at the SCIC—and found the surface of the rock to be highly exfoliated. One small area, approximately 2 cm by 2 cm, appeared to retain a slick remnant. The originally recorded slick is in very poor condition. No artifacts or midden soils were identified in the vicinity of the resource.

Testing Methods and Results

Prior to commencing subsurface investigation, the areas surrounding the site were intensively surveyed for surface artifacts that might identify potential cultural deposits in addition to the bedrock milling features. Surface visibility was fair to poor, averaging less than 50 percent due to the presence of low grasses. No artifacts were identified on the ground surface near either of the bedrock milling sites when they were originally recorded or during subsequent investigations. Therefore, shovel test pit (STP) locations were selected arbitrarily within 5 m of each milling feature. Five STPs were excavated at site CA-SDI-19333 and four were excavated at site CA-SDI-19332. If the STPs were positive, additional STPs were to be placed radiating outward from the site to establish the site's subsurface boundaries and determine the depth of deposit (Figure 3).



STPs were excavated to a minimum depth of 40 cm and would have been excavated to two sterile levels below the level of the last recovered artifacts had artifacts been recovered. All excavated soil was passed through sifting screens with 1/8-inch mesh.

Photo 2. STP 2 at terminal 40 cm level with granitic cobbles present, CA-SDI-19332

Soils within the STPs tended to be consistent with an upper layer of loose d ark brown loamy, organic, root-matted soil ranging anywhere from 5-10 cm in thickness followed by a layer of compact dark gray-brown silty clay with some gravel and occasional large granitic cobbles. The soil became more compact with depth and some pockets and layers of hard compact decomposing granite were encountered below 30 cm in depth. All nine of the STPs excavated at sites CA-SDI-019332 and CA-SDI-019333 were negative for cultural materials or ecofacts and it is worth noting that no types of stone normally associated with stone tool making were identified in the STPs other than chunks of granite.

Guidelines for Determining Significance

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality for illustrating or interpreting the heritage of San Diego County in history, architecture, archaeology, engineering, and culture. Several criteria are used in demonstrating resource importance. Specifically, the criteria outlined in the NRHP, CEQA, and the Local Register provide the guidance for making such a determination. The following sections detail the criteria that a resource must meet to be determined important.

California Environmental Quality Act

According to CEQA Section 15064.5a, the term "historical resource" includes the following:

A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR (Public Resources Code Section 5024.1; 14 CCR 4850 et seq.).

A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically of culturally significant. Public agencies must treat any such resource as significant, unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the CRHR (Public Resources Code Section 5024.1, 14 CCR 4852), including the following:

Criterion 1: Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

Criterion 2: Is associated with the lives of persons important in our past;

Criterion 3: Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values; or

Criterion 4: Has yielded, or may be likely to yield, information important in prehistory or history.

The fact that a resource is not listed in, or determined eligible for listing in, the CRHR; not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources

Code); or identified in a historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resource Code) does not preclude a lead agency from determining that the resource may be a historical resource, as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

According to CEQA Section 15064.5b, a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as follows:

Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.

The significance of a historical resource is materially impaired when a project:

Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or

Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources, pursuant to Section 5020.1(k) of the Public Resources Code, or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and justify its eligibility for inclusion in the CRHR, as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects on archaeological sites and contains the following additional provisions regarding archaeological sites: When a project will affect an archaeological site, a lead agency shall first determine whether the site is a historical resource, as defined in subsection (a).

If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, and this section, Section 15126.4 of the CEQA Guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.

If an archaeological site does not meet the criteria defined in subsection (a) but does meet the definition of a unique archaeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c–f) do not apply to surveys and site evaluation activities intended to determine whether a project location contains unique archaeological resources.

If an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of a project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the initial study or environmental impact report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Sections 15064.5(d) and (e) contain additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) provides the following:

(d) When an initial study identifies the existence, or the probable likelihood, of Native American human remains within a project area, a lead agency shall work with the appropriate Native Americans, as identified by the NAHC, and provided in Public Resources Code Section 5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans, as identified by the NAHC. Action implementing such an agreement is exempt from:

(1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).

(2) The requirement of CEQA and the Coastal Act.

San Diego County Local Register of Historical Resources

The County of San Diego requires that resource importance be assessed not only at the state level, as required by CEQA, but at the local level as well. If a resource meets any one of the following criteria, as outlined in the Local Register, it will be considered an important resource. A cultural resource is significant at the local level if it:

Is associated with events that have made a significant contribution to the broad patterns of San Diego County's history and cultural heritage;

Is associated with the lives of persons important to the history of San Diego County or its communities;

Embodies the distinctive characteristics of a type, period, San Diego County region, or method of construction; represents the work of an important creative individual; or possesses high artistic values; or

Has yielded, or may be likely to yield, information important in prehistory or history.

Resource Importance and Evaluation

Nine STPs were excavated at sites CA-SDI-19333 and CA-SDI-19332. None of the STPs contained artifacts or other cultural materials. Prehistoric bedrock milling sites do not possess the qualities that would make them eligible for the CRHR under Criteria 1-3 or the Local Register under Criteria 1-3. However, bedrock milling sites when associated with deposits that have potential to yield additional information or exist as part of large habitation site or district may be eligible under CRHR Criterion 4 or Local Register Criterion 4. Both CA-SDI-19333 and CA-SDI-19332 are isolated bedrock milling sites with no evidence of additional activities taking place in the immediate vicinity. The sites may be outliers related to the larger bedrock milling complex at CA-SDI-5199 which has been found not be eligible for the CRHR. These site types are thought to reflect late prehistoric resource collection and processing activities by the Kumeyaay people. These sites occur in an area with abundant evidence of prehistoric land use and are a very common site type in the area. Based on the results of the shovel probe survey, no subsurface components are associated with these sites, and they are unlikely to yield significant information that would warrant consideration for the CRHR under Criterion 4 or Local Register. The recording and testing of CA-SDI-19333 and CA-SDI-19332

has exhausted their research potential and therefore, the Project would have no impact on historical resources.

Recommendations

The County of San Diego's preferred management method for cultural resources is to incorporate avoidance and preservation into project designs. Although no cultural resources eligible for the CRHR or Local Register have been identified in the Project the possibility exists that potentially significant subsurface deposits may exist within the Project Area. Because of the nature of the prehistoric and historic sites in the Project Area, signage could be provided to emphasize the prehistoric and ethnographic activity represented by the resources and discuss the connection between these features and the original ecological context of the area. Signage would provide an opportunity to tie the Project Area into the larger regional landscape, along with interpretive programs and displays to illustrate how the Project Area is connected to patterns of Native American subsistence.

The following mitigation measure is recommended to reduce potential impacts to cultural resources.

MM-CUL-1: Archaeological Monitoring. The County Department of Parks and Recreation (DPR) will retain a qualified archaeologist to monitor all proposed ground-disturbing activities related to the implementation of the proposed project in order to minimize disturbance of subsurface archaeological deposits. Specifically, the following measures will be implemented to reduce impacts:

- All proposed ground disturbance, including grading and excavation for the project, will be monitored by a qualified archaeologist(s) who meets the Secretary of the Interior's Professional Qualifications Standards, as promulgated in Code of Federal Regulations (CFR), Title 36, Section 61 or in the City's Land Development Code.

- Prior to the start of construction, a monitoring plan will be prepared that describes the nature of the archaeological monitoring work, procedures to follow in the event of an unanticipated discovery, and reporting requirements.

- The archaeologist will be invited to the preconstruction meeting to inform all personnel of the high probability of archaeological materials being encountered during construction.

- If intact subsurface deposits are identified during construction, the archaeologist will be empowered to divert construction activities away from the find and will be given sufficient time and compensation to investigate the find and determine its significance. No soil will be exported off site until a determination can be made regarding the significance of the resource, especially if Native American resources are encountered.

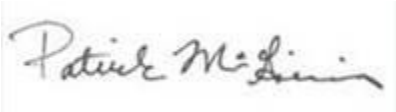
- Recovered items will be treated in accordance with current professional standards by being properly provenienced, cleaned, analyzed, researched, and reported. Curation of recovered items in a collection facility meeting the Secretary of the Interior's Standards, as promulgated in 36 CFR 79, such as the San Diego Archaeological Center is the preferred final disposition of any recovered assemblage. The costs for curation would be included in the budget for recovery of the archaeological remains. Conversely, if the assemblage is minimal, once the recovered items have been appropriately recorded and analyzed they may be reburied on the project site as near as possible to their original depth and location when originally recovered. The artifacts will be

identified to indicate that they are secondary deposition. The location will be recorded and submitted to the SCIC for their records.

- A final Cultural Resources Monitoring report will be produced, which will discuss the monitoring program and its results and will provide interpretations of any recovered cultural materials.

Although there is no evidence to suggest the presence of human remains, in the unlikely event that human remains are encountered during future ground disturbing activities, all work will cease and the requirements of California Health and Safety Code § 7050.5(a) (b) shall be followed and the County coroner will be contacted. Should the remains be identified as Native American, the coroner will contact the NAHC within 24 hours and the Native American Heritage Commission will designate a Most Likely Descendent (MLD) within 48 hours. The MLD and the County will work together to determine appropriate treatment of the human remains.

Sincerely,



Patrick McGinnis, M.A., RPA
Senior Archaeologist

Attachments Attachment 1: Figures 1, 2, and 3
Attachment 2: Updated DPR forms (Confidential)

ATTACHMENT 1: Figures 1-3 (Figure 3 is Confidential and Not for Public Review)

ATTACHMENT 2: Updated DPR Forms (Confidential)

Appendix F
Geotechnical Evaluation

Geotechnical Evaluation

Alpine Community Park

Alpine, California

MW Peltz & Associates

143 South Cedros Avenue, Suite B104 | Solana Beach, California 92075

December 30, 2020 | Project No. 109107001



Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

Geotechnical Evaluation
Alpine Community Park
Alpine, California

Mr. Mike Peltz
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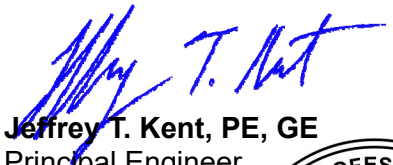
December 30, 2020 | Project No. 109107001





Christina Tretinjak, PG, CEG
Senior Project Geologist



Jeffrey T. Kent, PE, GE
Principal Engineer



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1 INTRODUCTION

In accordance with your request and authorization, we have prepared this geotechnical evaluation report for the proposed Alpine Community Park in Alpine, California (Figure 1). Presented in this report are the results of our background review, field exploration, and geotechnical laboratory testing along with our conclusions regarding the geotechnical conditions at the site and our recommendations for the design and earthwork construction aspects of this project.

2 SCOPE OF SERVICES

Ninyo & Moore's scope of services for this project included review of pertinent background data, performance of a geologic reconnaissance, subsurface exploration, and engineering analysis with regard to the proposed construction. These services generally follow the scope outlined in our proposal dated April 3, 2020. Specifically, we performed the following tasks:

- Reviewing readily available pertinent information including published in-house geotechnical literature, topographic maps, geologic maps, and fault maps, historic stereoscopic aerial photographs, and project conceptual drawings (MW Peltz + Associates, 2020).
- Performing a field reconnaissance to observe site conditions and to mark the locations of our exploratory test pits.
- Coordinating with Underground Service Alert (USA) for utility clearance at our test pit locations.
- Performing a subsurface exploration consisting of the excavating, logging, and sampling of 15 exploratory test pits. The test pits were excavated to depths of up to approximately 7.2 feet using a rubber-tire backhoe. Bulk samples of the materials encountered were collected at selected intervals from the test pits and transported to our in-house geotechnical laboratory for testing.
- Performing infiltration testing using the simple open pit test method within seven of the test pits. Infiltration testing was performed in general conformance with the guidelines presented in the 2020 County of San Diego BMP Design Manual.
- Performing geotechnical laboratory testing on representative samples to evaluate soil parameters for design and classification purposes.
- Performing engineering analyses of the site geotechnical conditions based on data obtained from our background review, field exploration, and laboratory testing.
- Preparing this geotechnical evaluation report describing the findings and conclusions of our study and providing recommendations for design and construction of the proposed improvements.

3 SITE AND PROJECT DESCRIPTION

The site is located on the western and northern sides of South Grade Road at its intersections with Calle de Compadres and Via Viejas in Alpine, California (Figure 1). The project site consists of undeveloped land with a gentle gradient down to the southeast, with a cross slope inclined toward the southeast. Onsite elevations range from approximately 2,030 feet above mean sea level (MSL) in the northeastern portion of the site to approximately 1,970 feet above MSL in the southwestern portion of the site. The project site is generally undeveloped and sparsely vegetated with grasses, shrubs, and trees. Several dirt roads and trails transect portions of the site.

Based on our review of project conceptual drawings (MW Peltz + Associates, 2020), we understand that the project will consist of the construction of a new County of San Diego park. The park improvements are to include new administration, restroom, and storage buildings, shade structures, a skate park, basketball courts, pickle-ball courts, sports fields, a bike park, a dog park, and a community garden. Additional improvements are anticipated to consist of parking and drive areas, picnic tables, underground utilities, American with Disabilities Act (ADA) access walkways and ramps, landscaping, and signage.

4 SUBSURFACE EXPLORATION

Our subsurface exploration was conducted on November 18 and 19, 2020, and included the excavating, logging, and sampling of 15 exploratory test pits (TP-1 through TP-15). Prior to commencing the subsurface exploration, USA was notified for marking of the existing site utilities. The purpose of the test pits was to evaluate subsurface conditions and to collect soil samples for laboratory testing.

The test pits were excavated to depths ranging from approximately 3 feet to 7.2 feet using a rubber-tire backhoe. Ninyo & Moore personnel logged the borings in general accordance with the Unified Soil Classification System (USCS) and ASTM International (ASTM) Test Method D 2488 by observing cuttings and bulk samples. Representative bulk and in-place soil samples were obtained from the test pits. The samples were then transported to our in-house geotechnical laboratory for testing. The approximate locations of the exploratory test pits are shown on Figure 2. Logs of the test pits are included in Appendix A.

5 INFILTRATION TESTING

Field infiltration testing was performed on November 18 and 19, 2020 in general accordance with the County of San Diego BMP Design Manual (2020) using the simple open pit test method. The infiltration tests IT-1 through IT-7 were performed within exploratory test pits TP-1, TP-2, TP-7, TP-9, TP-12, TP-14 and TP-15). An approximately 2 foot by 2 foot, square hole that was approximately 1-foot-deep was manually excavated within each of the noted test pits. For testing, the test holes were filled with 6 to 12 inches of water and the depth to the water was measured at 10 minute intervals for a span of 1 hour and then the test at each location was repeated another 2 times for total of 3 hours of testing per location. The test holes were refilled after the respective intervals as needed to restore the initial water level.

Infiltration rates were calculated using the Porchet method and an equivalent radius for the square holes. Infiltration tests IT-1 through IT-4 indicated that the observed (i.e., unfactored) infiltration rates ranged from a no infiltration condition to very slow variable infiltration rates. Per the County of San Diego BMP Design Manual (2020) Appendix D Section D.2-3 the safety factor must be between 2.0 and 9.0, and per Table D.2-3 a safety factor of 2.25 was selected. Completed Tables D.1-1: Consideration for Geotechnical Analysis of Infiltration Restrictions and D.2-3: Determination of Safety Factor are presented in Appendix D. Infiltration test results and calculations are included in Appendix C and summarized in Table 1 below.

Table 1 – Infiltration Test Results Summary

Infiltration Test	Approximate Test Depth (feet)	Description	Observed Infiltration Rate (in/hr)	Suitability Assessment Safety Factor[1]	Reliable/ Factored Infiltration Rate[2] (in/hr)
IT-1	3.3	Decomposed Granitic Rock	0.17[3]	2.25	0.07[3]
IT-2	3.8	Decomposed Granitic Rock	DNI	2.25	DNI
IT-3	3.2	Decomposed Granitic Rock	DNI	2.25	DNI
IT-4	4.2	Decomposed Granitic Rock	DNI	2.25	DNI
IT-5	3.8	Decomposed Granitic Rock	0.21[3]	2.25	0.09[3]
IT-6	3.6	Decomposed Granitic Rock	DNI	2.25	DNI
IT-7	4.9	Decomposed Granitic Rock	DNI	2.25	DNI

Notes:
DNI = did not infiltrate
in/hr = inches per hour
[1] Design safety factor to be determined by the design engineer in accordance with Appendix D of the County of San Diego BMP Design Manual (2019)
[2] Factored infiltration rate shall be divided by the design safety factor to obtain the design infiltration rate.
[3] Infiltration rates ranged from a no infiltration condition to very slow variable rates. The listed rates are approximations based on interpretation of the test results presented in Appendix C.

We note that the in-situ infiltration rates presented in Table 1 represent the infiltration rates at the specific locations and depths indicated in the table. Variation in the infiltration rates can be expected at different depths and/or locations from those shown in the table.

6 LABORATORY TESTING

Geotechnical laboratory testing was performed on representative soil samples collected from our subsurface exploration. Testing included an evaluation of gradation (sieve) analysis, expansion index, soil corrosivity, and R-value. Descriptions of the geotechnical laboratory test methods and the results of the geotechnical laboratory tests performed are presented in Appendix B.

7 GEOLOGY AND SUBSURFACE CONDITIONS

Our findings regarding regional and site geology and groundwater conditions are provided in the following sections.

7.1 Regional Geologic Setting

The project is situated in the coastal foothill section of the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990; Harden, 2004). The province varies in width from approximately 30 to 100 miles. In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the southern California batholith. The portion of the province in San Diego County that includes the project area consists generally of Cretaceous age sedimentary and granitic rock.

The Peninsular Ranges Province is traversed by a group of sub-parallel faults and fault zones trending approximately northwest. Several of these faults, shown on Figure 3, are considered active faults (Jennings, 2010). The Elsinore, San Jacinto, and San Andreas are active fault systems located northeast of the project area and the Rose Canyon, Coronado Bank, San Diego Trough, and San Clemente faults are active fault located west of the project area. The Elsinore fault zone is the nearest active fault system and has been mapped approximately 21 miles east of the project site. Major tectonic activity associated with these and other faults within this regional tectonic framework consists primarily of right-lateral, strike-slip movement. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report

7.2 Site Geology

The geology of the site vicinity is shown on Figure 3. Geologic units encountered during our site reconnaissance and subsurface exploration included topsoil and decomposed granitic rock. Generalized descriptions of the earth units encountered during our field reconnaissance and subsurface exploration and mapped in the vicinity of the project site are provided in the subsequent sections (Todd, 2004). Additional descriptions of the subsurface units are provided on the test pit logs in Appendix A.

7.2.1 Topsoil

Topsoil was encountered in each of our test pits from the ground surface to depths of approximately 3.8 feet. As encountered, the topsoil generally consisted of dark brown, moist, stiff to very stiff, sandy clay and medium dense, clayey sand. Gravel, cobbles, and boulders were encountered in the topsoil.

7.2.2 Lusardi Formation

Although not encountered during our subsurface exploration, materials of the Cretaceous-age Lusardi Formation are mapped at the site. The Lusardi Formation generally consists of cobble and boulder conglomerate with thin lenses of sandstone.

7.2.3 Decomposed Granitic Rock

Decomposed granitic rock was encountered in each of our test pits underlying the topsoil and extended to the total depths explored. As encountered the decomposed granitic rock generally consisted of various shades of brown, yellow, and red, dry to moist, weathered, friable, fine- to medium-grained granitic rock with iron oxide staining. The granitic rock was observed to vary in degrees of weathering with the rock being less weathered with depth. Unweathered granitic rock corestones were encountered within out test pits and boulders were observed on the surface at numerous locations within the site.

7.3 Groundwater

Groundwater was not encountered during our evaluation and groundwater is not anticipated to be encountered during construction of the proposed improvements. However, perched groundwater or groundwater seepage may be encountered between the contact of topsoil and granitic rock or within fractures in the granitic rock. Fluctuations in groundwater typically occur due to variations in precipitation, ground surface topography, subsurface stratification, irrigation, groundwater pumping, flooding, and other factors.

7.4 Faulting and Seismicity

The numerous faults in southern California include active, potentially active, and inactive faults. As defined by the California Geological Survey, active faults are faults that have ruptured within Holocene time, or within approximately the last 11,000 years. Potentially active faults are those that show evidence of movement during Quaternary time (approximately the last 1.6 million years), but for which evidence of Holocene movement has not been established. Inactive faults have not ruptured in the last approximately 1.6 million years. The approximate locations of major active and potentially active faults in the vicinity of the site and their geographic relationship to the site are shown on Figure 4. Additionally, the site is not located within a State of California Earthquake Fault Zone (formerly known as Alquist-Priolo Special Studies Zone) (Hart and Bryant, 2007).

The site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion is considered significant during the design life of the proposed structures. Based on our review of the referenced geologic maps, as well as on our site reconnaissance, no faults are mapped as underlying the project site. The nearest known active fault is the Elsinore fault, located approximately 21 miles east of the site.

In general, hazards associated with seismic activity include strong ground motion, ground rupture, and liquefaction. These hazards, along with landsliding, are discussed in the following sections.

7.4.1 Ground Motion

The 2019 California Building Code (CBC) specifies that the Risk-Targeted, Maximum Considered Earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. The MCE_R ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits for near-source effects. The horizontal peak ground acceleration (PGA) that corresponds to the MCE_R for the site was calculated as 0.39g using the Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) (SEAOC and OSHPD, 2020) seismic design tool (web-based).

The 2019 CBC specifies that the potential for liquefaction and soil strength loss be evaluated, where applicable, for the Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration with adjustment for site class effects in accordance with the American Society of Civil Engineers (ASCE) 7-16 Standard. The MCE_G peak ground acceleration is based on the geometric mean peak ground acceleration with a 2 percent probability of exceedance in 50 years. The MCE_G peak ground acceleration with adjustment for site class effects (PGA_M) was calculated as 0.42g using the USGS (USGS, 2020) seismic design tool that yielded a mapped MCE_G peak ground acceleration of 0.35g for the site and a site coefficient (F_{PGA}) of 1.2 for Site Class C.

7.4.2 Ground Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project vicinity. Therefore, the potential for ground rupture due to faulting at the site is considered low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

7.4.3 Liquefaction and Seismically Induced Settlement

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 60 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking. Due to the dense nature of the underlying granitic rock at the site, liquefaction is not a design consideration.

7.4.4 Landsliding

Based on our review of referenced geologic maps, literature and topographic maps, and subsurface exploration, landslides or indications of deep-seated landsliding were not noted underlying the project site. In our opinion, the potential for significant large-scale slope instability at the site is not a design consideration.

7.5 Flood Hazards

Based on review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the site is not located within mapped flood zones or floodplains. In our opinion, the potential for significant flooding at the site is not a design consideration.

8 CONCLUSIONS

Based on our review of the referenced background data, subsurface exploration, and geotechnical laboratory testing, it is our opinion that construction of the proposed improvements is feasible from a geotechnical standpoint. In general, the following conclusions were made:

- Based on the results of our field and laboratory evaluations, the subsurface soils at the project site consist of topsoil and decomposed granitic rock.
- The topsoil materials are loose and considered unsuitable for structural support in their present condition. Accordingly, recommendations are presented herein for remedial grading of these materials in preparation for new construction.
- Outcroppings of rock are exposed at the surface of the site. Excavations extending into granitic rock will encounter very difficult excavation conditions due to the presence of bedrock materials, boulders, and/or corestones. The contractor should be prepared for the use of heavy ripping, rock breaking, rock coring, and/or blasting techniques to perform onsite excavations.
- Groundwater was not encountered during our evaluation and is not anticipated to be a design and construction consideration.
- The project site is not located within a mapped floodplain or flood zone.
- No faults are mapped at the site. The closest known active fault, the Elsinore fault, has been mapped approximately 21 miles east of the site.
- Based on our field evaluation and a review of referenced maps, landslides are not present on the project site.
- Onsite excavations will generate oversized materials. Oversized materials should be screened, rock-picked, crushed, removed, or otherwise processed from the excavated materials prior to reuse as compacted fill.
- Based on the results of our laboratory testing, the topsoil possesses a medium to high potential for expansion. Accordingly, these expansive soils are not suitable for reuse as compacted fill beneath buildings, for retaining walls, or exterior concrete pedestrian flatwork. Remedial grading recommendations for these areas are presented herein.
- Based on the results of our soil corrosivity tests and Caltrans amended (2019) AASHTO (2017) corrosion criteria, the onsite soils would not be classified as corrosive.

9 RECOMMENDATIONS

The following recommendations are provided for the design and construction of the proposed project. These recommendations are based on our evaluation of the site geotechnical conditions and our assumptions regarding the planned development. The proposed site improvements should be constructed in accordance with the requirements of the applicable governing agencies.

9.1 Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. The geotechnical consultant should be contacted for questions regarding the recommendations or guidelines presented herein.

9.1.1 Pre-Construction Conference

We recommend that a pre-construction meeting be held prior to commencement of grading. The owner or his representative, the Project Inspector, the agency representatives, the architect, the civil engineer, Ninyo & Moore, and the contractor should attend to discuss the plans, the project, and the proposed construction schedule.

9.1.2 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation, utility lines, asphalt, concrete, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside of the proposed excavation and fill areas. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed of at a legal dumpsite away from the project area, unless noted otherwise in the following sections.

9.1.3 Excavation Characteristics

During our subsurface evaluation, we observed outcroppings of rocks at the surface and encountered decomposed granitic rock with corestones in varying states of weathering. Onsite excavations will encounter very difficult excavation conditions due to the presence of bedrock materials, boulders, and/or corestones. The contractor should be prepared for the use of heavy ripping, rock breaking, rock coring, and/or blasting techniques to perform onsite excavations.

Additionally, onsite excavations will generate oversize materials that should be screened, rock-picked, crushed, removed, or otherwise processed from the excavated materials prior to reuse as compacted fill.

9.1.4 Temporary Excavations

For temporary excavations, we recommend that the following Occupational Safety and Health Administration (OSHA) soil classifications be used:

Topsoil	*Type C*
Granitic Rock	*Type B*

Upon making the excavations, the soil classifications and excavation performance should be evaluated in the field in accordance with the OSHA regulations. Temporary excavations should be constructed in accordance with OSHA recommendations. For trench or other excavations, OSHA requirements regarding personnel safety should be met using appropriate shoring (including trench boxes) or by laying back the slopes to a slope ratio no steeper than 1½:1 (horizontal to vertical) in topsoil and 1:1 in granitic rock. Temporary excavations that encounter seepage may require shoring or may be stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. Onsite safety of personnel is the responsibility of the contractor.

9.1.5 Remedial Grading – Structural Buildings

Based on the results of our laboratory testing presented in Appendix B, the existing topsoil possesses a medium to high potential for expansion. To mitigate for the effects of highly expansive onsite soils, we recommend the performance of the following remedial grading measures for buildings. Furthermore, recommendations to support the structures on deepened foundations, in conjunction with these remedial grading recommendations, are presented in following sections of this report.

We recommend that the existing near-surface topsoil within the building pad be removed down to competent decomposed granitic rock or 1 foot below the bottom of footings, whichever is deeper. This overexcavation should extend to the horizontal limits of the building pad. For the purposes of this report, the building pad is defined as the structural footprint (including foundations for attached overhangs, canopies, and other building appurtenances) plus a horizontal distance of 5 feet, where feasible. The lateral extents of the overexcavation may be modified in the field based on site constraints, such as property lines. The extent and depths of removals and overexcavations should be evaluated by Ninyo & Moore's representative in the field based on the materials exposed.

Subsequent to performance of the overxcavation removal, the resulting surface should be scarified to a depth of approximately 6 inches, moisture conditioned, and recompacted to a relative compaction of 90 percent as evaluated by the ASTM D 1557 prior to placing new fill. Once the resulting removal surface has been recompacted, the overexcavation should then be backfilled with compacted fill soils placed in accordance with the recommendations herein.

We recommend that the upper 2 feet of compacted fill soils placed within the building pads possess a very low to low potential for expansion (i.e. an expansion index of less than 50). As noted earlier, the onsite topsoil possesses a medium to high potential for expansion and are not considered suitable for reuse within the upper 2 feet of compacted fill soils with building pads. Accordingly, the upper 2 feet of compacted fill soils within building pads may consist of import soils, soils derived from onsite excavations into the decomposed granitic rock, or lime-treatment of onsite soils.

9.1.6 Remedial Grading – Retaining Walls

We recommend that the existing near-surface topsoil beneath retaining walls be removed down to a depth of 1 foot below the bottom of the retaining wall foundations. This overexcavation should extend a lateral distance of 1 foot beyond the horizontal limits of the foundation. The lateral extents of the overexcavation may be modified in the field based on site constraints. The extent and depths of removals and overexcavations should be evaluated by Ninyo & Moore's representative in the field based on the materials exposed.

Subsequent to performance of the overxcavation removal, the resulting surface should be scarified to a depth of approximately 6 inches, moisture conditioned, and recompacted to a relative compaction of 90 percent as evaluated by the ASTM D 1557 prior to placing new fill. Once the resulting removal surface has been recompacted, the overexcavation should then be backfilled with compacted fill soils placed in accordance with the recommendations herein.

We recommend that the upper 1 foot of compacted fill soils placed beneath retaining walls possess a very low to low potential for expansion (i.e., an expansion index of less than 50). As noted earlier, the onsite topsoil possesses a medium to high potential for expansion and are not considered suitable for reuse within the upper 1 foot of compacted fill soils beneath retaining walls. Accordingly, the upper 1 foot of compacted fill soils beneath retaining walls may consist of import soils, soils derived from onsite excavations into the decomposed granitic rock, or lime-treatment of onsite soils.

9.1.7 Remedial Grading – Exterior Pedestrian Concrete Flatwork

We recommend that the existing near-surface topsoil beneath exterior pedestrian concrete flatwork be removed down to a depth of 2 feet below the planned finished subgrade elevation. This overexcavation should extend a lateral distance of 1 foot beyond the horizontal limits of the flatwork. The lateral extents of the overexcavation may be modified in the field based on site constraints. The extent and depths of removals and overexcavations should be evaluated by Ninyo & Moore's representative in the field based on the materials exposed.

Subsequent to performance of the overxcavation removal, the resulting surface should be scarified to a depth of approximately 6 inches, moisture conditioned, and recompacted to a relative compaction of 90 percent as evaluated by the ASTM D 1557 prior to placing new fill. Once the resulting removal surface has been recompacted, the overexcavation should then be backfilled with compacted fill soils placed in accordance with the recommendations herein.

We recommend that the upper 2 feet of compacted fill soils placed beneath exterior pedestrian flatwork possess a very low to low potential for expansion (i.e. an expansion index of less than 50). As noted earlier, the onsite topsoil possesses a medium to high potential for expansion and are not considered suitable for reuse within the upper 2 feet of compacted fill soils beneath exterior pedestrian flatwork. Accordingly, the upper 2 feet of compacted fill soils beneath exterior pedestrian flatwork may consist of import soils, soils derived from onsite excavations into the decomposed granitic rock, or lime-treatment of onsite soils.

9.1.8 Materials for Fill

Materials for fill may be processed from onsite excavations or may consist of import materials. Onsite soils with an organic content of less than approximately 3 percent by volume (or 1 percent by weight) are suitable for reuse as general fill material. Fill soils should be free of trash, debris, roots, vegetation, organics, or other deleterious materials. Due to the shallow groundwater moisture conditioning of onsite materials, including drying and/or aerating, should be anticipated. Fill and utility trench backfill materials should not contain rocks or lumps over 3 inches, and not more than 30 percent larger than ¾ inch. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or disposed of offsite.

As noted earlier, expansion index testing presented in Appendix B indicates that some of the onsite topsoil possesses a medium to high potential for expansion. Soils that possess a medium to high potential for expansion (i.e., an expansion index of 50 or more) are not suitable for reuse within the upper 2 feet of building pads, in the upper 1 foot beneath retaining wall footings, as retaining wall backfill, or as the upper 2 feet of subgrade soils beneath pedestrian concrete flatwork.

Imported fill material should generally be granular soils with a very low to low expansion potential (i.e., an expansion index of 50 or less). Import fill material should also be non-corrosive in accordance with the Caltrans amended (2019) AASHTO (2017) corrosion criteria. Non-corrosive soils are soils that possess an electrical resistivity more than 1,100 ohm-centimeters (ohm-cm), a chloride content less than 500 parts per million (ppm), less than 0.15 percent sulfates, and a pH less than 5.5. Materials for use as fill should be evaluated by Ninyo & Moore's representative prior to filling or importing. To reduce the potential of importing contaminated materials to the site, prior to delivery, soil materials obtained from off-site sources should be sampled and tested in accordance with standard practice (DTSC, 2001). Soils that exhibit a known risk to human health, the environment, or both, should not be imported to the site.

9.1.9 Compacted Fill

Prior to placement of compacted fill, the contractor should request an evaluation of the exposed ground surface by Ninyo & Moore. Unless otherwise recommended, the exposed ground surface should then be scarified to a depth of approximately 8 inches and watered or dried, as needed, to achieve moisture contents generally at or slightly above the optimum moisture content. The scarified materials should then be compacted to a relative compaction of 90 percent as evaluated in accordance with the ASTM D 1557. The evaluation of compaction by the geotechnical consultant should not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify this office and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

Fill materials should be moisture conditioned to generally at or slightly above the laboratory optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture conditioning of fill soils should be generally consistent within the soil mass.

Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture conditioning, and recompaction.

Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve a moisture content generally at or slightly above the laboratory optimum, mixed, and then compacted by mechanical methods to a relative compaction of 90 percent as evaluated by ASTM D 1557. The upper 12 inches of the subgrade materials beneath vehicular pavements

should be compacted to a relative compaction of 95 percent relative density as evaluated by ASTM D 1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

9.1.10 Slopes

We anticipate that new cut and fill slopes will be constructed for the project. Unless otherwise recommended by our offices and approved by the regulating agencies, permanent cut and fill slopes should not be steeper than 2:1 (horizontal to vertical). Buildings, structures, and improvements should be set back from the top of slopes in accordance with the 2019 CBC. We recommend buildings and structures be set back 20 feet or more from the top of slopes.

Compaction of the face of fill slopes should be performed by backrolling at intervals of 4 feet or less in vertical slope height, or as dictated by the capability of the available equipment, whichever is less. Fill slopes should be overbuilt and cut back to finish grades. The placement, moisture conditioning, and compaction of fill slope materials should be done in accordance with the recommendations presented herein.

Site runoff should not be permitted to flow over the tops of slopes. Positive drainage should be established away from the top of slopes. This may be accomplished by utilizing brow ditches placed at the top of slopes to divert surface runoff away from the slope face where drainage devices are not otherwise available.

The onsite soils are susceptible to erosion. The project plans and specifications should contain design features and construction requirements to mitigate erosion of soils or contain a maintenance program to redress erosion features as they develop on a periodic basis.

9.1.11 Pipe Bedding and Modulus of Soil Reaction (*E'*)

It is our recommendation that new pipelines (pipes), where constructed in open excavations, be supported on 6 or more inches of granular bedding material. Granular pipe bedding should be provided to distribute vertical loads around the pipe. Bedding material and compaction requirements should be in accordance with this report. Pipe bedding typically consists of graded aggregate with a coefficient of uniformity of three or greater.

Pipe bedding and pipe zone backfill should have a Sand Equivalent of 30 or more, and be placed around the sides and the crown of the pipe. In addition, the pipe zone backfill should extend 1 foot or more above the crown of the pipe. Special care should be taken not to allow voids beneath and around the pipe. Compaction of the pipe zone backfill should proceed up both sides of the pipe.

It has been our experience that the voids within a crushed rock material are sufficiently large to allow fines to migrate into the voids, thereby creating the potential for sinkholes and depressions to develop at the ground surface. If open-graded gravel is utilized as pipe zone backfill, this material should be separated from the adjacent trench sidewalls and overlying trench backfill with a geosynthetic filter fabric.

The modulus of soil reaction (*E'*) is used to characterize the stiffness of soil backfill placed at the sides of buried flexible pipes for the purpose of evaluating deflection caused by the weight of the backfill over the pipe (Hartley and Duncan, 1987). A soil reaction modulus of 1,200 pounds per square inch (psi) may be used for an excavation depth of up to approximately 5 feet when backfilled with granular soil compacted to a relative compaction of 90 percent as evaluated by the ASTM D 1557. A soil reaction modulus of 1,500 psi may be used for trenches deeper than 5 feet.

9.1.12 Utility Trench Zone Backfill

Utility trench zone backfill should be free of organic material, clay lumps, debris, and meet the following recommendations. Trench backfill should not contain rocks or lumps over approximately 3 inches in diameter and not more than approximately 30 percent larger than ¾ inch. Backfill materials should be moisture-conditioned to generally at or slightly above the laboratory optimum. Trench backfill should be compacted to a relative compaction of 90 percent as evaluated by ASTM D 1557 except for the upper 12 inches of the backfill beneath pavement areas which should be compacted to a relative compaction of 95 percent as evaluated by ASTM D 1557. Wet soils should be allowed to dry to moisture contents near the optimum prior to their placement as backfill. Lift thickness for backfill will depend on the type of compaction equipment utilized, but fill should generally be placed in lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe during compaction of the backfill.

Note, the upper 2 feet of utility trench backfill beneath building pads, in the upper 1 foot beneath retaining wall footings, or within the upper 2 feet of subgrade soils beneath exterior pedestrian concrete flatwork should possess a medium to high potential for expansion (i.e., an expansion index of 50 or more).

9.1.13 Thrust Blocks

Thrust restraint for buried pipelines may be achieved by transferring the thrust force to the soil outside the pipe through a thrust block. Thrust blocks may be designed using the magnitude and distribution of passive lateral earth pressures presented on Figure 5. Thrust blocks should be backfilled following the recommendations presented in this report.

9.1.14 Drainage

Roof, pad, and slope drainage should be directed such that runoff water is diverted away from slopes and structures to suitable discharge areas by nonerodible devices (e.g., gutters, downspouts, concrete swales, etc.). Positive drainage adjacent to structures should be established and maintained. Positive drainage may be accomplished by providing drainage away from the foundations of the structure at a gradient of 2 percent or steeper for a distance of 5 feet or more outside building perimeters, and further maintained by a graded swale leading to an appropriate outlet, in accordance with the recommendations of the project civil engineer and/or landscape architect.

Surface drainage on the site should be provided so that water is not permitted to pond. A gradient of 2 percent or steeper should be maintained over the pad area and drainage patterns should be established to divert and remove water from the site to appropriate outlets.

Care should be taken by the contractor during final grading to preserve any berms, drainage terraces, interceptor swales or other drainage devices of a permanent nature on or adjacent to the property. Drainage patterns established at the time of final grading should be maintained for the life of the project. The property owner and the maintenance personnel should be made aware that altering drainage patterns might be detrimental to foundation performance.

9.2 Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 2 presents the seismic design parameters for the site in accordance with the CBC (2019) guidelines and adjusted MCE_R spectral response acceleration parameters (SEAOC/OSHPD, 2020).

Table 2 – 2019 California Building Code Seismic Design Criteria

Seismic Design Factors	Value
Seismic Design Category	D
Site Class	C
Site Coefficient, F_a	1.2
Site Coefficient, F_v	1.5
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.806g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.291g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.967g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.436g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.645g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.291g

9.3 Building Foundations

Based on our understanding of the project, site development will include the construction of various buildings. The new buildings are anticipated to be supported on shallow foundations. Recommendations for the shallow building foundations are presented in following sections. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

9.3.1 Shallow Foundations

Shallow, spread or continuous footings supported on compacted fill or competent decomposed granitic rock may be designed using an allowable bearing capacity of 3,000 pounds per square foot (psf). The allowable bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces. We recommend that shallow foundations for the new buildings be founded 30 inches below the lowest adjacent grade to mitigate for the effects of the highly expansive soils onsite. Continuous footings should have a width of 18 inches and spread footings should be 24 inches in width. The footings should be reinforced in accordance with the recommendations of the project structural engineer.

9.3.2 Lateral Resistance

For resistance of footings to lateral loads, we recommend an allowable passive pressure of 300 psf per foot of depth be used with a value of up to 3,000 psf. This value assumes that the ground is horizontal for a distance of 10 feet, or three times the height generating the passive pressure, whichever is more. We recommend that the upper 1 foot of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend a coefficient of friction of 0.2 be used between soil and concrete. The passive resistance values may be increased by one-third when considering loads of short duration such as wind or seismic forces.

9.3.3 Static Settlement

We estimate that the proposed structures, designed and constructed as recommended herein, and founded in compacted fill will undergo total settlement on the order of 1 inch. Differential settlement on the order of ½ inch over a horizontal span of 40 feet should be expected. These static settlements are considered to be in addition to the dynamic settlements presented in earlier sections of this report.

9.4 Interior Slabs-On-Grade

We recommend that interior concrete slabs-on-grade be underlain by 2 feet or more of compacted fill materials that generally possess a very low to low expansion potential (i.e. an expansion index of 50 or less). Interior concrete slabs-on-grade should be 5 inches thick. If moisture sensitive floor coverings are to be used, we recommend that slabs be underlain by a vapor retarder and capillary break system consisting of a 10-mil polyethylene (or equivalent) membrane placed over 4 inches of medium to coarse, clean sand or pea gravel. The slabs-on-grade should be reinforced with No. 4 reinforcing bars spaced 18 inches on center each way. The reinforcing bars should be placed near the middle of the slab. As a means to help reduce shrinkage cracks, we recommend that the slabs be provided with crack-control joints at intervals of approximately 12 feet each way. The slab reinforcement and expansion joint spacing should be designed by the project structural engineer.

9.5 Site Retaining Walls

If proposed, site retaining walls that are under 4 feet in height and are not a part of or are not connected to buildings may be supported on continuous footings bearing on compacted fill. The continuous footing should have a width of 24 inches or more and be embedded a depth of 18 inches or more. An allowable bearing capacity of 2,500 psf may be used for the design of site retaining wall foundations. The allowable bearing capacity may be increased by one-third when considering loads of short duration, such as wind or seismic forces.

For the design of a site yielding retaining wall that is not restrained against movement by rigid corners or structural connections, lateral pressures are presented on Figure 6. These pressures assume select backfill materials are used and free draining conditions. Select backfill materials should not contain rocks or lumps over 3 inches, and not more than 30 percent larger than ¾ inch, and possess a very low to low potential for expansion (i.e. an expansion index less than 50). Measures should be taken to reduce the potential for build-up of moisture behind the retaining walls. A drain should be provided behind the retaining wall as shown on Figure 7. The drain should be connected to an appropriate outlet.

9.6 Shade Structure, Light Pole and Backstop Foundations

Improvements such as shade structures, light poles, and backstop fencing are structures that typically impose relatively light axial loads on foundations and have more structural demands for lateral and uplift loading. Typically, we recommend that such structures be supported on cast-in-drilled-hole (CIDH) pile foundations. However, due to potential difficulty with drilling of these foundations due to the presence of corestones at the surface and within the decomposed granite rock, we are also providing alternative recommendations to support these structures on shallow spread footings.

9.6.1 Cast-in-Drilled-Hole (CIDH) Piles

Shade structures, light poles, and backstop fencing typically impose relatively light axial loads on foundations. Although we anticipate that pile dimensions will be generally controlled by the lateral load demand, we recommend that such drilled foundations have a diameter of 18 inches or more. Furthermore, to mitigate for the potential effects of the highly expansive onsite soils, CIDH pile foundations should extend to depths for 6 feet or more. The pile dimensions (i.e., diameter and embedment) should be evaluated by the project structural engineer.

The drilled pile construction should be observed by Ninyo & Moore during construction to evaluate if the piles have been extended to the design depths. It is the contractor's responsibility to (a) take appropriate measures for maintaining the integrity of the drilled holes, (b) see that the holes are cleaned and straight, and (c) see that sloughed loose soil is removed from the bottom of the hole prior to the placement of concrete. Drilled piles should be checked for alignment and plumbness during installation. The amount of acceptable misalignment of a pile is approximately 3 inches from the plan location. It is usually acceptable for a pile to be out of plumb by 1 percent of the depth of the pile. The center-to-center spacing of piles should be no less than three times the nominal diameter of the pile. If the CIDH piles extend into groundwater or seepage, the contractor should consider appropriate measures during construction to reduce the potential for caving of the drilled holes, including the use of steel casing and/or drilling mud. In addition, we recommend concrete be placed by tremie method, to see that the aggregate and cement do not segregate during concrete placement, on the same day the CIDH piles are drilled.

Due the variable nature and depth of the existing fill materials at the site, we recommend CIDH foundations be designed using an allowable passive pressure of 300 psf per foot of depth, with an upper bound value of up to 3,000 psf. This value assumes that the posts/poles are designed to tolerate ½ inch of deflection at the surface and that the ground is horizontal for a distance of 10 feet, or three times the height generating the passive pressure, whichever is greater. We recommend that the upper 1 foot of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend a coefficient of friction of 0.3 be used between soil and concrete. The allowable lateral resistance values may be increased by 1/3 during short-term loading conditions, such as wind or seismic loading.

9.6.2 Shallow Spread Footings

Due to the potential drilling refusal on corestones that may be encountered within the decomposed granitic rock, we are providing alternative recommendations to support shade structures, light poles, and backstop fencing on shallow spread footings. To mitigate for the potential effects of the highly expansive onsite soils, spread footings for these types of structures should be embedded to depths for 3 feet or more. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

Shallow, spread footings for shade structures, light poles, and backstop fencing bearing on compacted fill or competent site soils may be designed using an allowable bearing capacity of 2,000 psf. These allowable bearing capacities may be increased by one-third when considering loads of short duration such as wind or seismic forces. Spread footings should be 36 inches or more in width. The footings should be reinforced in accordance with the recommendations of the project structural engineer.

For resistance of spread footings to lateral loads, we recommend an allowable passive pressure of 300 psf per foot of depth be used with a value of up to 3,000 psf. This value assumes that the ground is horizontal for a distance of 10 feet, or three times the height generating the passive pressure, whichever is more. We recommend that the upper 1 foot of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend a coefficient of friction of 0.2 be used between soil and concrete. The passive resistance values may be increased by one-third when considering loads of short duration such as wind or seismic forces.

9.7 Preliminary Flexible Pavement Design

We understand that the project will include the construction of new flexible AC pavements. Our laboratory testing of near surface soil samples at the project site indicated an R-values of less than 5. We have used an R-value of less than 5, along with estimated design Traffic Indices (TI) of 4.5, 5, 6, and 7 as the basis of our preliminary flexible pavement design. These assumed TIs should be evaluated by the Civil Engineer based on anticipated traffic loading at the site. Actual pavement recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations across the site at the completion of the grading operations. The preliminary recommended flexible pavement sections are presented in Table 3.

Table 3 – Recommended Preliminary Flexible Pavement Sections

Traffic Index (Pavement Usage)	Design R-Value	Asphalt Concrete Thickness (inches)	Aggregate Base Thickness (inches)
4.5 (Parking Stalls)	Less than 5	3	8
5 (Drive Aisles)	Less than 5	3	10
6 (Heavy Traffic Areas)	Less than 5	3	14
7 (Fire Lanes)	Less than 5	4	16

As indicated, these values assume TIs of 7.0 or less for site roads. If traffic loads are different from those assumed, the pavement design should be re-evaluated. In addition, we recommend that the upper 12 inches of the subgrade and aggregate base materials be compacted to a relative compaction of 95 percent relative density as evaluated by the current version of ASTM D 1557.

9.8 Preliminary Gravel Road Design

As part of the new construction, we anticipate that new gravel vehicular roads and parking areas will be constructed. Our laboratory testing of near surface soil samples at the project site indicated R-values of less than 5. This R-value, along with assumed design Traffic Indices (TI) of 4.5, 5, 6, and 7 has been the basis of our preliminary road design. These assumed TIs should be evaluated by the Civil Engineer based on anticipated traffic loading at the site. Actual gravel road recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations across the site at the completion of the grading operations. The preliminary recommended flexible pavement sections are presented in Table 4.

Table 4 – Recommended Preliminary Gravel Road Sections

Traffic Index (Pavement Usage)	Design R-Value	Aggregate Base Thickness (inches)
4.5 (Parking Stalls)	Less than 5	15
5 (Drive Aisles)	Less than 5	17
6 (Heavy Traffic Areas)	Less than 5	20
7 (Fire Access)	Less than 5	24

As indicated, these values assume TIs of 7.0 or less for site roads. If traffic loads are different from those assumed, the pavement design should be re-evaluated. In addition, we recommend that the upper 12 inches of the subgrade and aggregate base materials be compacted to a relative compaction of 95 percent relative density as evaluated by the current version of ASTM D 1557. Gravel access roads will require periodic maintenance.

9.9 Rigid Concrete Pavements

We understand that rigid concrete pavements may be used for the American with Disabilities Act (ADA) parking stalls and their associated walkways. We recommend that these ADA parking stalls and walkways be 6 inches in thickness and should be reinforced with No. 3 reinforcing bars placed at 18 inches on-center both ways. The concrete for the ADA parking stall and walkway should be underlain by 2 feet of compacted fill that possesses a very low to low potential for

expansion (i.e. an expansion index of less than 50). To reduce the potential manifestation of distress to rigid concrete pavements due to movement of the underlying soil, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as designed by the structural engineer. Positive drainage should be established and maintained adjacent to flatwork.

We also suggest that consideration be given to using Portland cement concrete pavements in areas where dumpsters will be stored and where refuse and delivery trucks will stop and load. Experience indicates that refuse and other heavy truck traffic can significantly shorten the useful life of AC or gravel road sections. We recommend that in these areas, a pavement section consisting of an 8-inch thickness of Portland cement concrete underlain by 8 inches of compacted aggregate base be placed. We recommend that the Portland cement concrete have a 600 pounds per square inch (psi) flexural strength and that it be reinforced with No. 4 bars that are placed 18 inches on center (both ways). The rigid pavement and aggregate base should be placed on compacted subgrade that is at a relative compaction of 95 percent as evaluated by ASTM D 1557.

9.10 Exterior Pedestrian Concrete Flatwork

We recommend that exterior pedestrian concrete flatwork be 5 inches in thickness and should be reinforced with No. 3 reinforcing bars placed at 24 inches on-center both ways. Exterior pedestrian concrete flatwork should be underlain by 2 feet of compacted fill soils that possess a very low to low potential for expansion (i.e. an expansion index of less than 50). A vapor retarder is not needed for exterior flatwork. To reduce the potential manifestation of distress to exterior concrete flatwork due to movement of the underlying soil, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as designed by the civil engineer. Positive drainage should be established and maintained adjacent to flatwork.

9.11 Corrosion

Laboratory testing was performed on a select representative sample of the onsite earth materials to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. The pH and electrical resistivity tests were performed in accordance with California Test (CT) 643 and the sulfate and chloride content tests were performed in accordance with CT 417 and CT 422, respectively. These laboratory test results are presented in Appendix B.

The results of the corrosivity testing indicated electrical resistivities of 630 to 1,600 ohm-cm, soil pH values of 7.4 to 7.5, chloride contents of 40 to 70 parts per million (ppm), and sulfate contents of 0.001 to 0.004 percent (i.e., 10 to 40 ppm). Based on a comparison with the California Department of Transportation amended (Caltrans, 2019) AASHTO (2017) corrosion criteria, the soils at the project site are classified as corrosive, which is defined as having earth materials with more than 500 ppm chlorides, more than 0.15 percent sulfates (i.e., 1,500 ppm), a pH less than 5.5, and/or an electrical resistivity less than 1,100 ohm-cm.

9.12 Concrete

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates that can be subject to premature chemical and/or physical deterioration. As noted, the soil samples tested in this evaluation indicated water-soluble sulfate contents of 0.001 to 0.004 percent by weight (i.e., 10 to 40 ppm). Based on the American Concrete Institute (ACI) 318 criteria, the site soils would correspond to exposure class S0. For this exposure class, ACI 318 recommends that normal weight concrete in contact with soil possess a compressive strength of 2,500 psi or more. Furthermore, due to the potential for variability of site soils, we also recommend that normal weight concrete in contact with soil use Type II, II/V, or V cement.

9.13 Storm Water BMPs

As previously discussed, the site subsurface soils at the project site had factored infiltration rates ranging from a no infiltration condition to very slow variable infiltration rates. Based on the geologic contact between the topsoil and the underlying granitic rock, attempts to infiltrate stormwater are anticipated to result in lateral movement, ponding, and/or mounding of stormwater and perched water conditions. Additionally, due to the presence of medium to highly expansive soils onsite, such conditions are anticipated to adversely affect surrounding improvements. Accordingly, we recommend that the project consider the use of pavement edge drains and cutoff curbs along the sides of infiltration devices to reduce the potential for lateral migration of water. Additionally, we recommend that permanent infiltration devices incorporate an overflow pipe that is connected to an appropriate outlet. Additional recommendations and/or considerations should be provided by the project civil engineer.

As previously noted, our testing was specific to the locations and depths documented herein. Other areas of the site may or may not accommodate infiltration of storm water. Additional infiltration testing would be needed in these other areas to evaluate whether infiltration in these areas/depths are feasible. Additionally, the horizontal separations between the proposed basins and existing improvements should be evaluated to check whether the setback requirements presented in County of San Diego BMP Design Manual (2020) are met.

10 PLAN REVIEW AND CONSTRUCTION OBSERVATION

The conclusions and recommendations presented in this report are based on analysis of observed conditions in widely spaced exploratory test pits. If conditions are found to vary from those described in this report, Ninyo & Moore should be notified, and additional recommendations will be provided upon request. Ninyo & Moore should review the final project drawings and specifications prior to the commencement of construction. Ninyo & Moore should perform the needed observation and testing services during construction operations.

The recommendations provided in this report are based on the assumption that Ninyo & Moore will provide geotechnical observation and testing services during construction. In the event that it is decided not to utilize the services of Ninyo & Moore during construction, we request that the selected consultant provide the client and Ninyo & Moore with a letter indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this report. Construction of proposed improvements should be performed by qualified subcontractors utilizing appropriate techniques and construction materials.

11 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

12 REFERENCES

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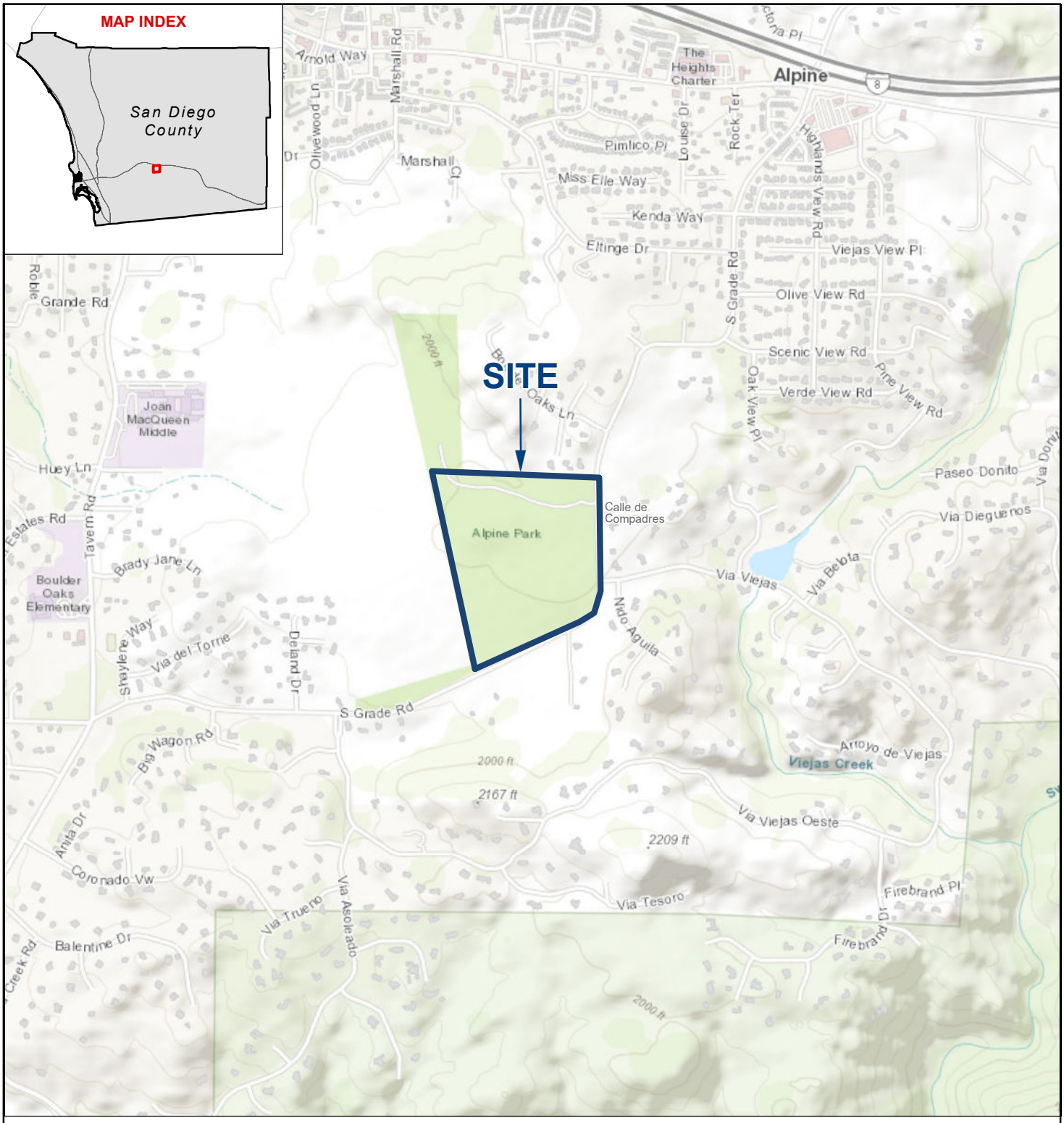
FIGURES



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: ESRI WORLD TOPO, 2020

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FIGURE 1

SITE LOCATION

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

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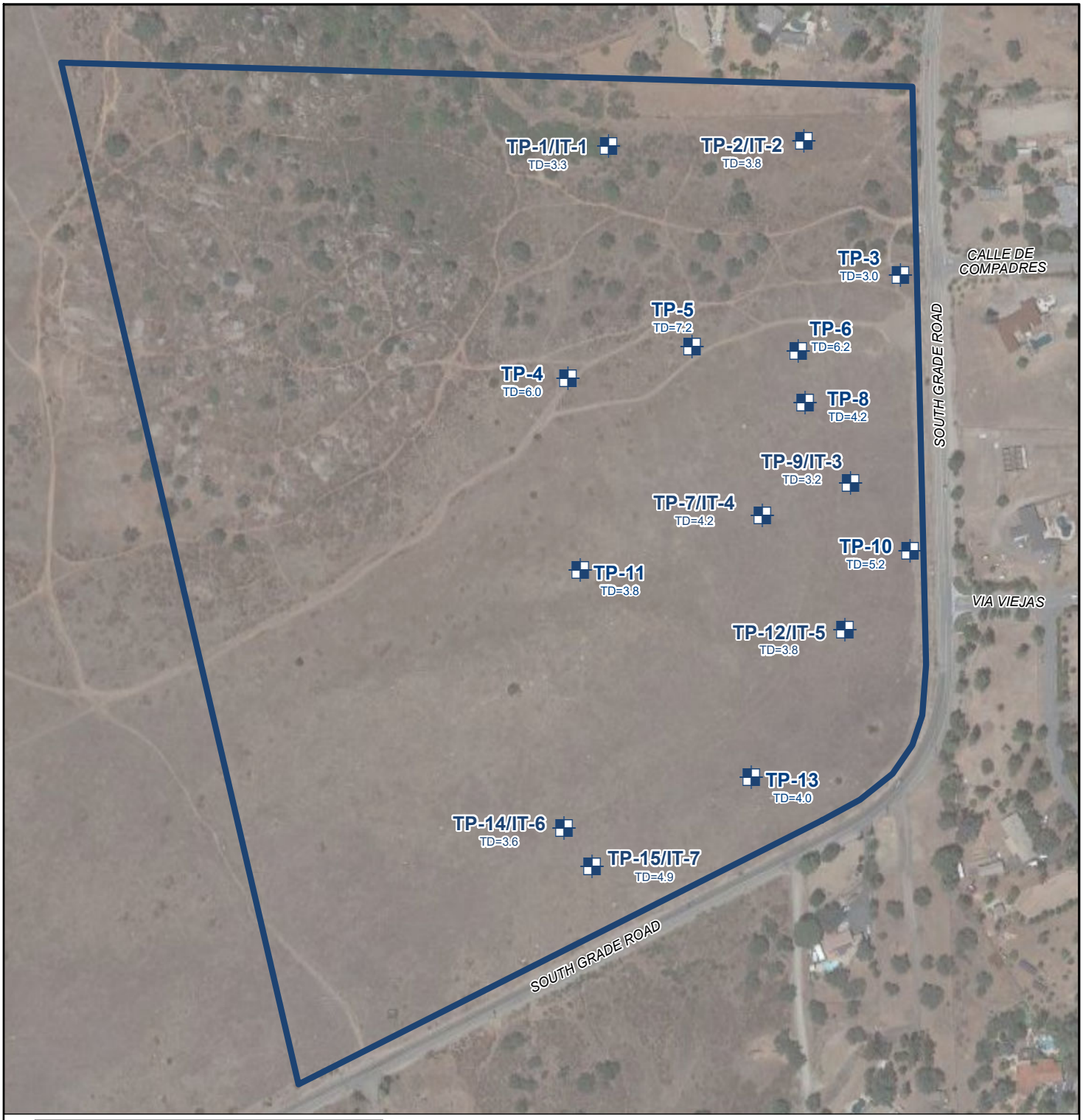
Geotechnical & Environmental Sciences Consultants



LEGEND

SITE BOUNDARY

TP-15/IT-7
TD=4.4

TEST PIT/INFILTRATION TEST
TD=TOTAL DEPTH IN FEET

N

FEET
0 300 600

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: GOOGLE EARTH, 2020

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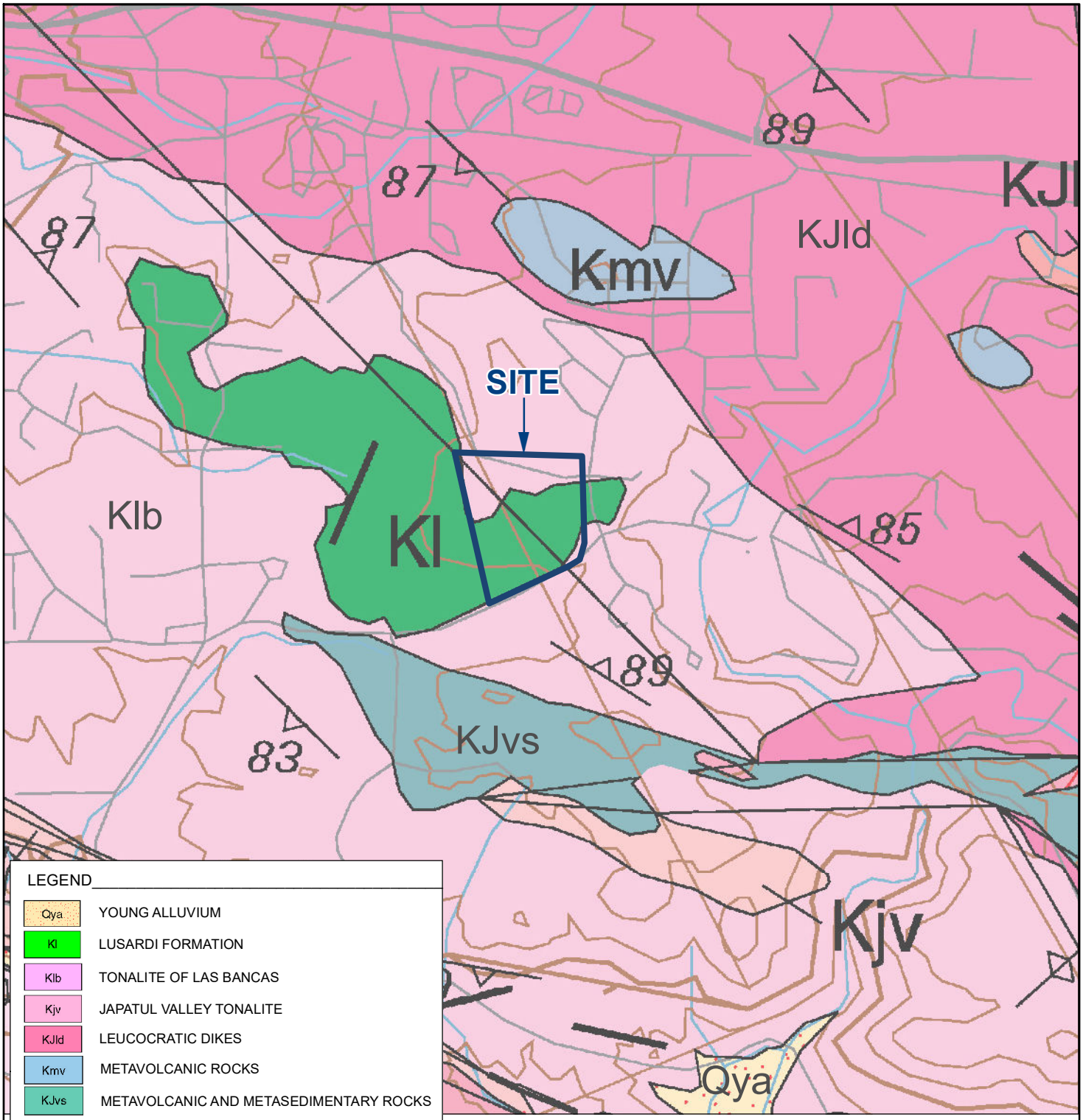
FIGURE 2

TEST PIT AND INFILTRATION TEST LOCATIONS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

Qya	YOUNG ALLUVIUM
Kl	LUSARDI FORMATION
Klb	TONALITE OF LAS BANCAS
Kjv	JAPATUL VALLEY TONALITE
KJld	LEUCOCRATIC DIKES
Kmv	METAVOLCANIC ROCKS
KJvs	METAVOLCANIC AND METASEDIMENTARY ROCKS

70 U D — Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

Strike and dip of foliation, primary igneous

50 — Inclined

Vertical

REFERENCE: TODD, V.R., 2004, PRELIMINARY GEOLOGIC MAP OF THE EL CAJON 30 X 60-MINUTE QUADRANGLE, SOUTHERN CALIFORNIA

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

N

FEET

0 2,000 4,000

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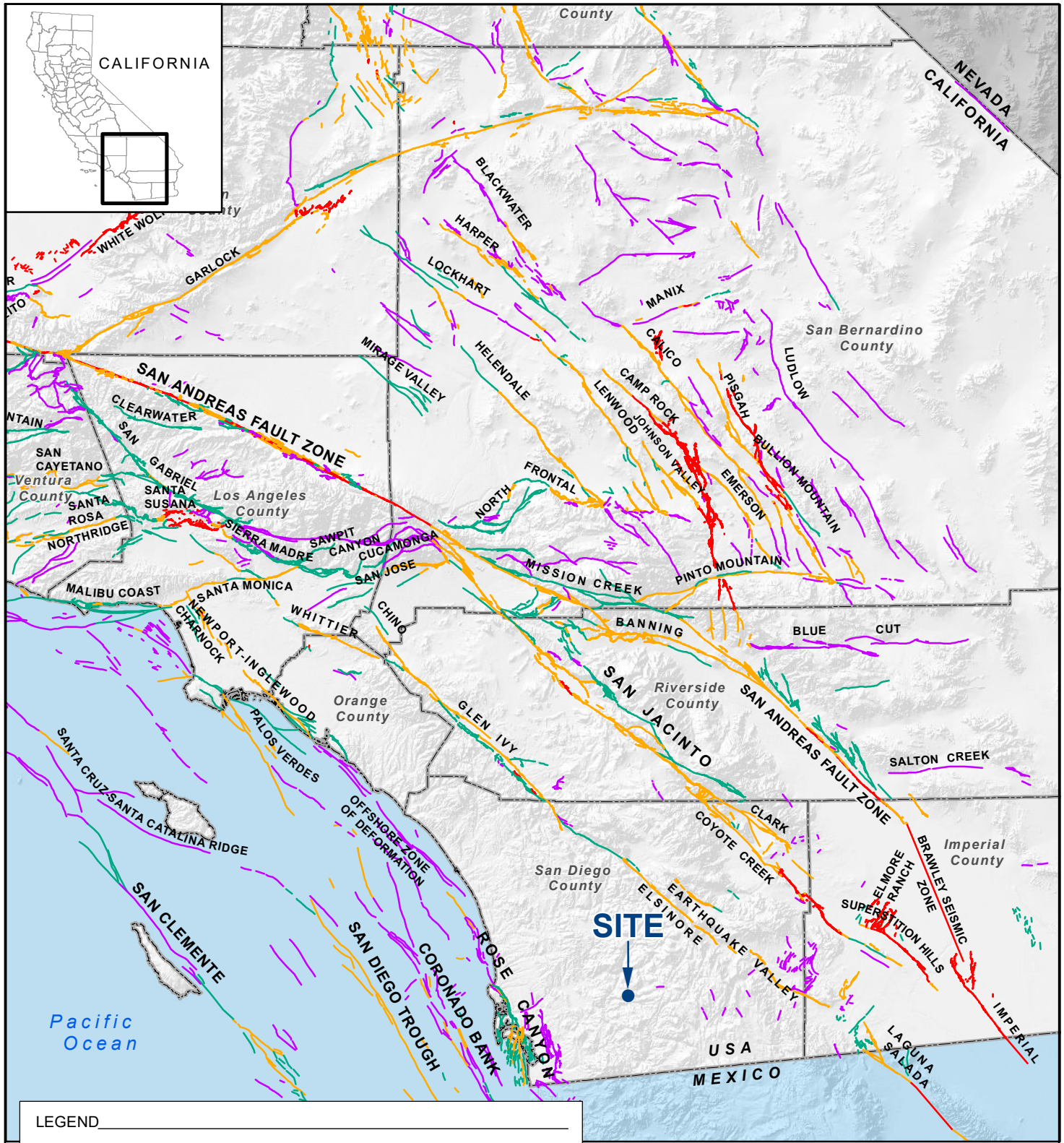
FIGURE 3

GEOLOGY

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

CALIFORNIA FAULT ACTIVITY

- HISTORICALLY ACTIVE
- HOLOCENE ACTIVE
- LATE QUATERNARY (POTENTIALLY ACTIVE)
- QUATERNARY (POTENTIALLY ACTIVE)
- STATE/COUNTY BOUNDARY

SOURCE: U.S. GEOLOGICAL SURVEY AND CALIFORNIA GEOLOGICAL SURVEY, 2006, QUATERNARY FAULT AND FOLD DATABASE FOR THE UNITED STATES.

N

MILES 0 30 60

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

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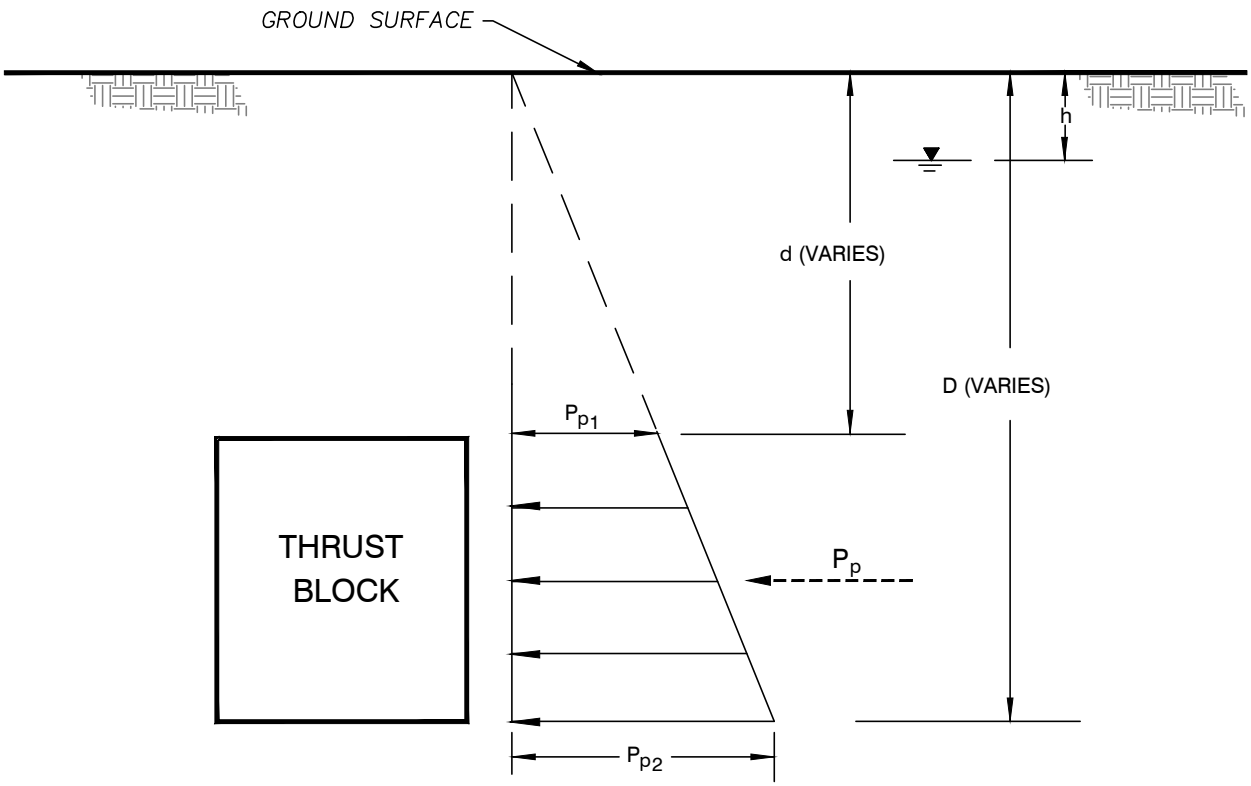
FIGURE 4

FAULT LOCATIONS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



NOTES:

1. GROUNDWATER BELOW BLOCK

   $P_p = 150 (D^2-d^2)$ lb/ft

2. ASSUMES BACKFILL IS GRANULAR MATERIAL
3. ASSUMES THRUST BLOCK IS ADJACENT TO COMPETENT MATERIAL
4. D, d AND h ARE IN FEET

NOT TO SCALE

FIGURE 5

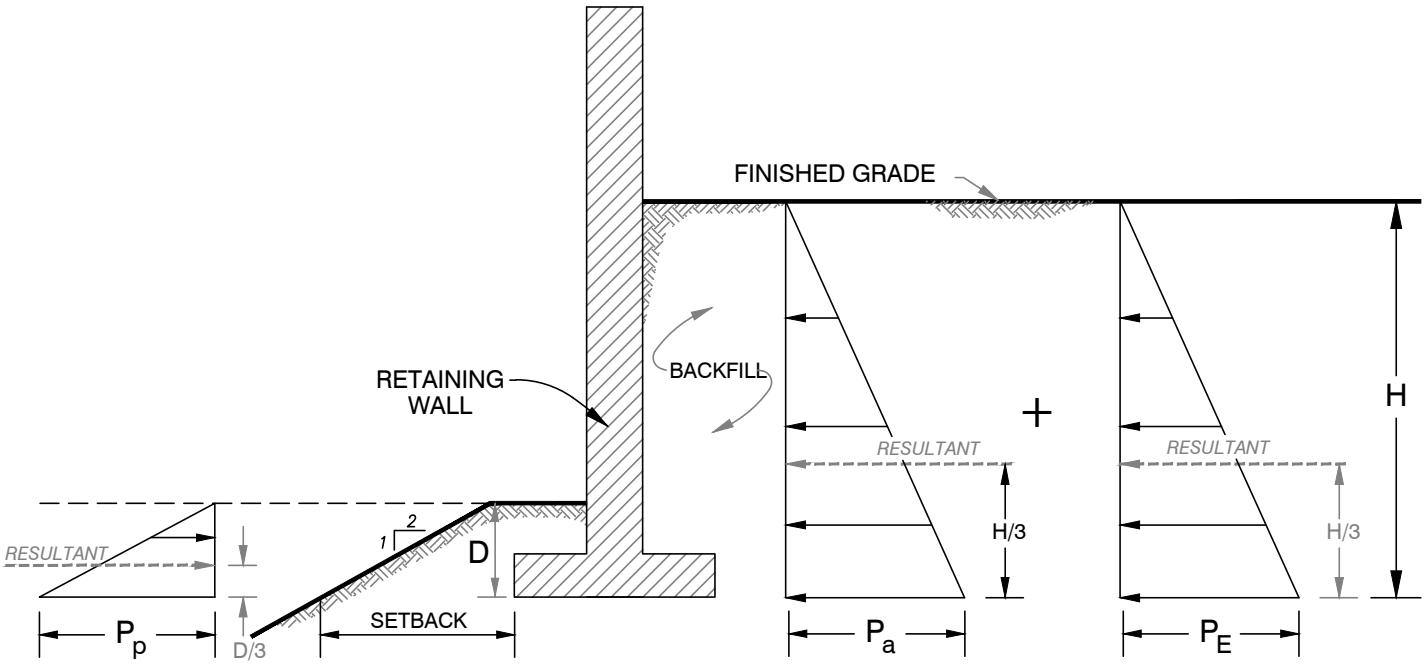
THRUST BLOCK LATERAL EARTH PRESSURE DIAGRAM

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 I 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

109107001 DETAIL FIGS.DWG AOB



NOTES:

1. ASSUMES NO HYDROSTATIC PRESSURE BUILD-UP BEHIND THE RETAINING WALL
2. GRANULAR BACKFILL MATERIALS AS SPECIFIED IN SECTION 9.5 OF THE REPORT SHOULD BE USED FOR RETAINING WALL BACKFILL
3. DRAINS AS RECOMMENDED IN THE RETAINING WALL DRAINAGE DETAIL SHOULD BE INSTALLED BEHIND THE RETAINING WALL
4. SURCHARGE PRESSURES CAUSED BY VEHICLES OR NEARBY STRUCTURES ARE NOT INCLUDED
5. H AND D ARE IN FEET
6. SETBACK SHOULD BE IN ACCORDANCE WITH THE CBC

RECOMMENDED GEOTECHNICAL DESIGN PARAMETERS

Lateral Earth Pressure	Equivalent Fluid Pressure ($lb/ft^2/ft$)[1]	
P_a	Level Backfill with Granular Soils[2]	2H:1V Sloping Backfill with Granular Soils[2]
	40 H	65 H
P_p	Level Ground	2H:1V Descending Ground
	300 D	130 D

NOT TO SCALE

109107001 DETAIL FIGS.DWG AOB

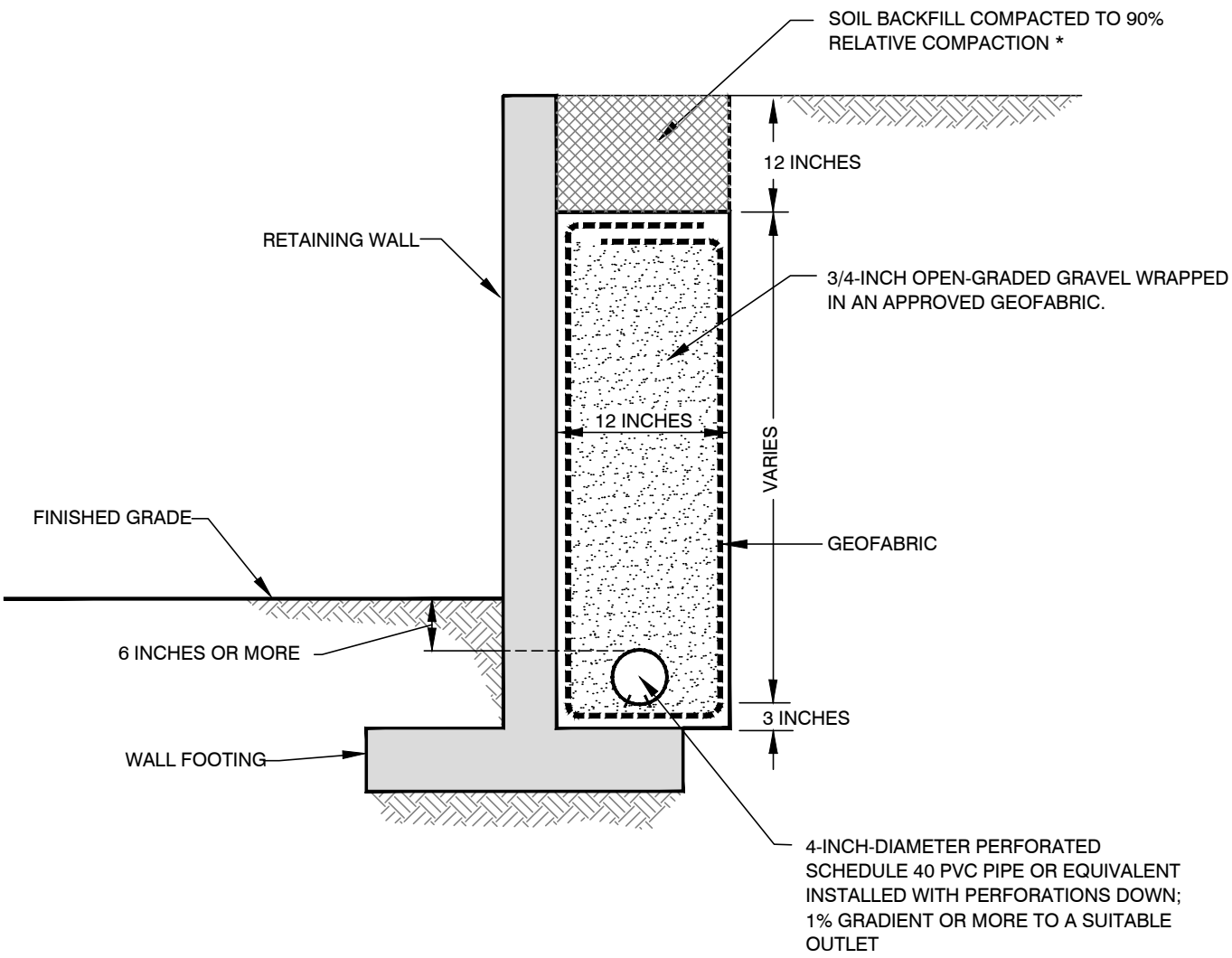
FIGURE 6

LATERAL EARTH PRESSURES FOR YIELDING RETAINING WALLS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

109107001 I 12/20



*BASED ON ASTM D1557

NOT TO SCALE

FIGURE 7

RETAINING WALL DRAINAGE DETAIL

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 I 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

109107001 DETAIL FIGS.DWG AOB

APPENDIX A

Test Pit Logs

APPENDIX A

TEST PIT LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed soil samples were obtained in the field using the following method.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory test pits. The samples were bagged and transported to the laboratory for testing.

DATE EXCAVATED _____

GROUND ELEVATION _____

METHOD OF EXCAVATION _____

TEST PIT DIAGRAM

EXCAVATION LOG EXPLANATION SHEET

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■	■				SM	FILL:
1	■	■					Bulk sample.
						ML	Dashed line denotes material change.
2			■				Drive sample.
							Sand cone performed.
3		X		♀			Seepage.
		X		▽			Groundwater encountered during excavation.
4		■					No recovery with drive sampler.
				▼			Groundwater encountered after excavation.
5							Sample retained by others.
				xx/xx			Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
6		X					
7							No recovery with Shelby tube sampler.
						SM	ALLUVIUM:
8							Solid line denotes unit change.
							Attitude: Strike/Dip
9							b: Bedding — s: Shear
							c: Contact — bss: Basal Slide Surface
10							j: Joint — sf: Shear Fracture
							f: Fracture — sz: Shear Zone
11							F: Fault — sbs: Sheared Bedding Surface
							cs: Clay Seam
12							The total depth is a solid line that is drawn at the bottom of the excavation log.

SCALE 1 inch = 2 feet

FIGURE B-1

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

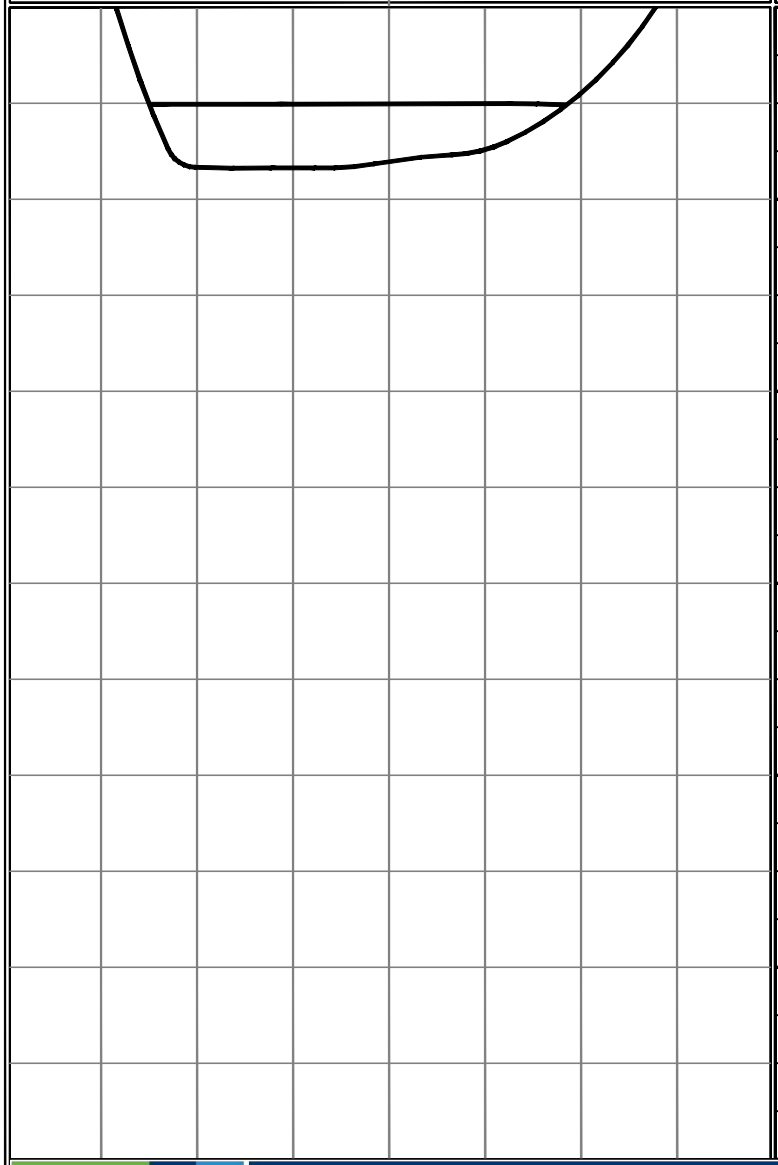
TEST PIT LOG
EXPLANATION OF TEST PIT, CORE, TRENCH AND HAND AUGER LOG SYMBOLS

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

PROJECT NO.	DATE
109107001	12/20



DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-1 / IT-1

GROUND ELEVATION 2,002' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Northwest Portion of Site

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					SC	TOPSOIL: Dark brown, moist, medium dense, clayey SAND; with fine gravel.
	■						DECOMPOSED GRANITIC ROCK: Brownish/yellowish red, moist, weathered, friable, unconsolidated DECOMPOSED GRANITIC ROCK; iron oxide staining.
4							Total Depth = 3.3 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020.
8							Notes: Groundwater, though not encountered at the time of excavation, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
12							
16							
20							
24							

SCALE = 1 in./4 ft.

FIGURE A-1

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

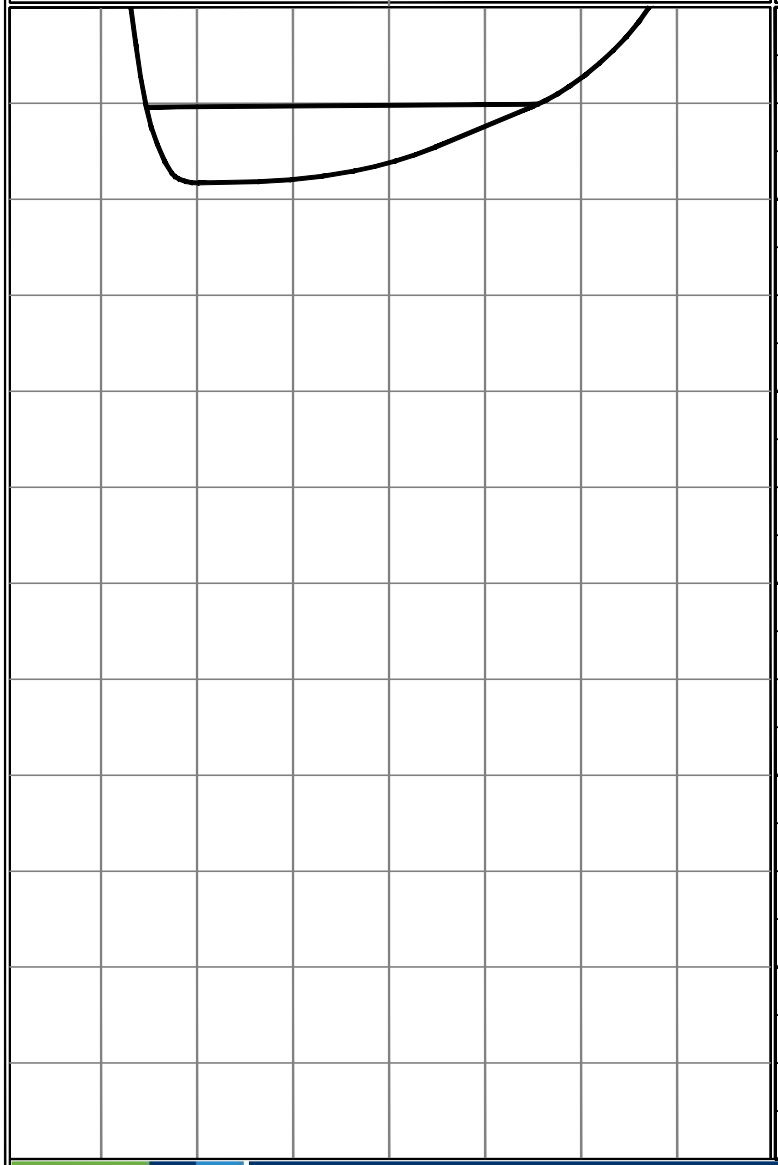
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-2 / IT-2

GROUND ELEVATION 2,020' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Northeast Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	TOPSOIL: Dark brown, moist, medium dense, silty SAND; micaceous.
							DECOMPOSED GRANITIC ROCK: Brownish, moist, DECOMPOSED GRANITIC ROCK; iron oxide staining.
4							Total Depth = 3.8 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
8							
12							
16							
20							
24							

SCALE = 1 in./4 ft.

FIGURE A-2

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

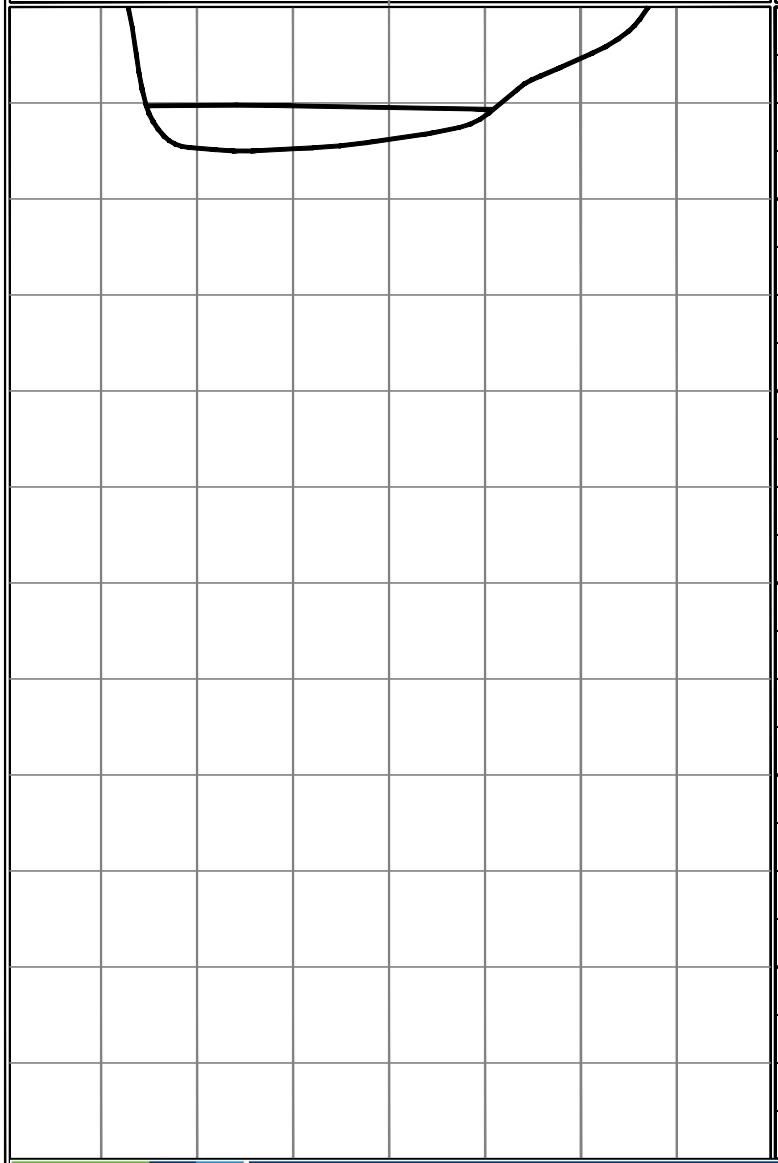
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-3

GROUND ELEVATION 2,032' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Northeast Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, moist, stiff to very stiff, sandy CLAY; with fine gravels and rootlets.
	■						DECOMPOSED GRANITIC ROCK: Mottled light brownish yellowish red, moist, unconsolidated, friable, DECOMPOSED GRANITIC ROCK.
3							Total Depth = 3.0 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020.

Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./4 ft.

FIGURE A-3

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

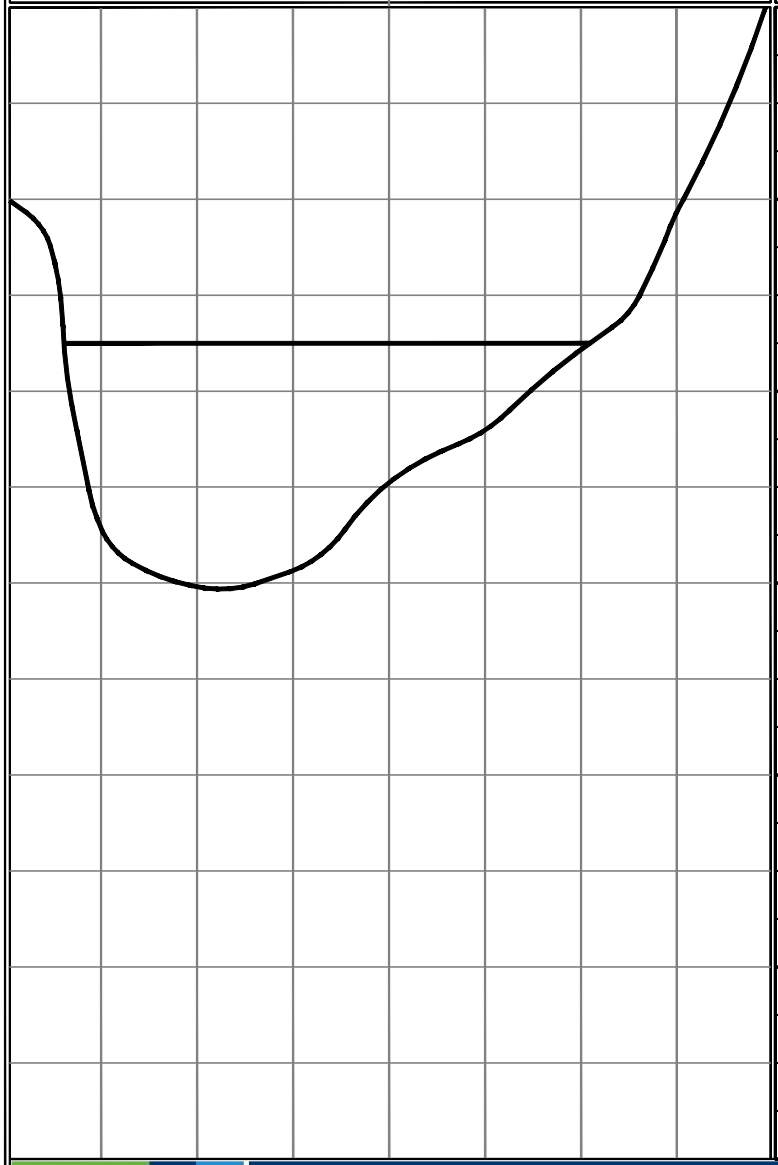
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-4

GROUND ELEVATION 2,028' ± (MSL) LOGGED BY SJQ

METHOD OF EXCAVATION Backhoe

LOCATION Northwest Portion of Site



SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
■					CL	TOPSOIL: Dark brown, moist, stiff to very stiff, silty sandy CLAY; with scattered gravels and rootlets.
■						DECOMPOSED GRANITIC ROCK: Yellowish brown, dry, moderately weathered, weakly to moderately friable, medium-grained DECOMPOSED GRANITIC ROCK; micaceous.
						Total Depth = 6.0 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-4

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

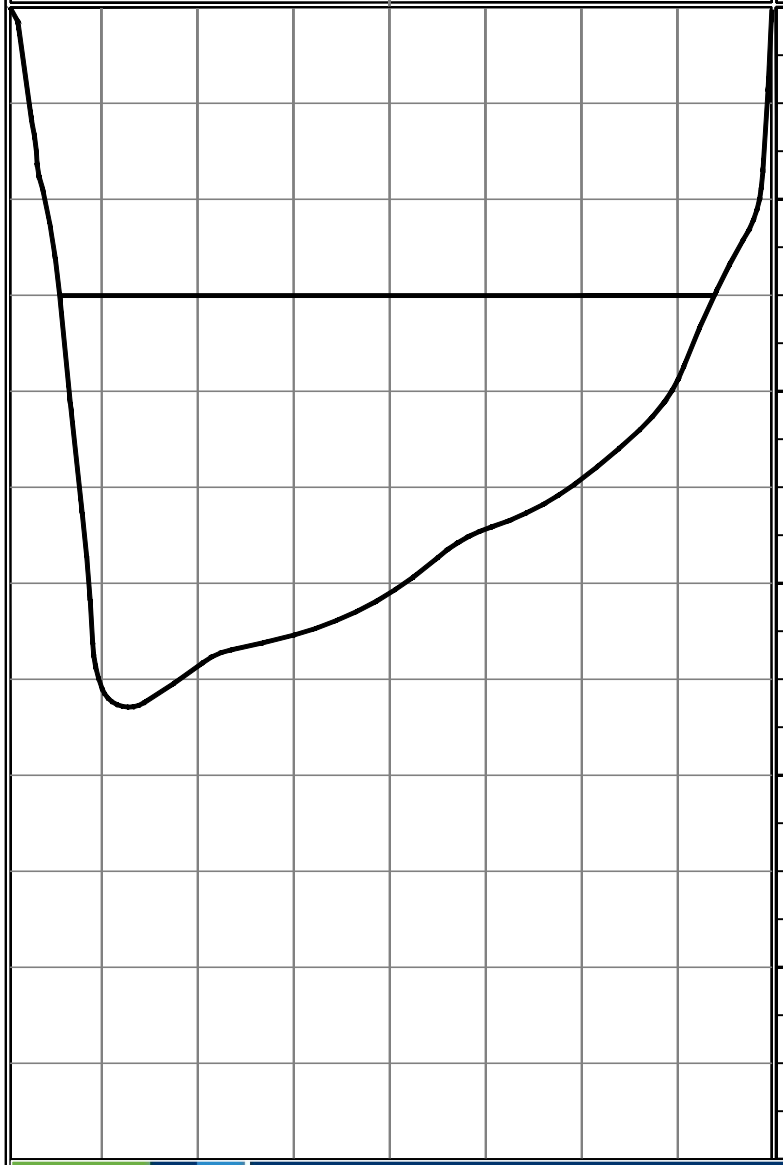
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-5

GROUND ELEVATION 2,026' ± (MSL) LOGGED BY SJQ

METHOD OF EXCAVATION Backhoe

LOCATION North Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, moist, stiff to very stiff, silty sandy CLAY; with scattered gravel and rootlets.
4	■						DECOMPOSED GRANITIC ROCK: Yellowish brown to reddish brown, moist, highly weathered, highly friable, DECOMPOSED GRANITIC ROCK.
7.2							Total Depth = 7.2 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020.

Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-5

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

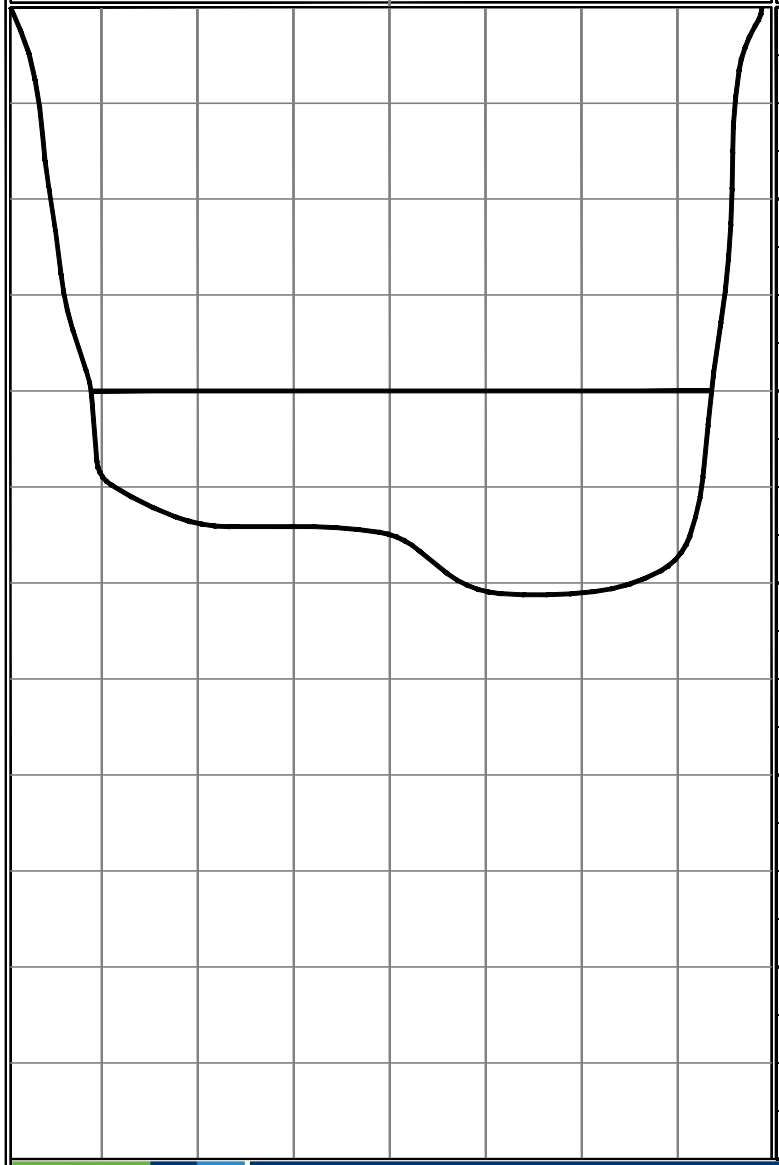
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-6

GROUND ELEVATION 2,024' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION North Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, moist, stiff to very stiff, silty sandy CLAY; with scattered gravel and rootlets.
4	■						DECOMPOSED GRANITIC ROCK: Reddish brown to light yellowish brown, dry, moderately weathered, moderately friable, coarse-grained DECOMPOSED GRANITIC ROCK; micaceous.
6							Total Depth = 6.2 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
8							
10							
12							

SCALE = 1 in./2 ft.

FIGURE A-6

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

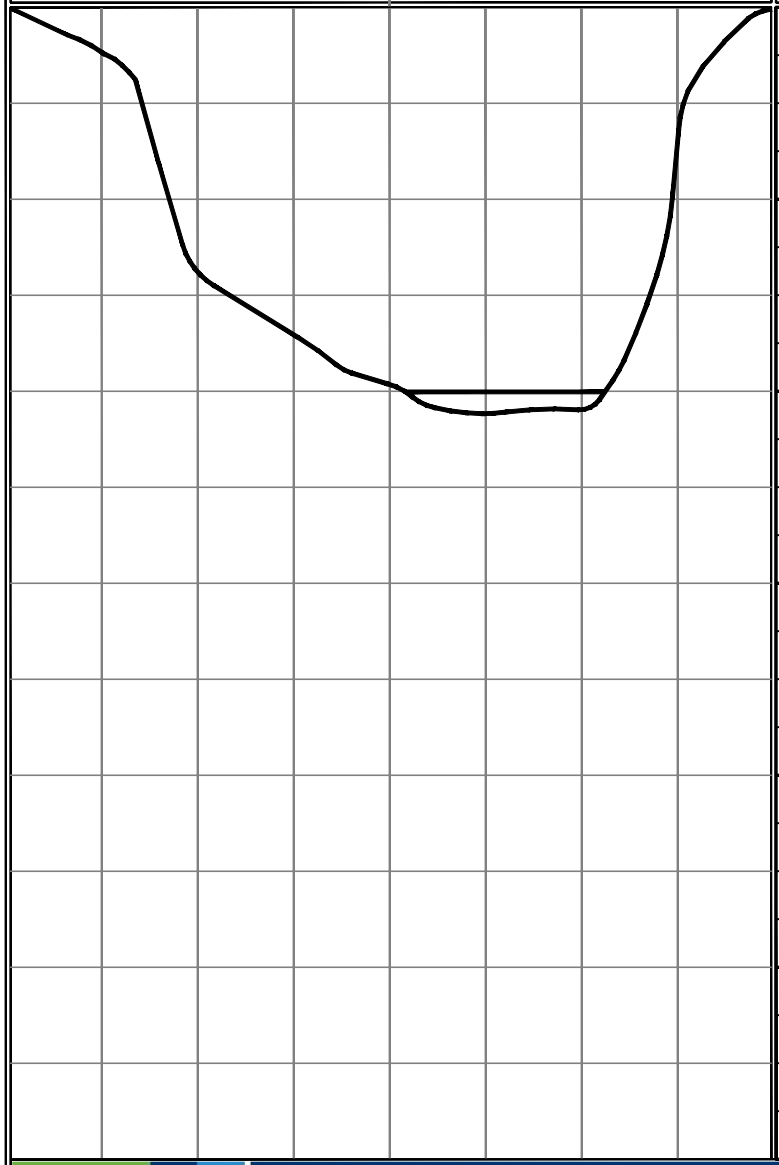
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-7 / IT-4

GROUND ELEVATION 2,010' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Central Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, moist, very stiff to hard, silty sandy CLAY; with scattered gravel.
4							DECOMPOSED GRANITIC ROCK: Yellowish to reddish brown, dry, moderately to highly weathered, moderately to highly friable, medium to coarse-grained GRANITIC ROCK.

Total Depth = 4.2 feet.
Groundwater not encountered during excavation.
Backfilled on 11/18/2020.

Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-7

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

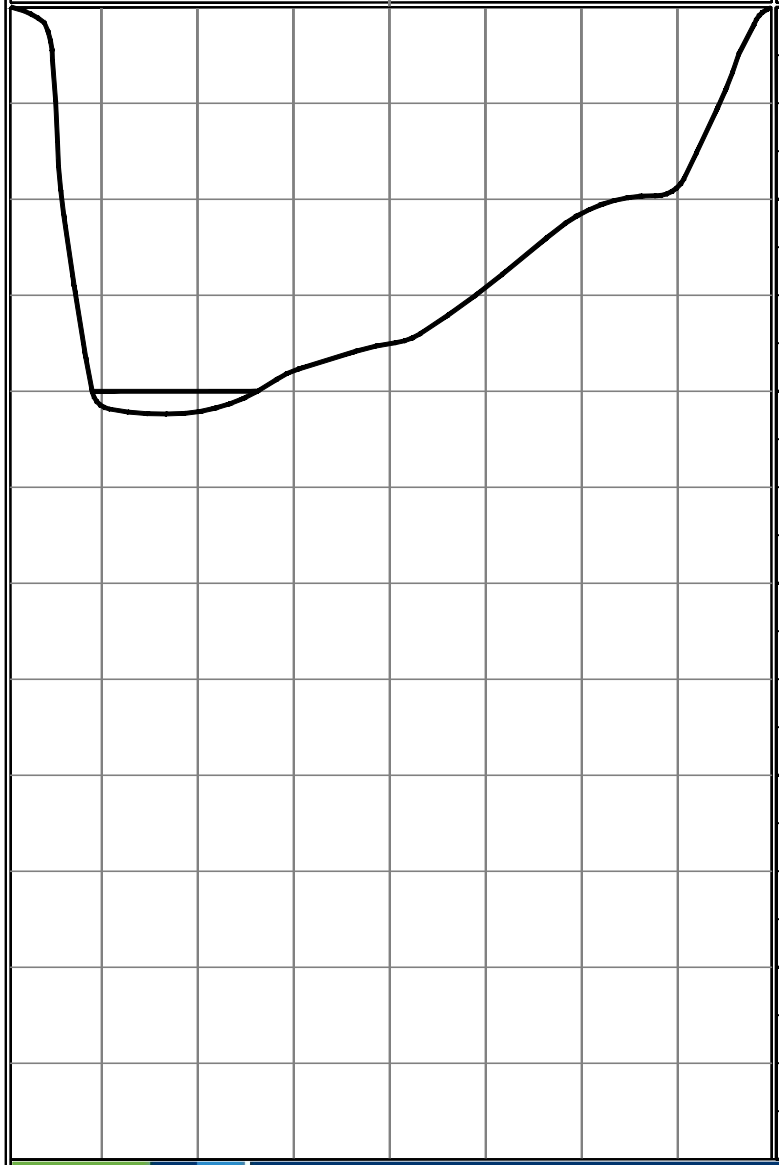
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-8

GROUND ELEVATION 2,020' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Central Portion of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					SC	TOPSOIL: Dark brown, moist, medium dense, clayey SAND; with scattered gravel and coarse sand; scattered rootlets.
4							DECOMPOSED GRANITIC ROCK: Yellowish brown to reddish brown with green chlorite staining, dry, moderately to highly weathered, medium-grained DECOMPOSED GRANITIC ROCK.

Total Depth = 4.2 feet.
Groundwater not encountered during excavation.
Backfilled on 11/18/2020.

Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-8

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

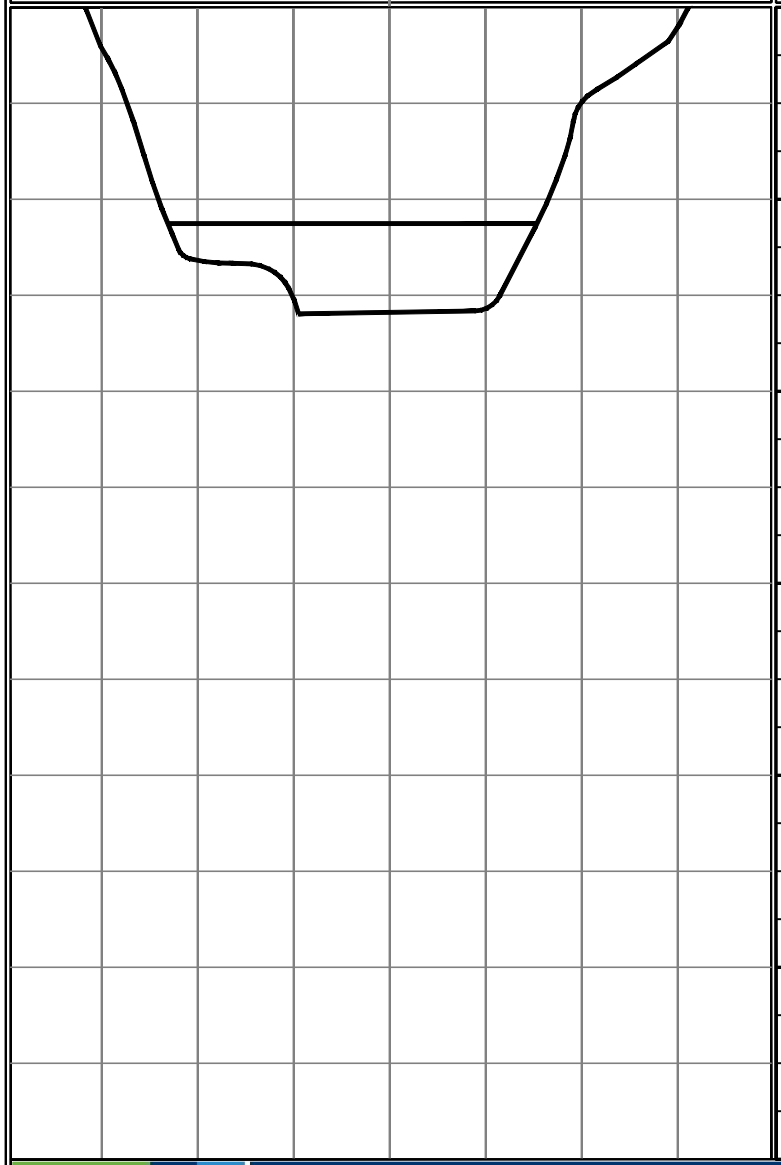
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-9 / IT-3

GROUND ELEVATION 2,011' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION East End of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, moist, very stiff, silty sandy CLAY; with scattered gravel and rootlets.
2	■						DECOMPOSED GRANITIC ROCK: Yellowish brown to reddish brown, dry, highly weathered, strongly friable, GRANITIC ROCK; scattered iron oxide staining; scattered friable core stones approximately 3 inches diameter.
4							Total Depth = 3.2 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020.
6							Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
8							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10							
12							

SCALE = 1 in./2 ft.

FIGURE A-9

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

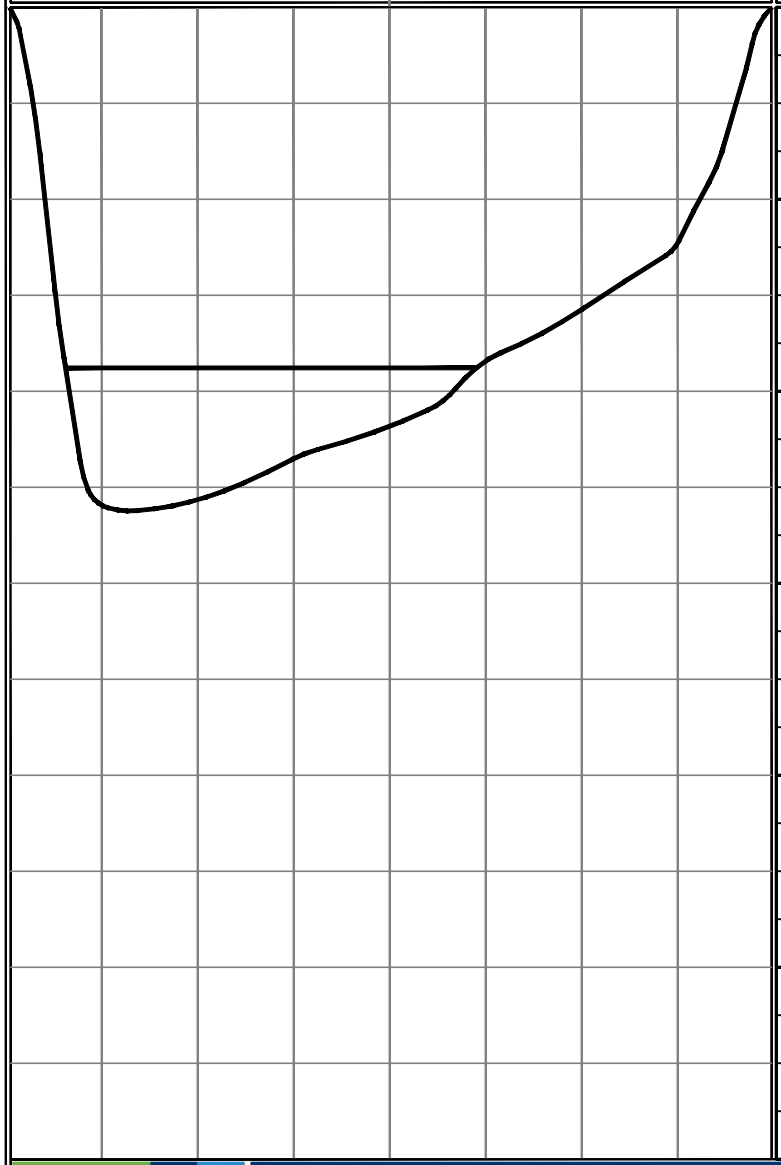
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-10

GROUND ELEVATION 2,002' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION East End of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					CL	TOPSOIL: Dark brown, very stiff, silty sandy CLAY; with scattered gravel, rootlets and caliche nodules and stringers.
4	■						DECOMPOSED GRANITIC ROCK: Yellowish brown to whitish yellow, dry, moderately to strongly weathered, moderately friable, GRANITIC ROCK; scattered iron oxide and greenish cholorite staining; occasional tonalite corestones.
							Total Depth = 5.2 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

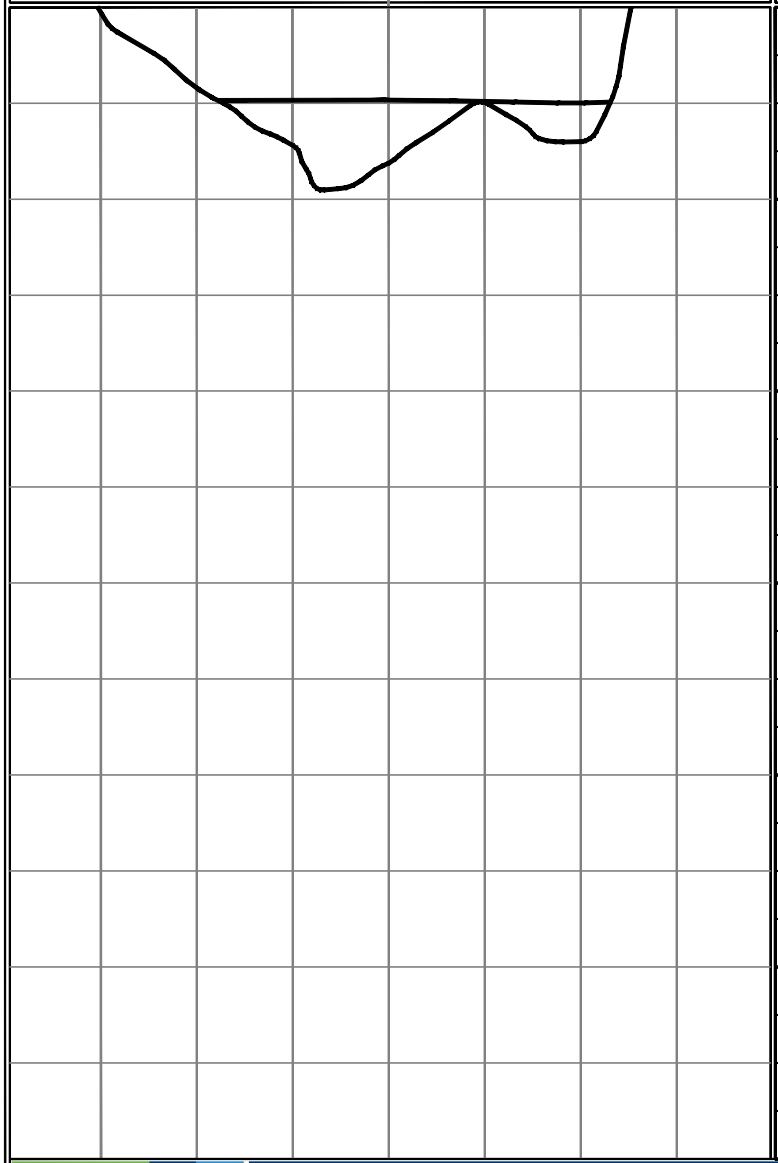
FIGURE A-10

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

PROJECT NO.	DATE
109107001	12/20



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SC	TOPSOIL: Dark brown, moist, medium dense, clayey SAND; with fine gravel and numerous large angular boulders of granitic rock; approximately 1 to 2-1/2 feet in size.
4							DECOMPOSED GRANITIC ROCK: Mottled, brownish yellow to reddish brown, moist, unconsolidated, friable, DECOMPOSED GRANITIC ROCK; weathered; iron oxide staining; with boulder size corestones.
8							Total Depth = 3.8 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020.
12							Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
16							The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20							
24							

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-11

GROUND ELEVATION 2,015' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION West Portion of Site

SCALE = 1 in./4 ft.

FIGURE A-11

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

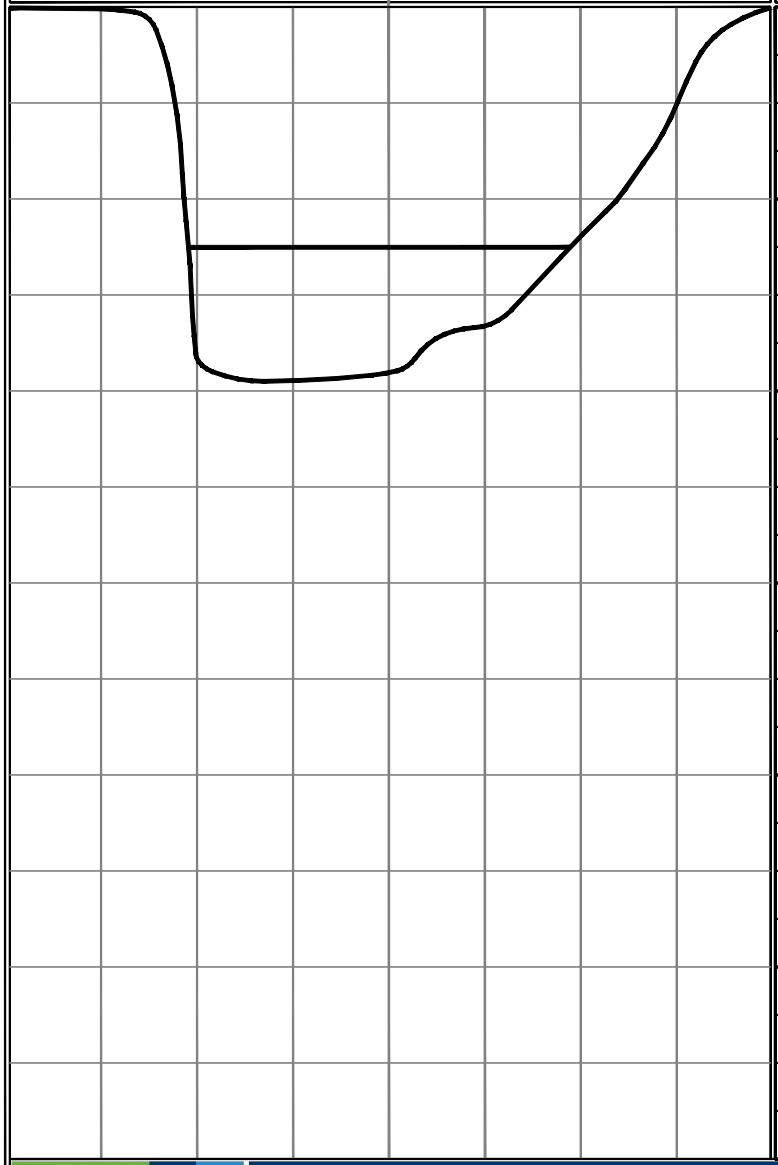
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/18/2020 TEST PIT NO. TP-12 / IT-5

GROUND ELEVATION 1,994' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION Southeast Portion of Site



SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
					CL	TOPSOIL: Dark brown, moist, stiff to very stiff, silty sandy CLAY; with scattered gravel and rootlets; occasional boulder.
						DECOMPOSED GRANITIC ROCK: Light grayish brown to yellowish brown, dry, moderately to highly weathered, moderately friable, medium-grained, DECOMPOSED GRANITIC ROCK.
						Total Depth = 3.8 feet. Groundwater not encountered during excavation. Backfilled on 11/18/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-12

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

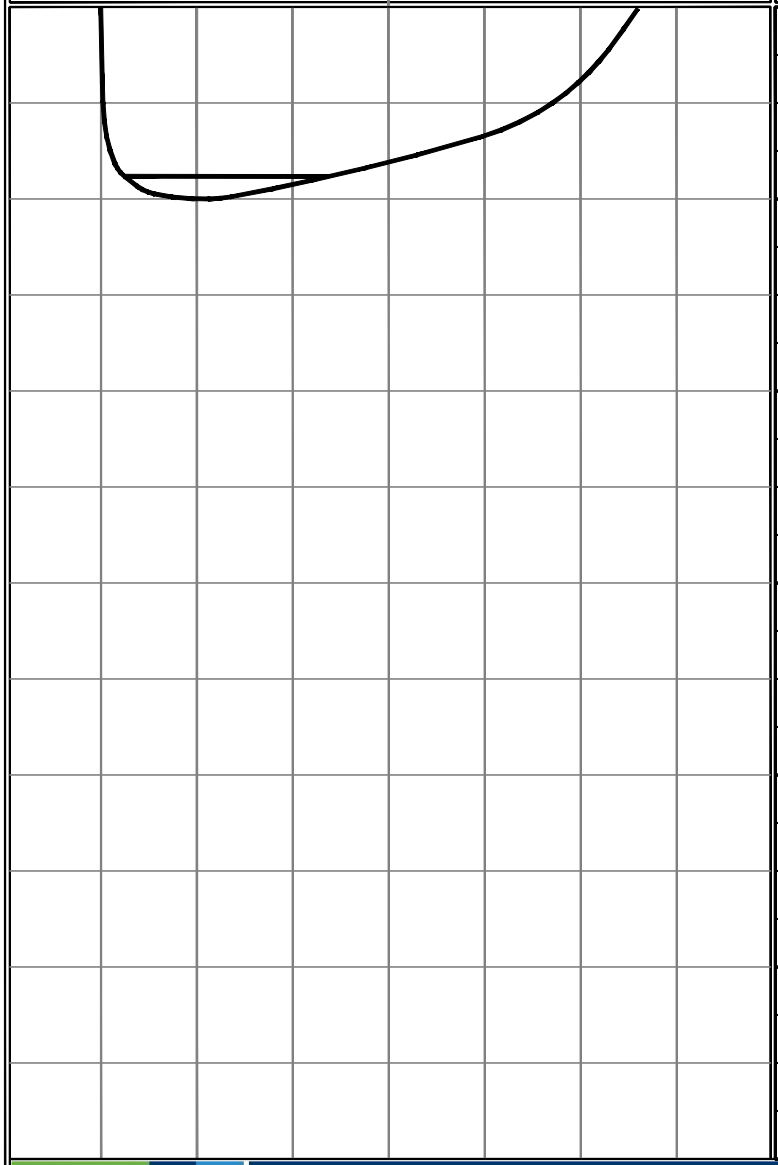
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-13

GROUND ELEVATION 1,985' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION South End of Site



DESCRIPTION

CL

TOPSOIL:
Dark brown to dark gray brown, moist, firm to very stiff, sandy CLAY; with fine gravel.

DECOMPOSED GRANITIC ROCK:
Mottled yellowish brown to reddish brown, moist, friable, unconsolidated to partially consolidated, DECOMPOSED GRANITIC ROCK.

Total Depth = 4.0 feet.
Groundwater not encountered during excavation.
Backfilled on 11/19/2020.

Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.

The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./2 ft.

FIGURE A-13

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

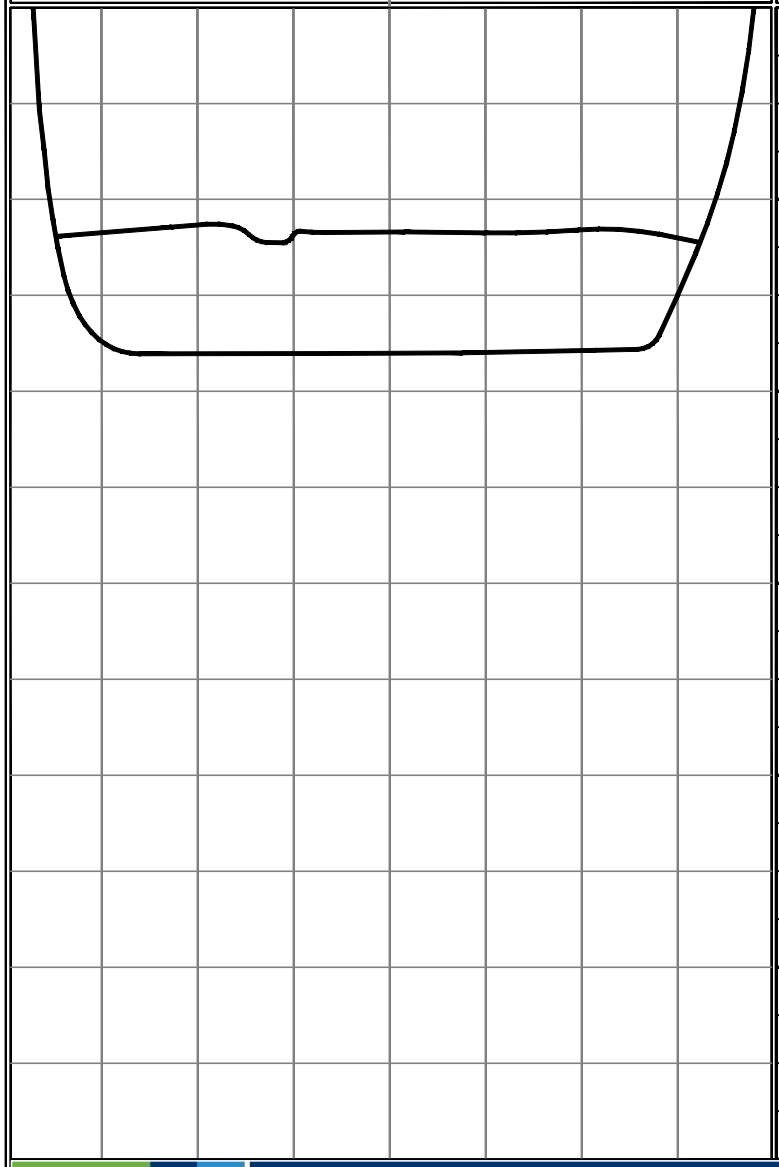
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-14 / IT-6

GROUND ELEVATION 1,989' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION South End of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SC	TOPSOIL: Dark brown, moist, medium dense, clayey SAND; with fine gravel; several large boulders and rootlets.
2							DECOMPOSED GRANITIC ROCK: Light brownish yellow, moist, friable, unconsolidated, DECOMPOSED GRANITIC ROCK; highly altered; iron oxide staining.
4							Total Depth = 3.6 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
6							
8							
10							
12							

SCALE = 1 in./2 ft.

FIGURE A-14

Ninyo & Moore

TEST PIT LOG

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

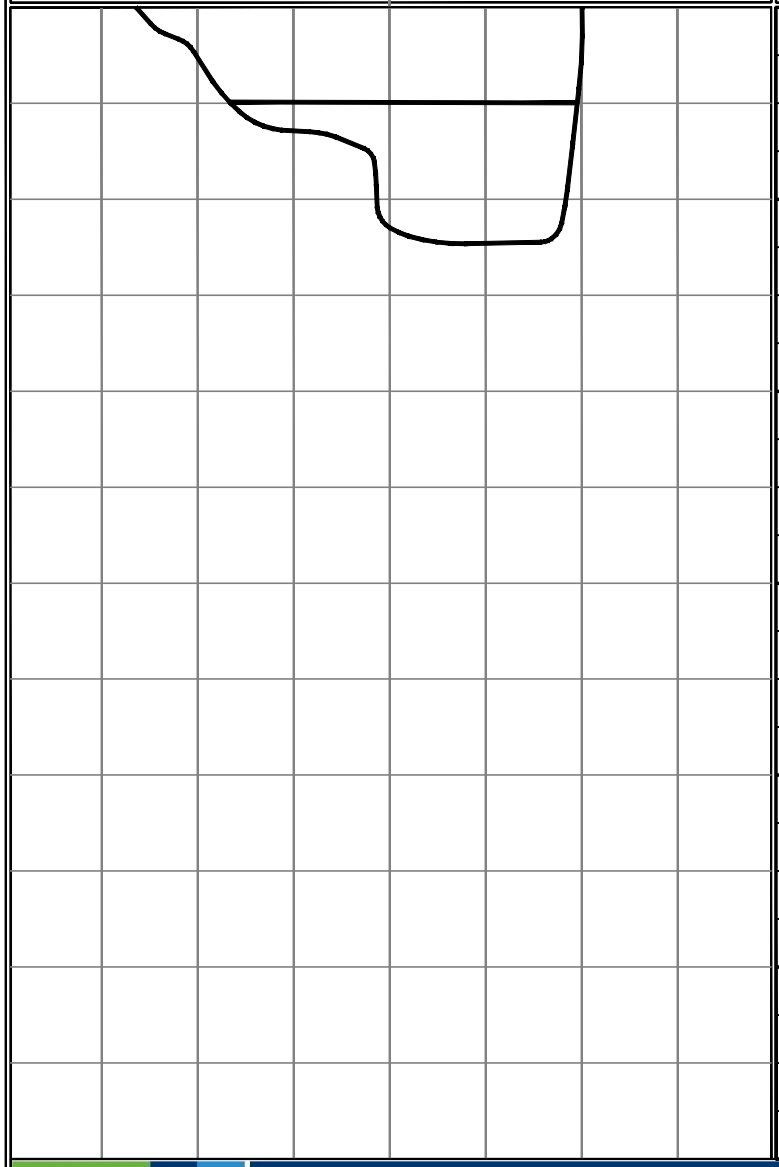
PROJECT NO.	DATE
109107001	12/20

DATE EXCAVATED 11/19/2020 TEST PIT NO. TP-15 / IT-7

GROUND ELEVATION 1,983' ± (MSL) LOGGED BY BAB

METHOD OF EXCAVATION Backhoe

LOCATION South End of Site



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■					SC	TOPSOIL: Dark brown, moist, medium dense, clayey SAND; with fine gravel; several boulders up to 15 inches in size.
4	■						DECOMPOSED GRANITIC ROCK: Light brownish yellow, moist, friable, unconsolidated, DECOMPOSED GRANITIC ROCK.
							Total Depth = 4.9 feet. Groundwater not encountered during excavation. Backfilled on 11/19/2020. Notes: Groundwater, though not encountered at the time of excavation may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

SCALE = 1 in./4 ft.

FIGURE A-15

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory test pits in Appendix A.

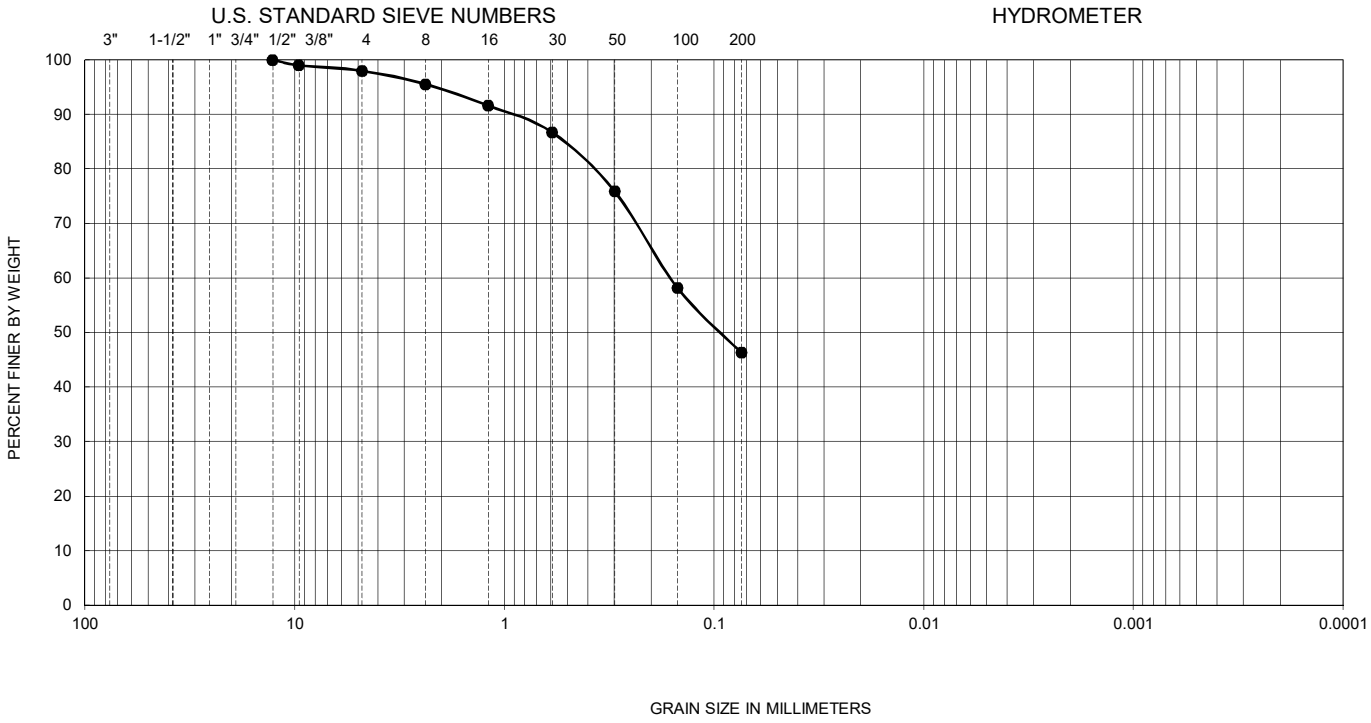
Gradation Analysis
Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain size distribution curves are shown on Figures B-1 through B-5. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

Expansion Index Tests
The expansion index of selected materials was evaluated in general accordance with ASTM D 4829. The specimens were molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The results of these tests are presented on Figure B-6.

Soil Corrosivity Tests
Soil pH and resistivity tests were performed on representative samples in general accordance with CT 643. The soluble sulfate and chloride contents of the selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-7.

R-Value
The resistance value, or R-value, for site soils was evaluated in general accordance with CT 301. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-8.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	TP-8	0.0-2.5	--	--	--	--	--	--	--	--	46	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-2

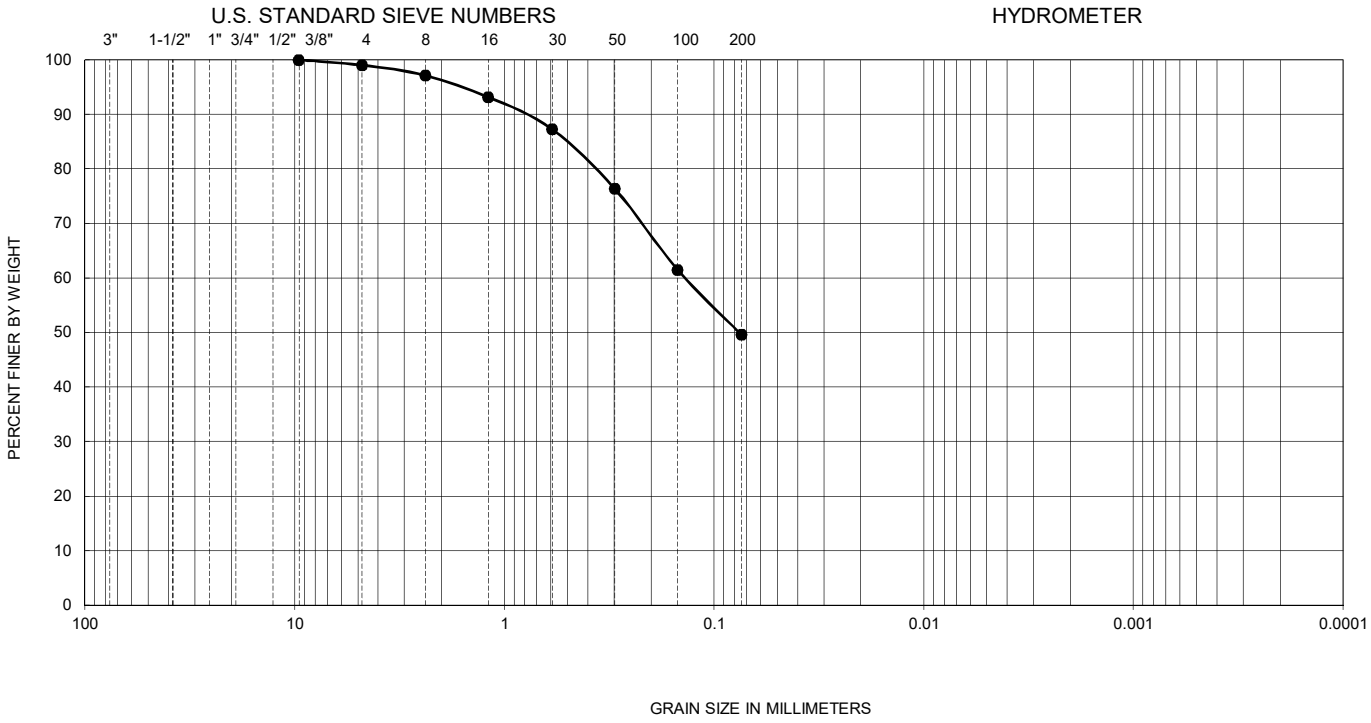
GRADATION TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	TP-10	0.0-3.3	--	--	--	--	--	--	--	--	50	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-3

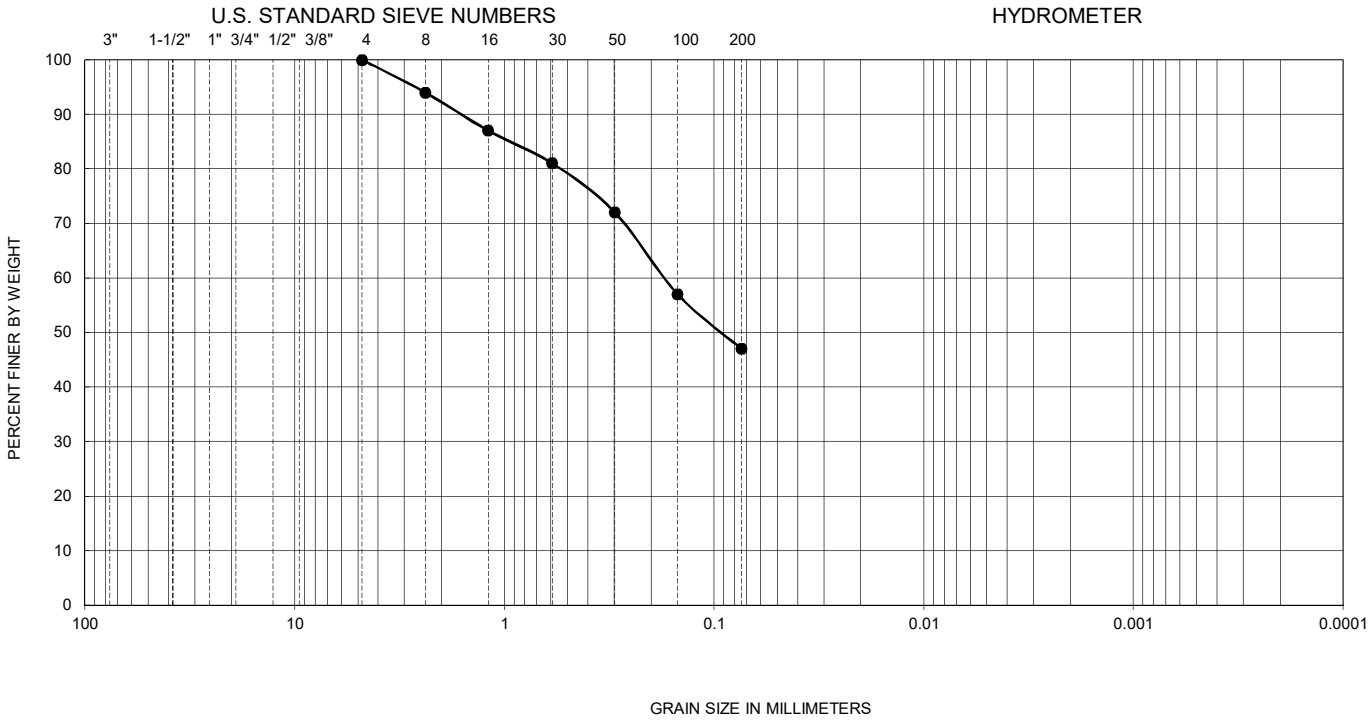
GRADATION TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	TP-11	0.0-1.9	--	--	--	--	--	--	--	--	47	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-4

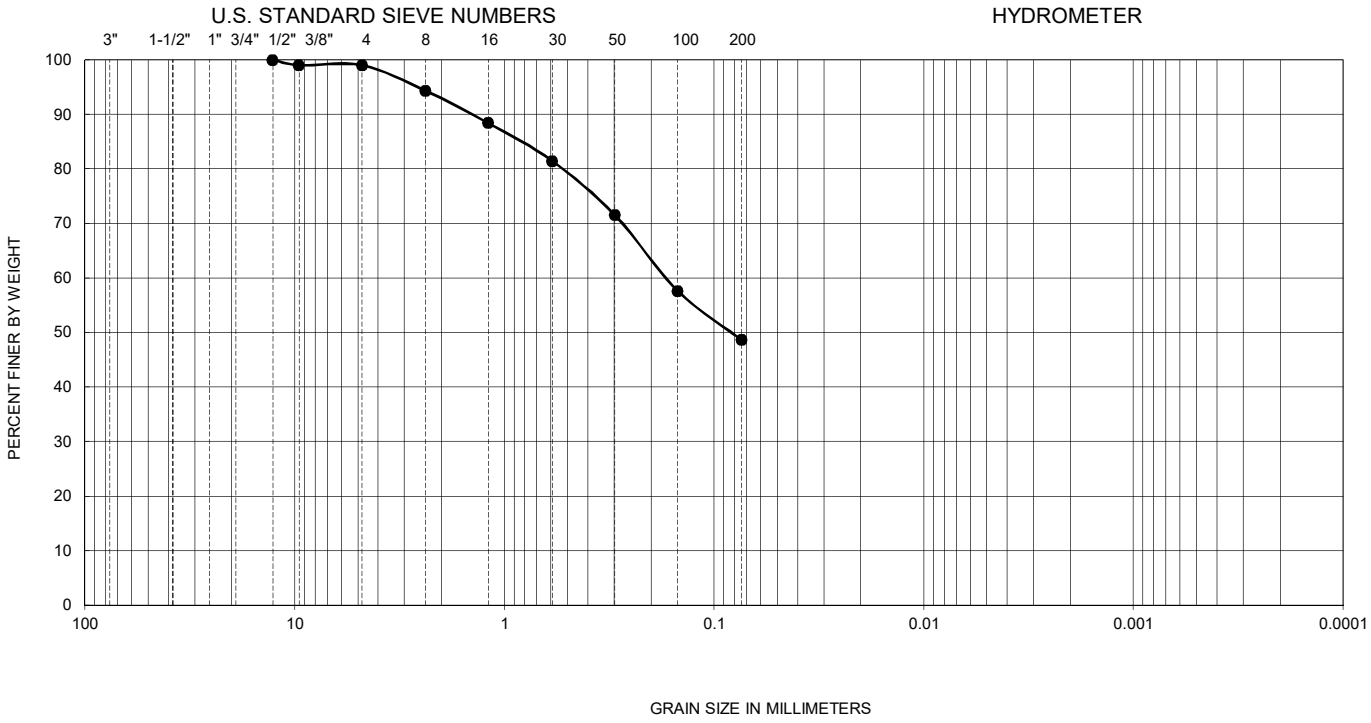
GRADATION TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	TP-14	0.0-2.4	--	--	--	--	--	--	--	--	49	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

FIGURE B-5

GRADATION TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SAMPLE LOCATION	SAMPLE DEPTH (ft)	INITIAL MOISTURE (percent)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (percent)	VOLUMETRIC SWELL (in)	EXPANSION INDEX	POTENTIAL EXPANSION
TP-4	0.0-2.5	12.0	100.9	23.3	0.094	94	High
TP-6	0.0-2.7	13.0	98.8	28.1	0.097	97	High
TP-11	0.0-1.9	12.0	103.3	23.3	0.088	88	Medium
TP-13	1.0-3.3	11.0	106.8	31.9	0.105	105	High
TP-15	0.0-2.0	11.0	107.1	23.5	0.061	61	Medium

PERFORMED IN GENERAL ACCORDANCE WITH ☐ UBC STANDARD 18-2 ☑ ASTM D 4829

FIGURE B-6

EXPANSION INDEX TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
TP-1	0.0-2.0	7.4	1,600	10	0.001	40
TP-14	0.0-2.4	7.5	630	40	0.004	70

[1] PERFORMED IN ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE B-7

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CORROSIVITY TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

SAMPLE LOCATION	SAMPLE DEPTH (ft)	SOIL TYPE	R-VALUE
TP-3	0.0-2.0	Sandy CLAY (CL)	LESS THAN 5
TP-13	1.0-3.3	Sandy CLAY (CL)	LESS THAN 5

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844/CT 301

FIGURE B-8

R-VALUE TEST RESULTS

ALPINE COMMUNITY PARK
ALPINE, CALIFORNIA

109107001 | 12/20

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

APPENDIX C

Infiltration Test Data

Test Date:	11/19/2020	Infiltration Test No.:	IT-1
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	3.3
Test Area (ft^2):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
9:45 AM	2.75	9:55 AM	2.79	10	0.04	20.83	0.53	1.00
9:55 AM	2.79	10:05 AM	2.81	10	0.02	41.67	0.50	0.52
10:05 AM	2.81	10:15 AM	2.81	10	0.00	*DNI*	0.49	*DNI*
10:15 AM	2.81	10:25 AM	2.81	10	0.00	*DNI*	0.49	*DNI*
10:25 AM	2.81	10:35 AM	2.83	10	0.02	36.23	0.48	0.61
10:35 AM	2.83	10:45 AM	2.83	10	0.00	*DNI*	0.47	*DNI*
End of Test #1								
10:50 AM	2.79	11:00 AM	2.79	10	0.00	*DNI*	0.51	*DNI*
11:00 AM	2.79	11:10 AM	2.79	10	0.00	*DNI*	0.51	*DNI*
11:10 AM	2.79	11:20 AM	2.81	10	0.02	41.67	0.50	0.52
11:20 AM	2.81	11:30 AM	2.81	10	0.00	*DNI*	0.49	*DNI*
11:30 AM	2.81	11:40 AM	2.81	10	0.00	*DNI*	0.49	*DNI*
11:40 AM	2.81	11:50 AM	2.83	10	0.02	36.23	0.48	0.61
End of Test #2								
11:52 AM	2.79	12:02 PM	2.79	10	0.00	*DNI*	0.51	*DNI*
12:02 PM	2.79	12:12 PM	2.79	10	0.00	*DNI*	0.51	*DNI*
12:12 PM	2.79	12:22 PM	2.79	10	0.00	*DNI*	0.51	*DNI*
12:22 PM	2.79	12:32 PM	2.81	10	0.02	41.67	0.50	0.52
12:32 PM	2.81	12:42 PM	2.81	10	0.00	*DNI*	0.49	*DNI*
12:42 PM	2.81	12:52 PM	2.83	10	0.02	41.67	0.48	0.53
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/19/2020	Infiltration Test No.:	IT-2
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	3.8
Test Area (ft^2):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
9:30 AM	3.33	9:40 AM	3.35	10	0.02	40.00	0.46	0.57
9:40 AM	3.35	9:50 AM	3.38	10	0.02	40.00	0.44	0.59
9:50 AM	3.38	10:00 AM	3.38	10	0.00	*DNI*	0.43	*DNI*
10:00 AM	3.38	10:10 AM	3.38	10	0.00	*DNI*	0.43	*DNI*
10:10 AM	3.38	10:20 AM	3.38	10	0.00	*DNI*	0.43	*DNI*
10:20 AM	3.38	10:30 AM	3.38	10	0.00	*DNI*	0.43	*DNI*
End of Test #1								
10:32 AM	3.31	10:42 AM	3.31	10	0.00	*DNI*	0.49	*DNI*
10:42 AM	3.31	10:52 AM	3.33	10	0.02	40.00	0.48	0.56
10:52 AM	3.33	11:02 AM	3.33	10	0.00	*DNI*	0.47	*DNI*
11:02 AM	3.33	11:12 AM	3.35	10	0.02	40.00	0.46	0.57
11:12 AM	3.35	11:22 AM	3.35	10	0.00	*DNI*	0.45	*DNI*
11:22 AM	3.35	11:32 AM	3.35	10	0.00	*DNI*	0.45	*DNI*
End of Test #2								
11:35 AM	3.29	11:45 AM	3.29	10	0.00	*DNI*	0.51	*DNI*
11:45 AM	3.29	11:55 AM	3.29	10	0.00	*DNI*	0.51	*DNI*
11:55 AM	3.29	12:05 PM	3.29	10	0.00	*DNI*	0.51	*DNI*
12:05 PM	3.29	12:15 PM	3.29	10	0.00	*DNI*	0.51	*DNI*
12:15 PM	3.29	12:25 PM	3.29	10	0.00	*DNI*	0.51	*DNI*
12:25 PM	3.29	12:35 PM	3.29	10	0.00	*DNI*	0.51	*DNI*
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/18/2020	Infiltration Test No.:	IT-3
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	3.2
Test Area (ft^2):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
9:09 AM	2.67	9:19 AM	2.75	10	0.08	10.42	0.49	2.10
9:19 AM	2.75	9:29 AM	2.79	10	0.04	20.83	0.43	1.14
9:29 AM	2.79	9:39 AM	2.82	10	0.03	27.78	0.40	0.90
9:39 AM	2.82	9:49 AM	2.83	10	0.01	83.33	0.38	0.31
9:49 AM	2.83	9:59 AM	2.83	10	0.00	*DNI*	0.37	*DNI*
9:59 AM	2.83	10:09 AM	2.83	10	0.00	*DNI*	0.37	*DNI*
End of Test #1								
10:17 AM	2.65	10:27 AM	2.66	10	0.01	83.33	0.55	0.25
10:27 AM	2.66	10:37 AM	2.67	10	0.01	83.33	0.54	0.25
10:37 AM	2.67	10:47 AM	2.68	10	0.01	83.33	0.53	0.25
10:47 AM	2.68	10:57 AM	2.68	10	0.00	*DNI*	0.52	*DNI*
10:57 AM	2.68	11:07 AM	2.68	10	0.00	*DNI*	0.52	*DNI*
11:07 AM	2.68	11:17 AM	2.68	10	0.00	*DNI*	0.52	*DNI*
End of Test #2								
11:28 AM	2.68	11:38 AM	2.68	10	0.00	*DNI*	0.52	*DNI*
11:38 AM	2.68	11:48 AM	2.68	10	0.00	*DNI*	0.52	*DNI*
11:48 AM	2.68	11:58 AM	2.69	10	0.01	83.33	0.52	0.25
11:58 AM	2.69	12:08 PM	2.69	10	0.00	*DNI*	0.51	*DNI*
12:08 PM	2.69	12:18 PM	2.69	10	0.00	*DNI*	0.51	*DNI*
12:18 PM	2.69	12:28 PM	2.69	10	0.00	*DNI*	0.51	*DNI*
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/18/2020	Infiltration Test No.:	IT-4
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	4.2
Test Area (ft²):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
1:40 PM	3.17	1:50 PM	3.19	10	0.02	41.67	1.02	0.31
1:50 PM	3.19	2:00 PM	3.21	10	0.02	41.67	1.00	0.32
2:00 PM	3.21	2:10 PM	3.21	10	0.00	*DNI*	0.99	*DNI*
2:10 PM	3.21	2:20 PM	3.23	10	0.02	41.67	0.98	0.32
2:20 PM	3.23	2:30 PM	3.23	10	0.00	*DNI*	0.97	*DNI*
2:30 PM	3.23	2:40 PM	3.23	10	0.00	*DNI*	0.97	*DNI*
End of Test #1								
2:41 PM	3.15	2:51 PM	3.17	10	0.02	41.67	1.04	0.31
2:51 PM	3.17	3:01 PM	3.17	10	0.00	*DNI*	1.03	*DNI*
3:01 PM	3.17	3:11 PM	3.19	10	0.02	41.67	1.02	0.31
3:11 PM	3.19	3:21 PM	3.19	10	0.00	*DNI*	1.01	*DNI*
3:21 PM	3.19	3:31 PM	3.19	10	0.00	*DNI*	1.01	*DNI*
3:31 PM	3.19	3:41 PM	3.19	10	0.00	*DNI*	1.01	*DNI*
End of Test #2								
3:46 PM	3.15	3:56 PM	3.15	10	0.00	*DNI*	1.05	*DNI*
3:56 PM	3.15	4:06 PM	3.15	10	0.00	*DNI*	1.05	*DNI*
4:06 PM	3.15	4:16 PM	3.15	10	0.00	*DNI*	1.05	*DNI*
4:16 PM	3.15	4:26 PM	3.15	10	0.00	*DNI*	1.05	*DNI*
4:26 PM	3.15	4:36 PM	3.17	10	0.02	41.67	1.04	0.31
4:36 PM	3.17	4:46 PM	3.17	10	0.00	*DNI*	1.03	*DNI*
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/18/2020	Infiltration Test No.:	IT-5
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	3.8
Test Area (ft²):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
11:50 AM	3.33	12:00 PM	3.38	10	0.05	16.67	0.45	1.40
12:00 PM	3.38	12:10 PM	3.40	10	0.02	41.67	0.41	0.59
12:10 PM	3.40	12:20 PM	3.42	10	0.02	41.67	0.39	0.60
12:20 PM	3.42	12:30 PM	3.42	10	0.00	*DNI*	0.38	*DNI*
12:30 PM	3.42	12:40 PM	3.44	10	0.02	41.67	0.37	0.62
12:40 PM	3.44	12:50 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
End of Test #1								
1:35 PM	3.42	1:45 PM	3.42	10	0.00	*DNI*	0.38	*DNI*
1:45 PM	3.42	1:55 PM	3.44	10	0.02	41.67	0.37	0.62
1:55 PM	3.44	2:05 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
2:05 PM	3.44	2:15 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
2:15 PM	3.44	2:25 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
2:25 PM	3.44	2:35 PM	3.46	10	0.02	41.67	0.35	0.64
End of Test #2								
2:38 PM	3.42	2:48 PM	3.44	10	0.02	41.67	0.37	0.62
2:48 PM	3.44	2:58 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
2:58 PM	3.44	3:08 PM	3.44	10	0.00	*DNI*	0.36	*DNI*
3:08 PM	3.44	3:18 PM	3.46	10	0.02	41.67	0.35	0.64
3:18 PM	3.46	3:28 PM	3.46	10	0.00	*DNI*	0.34	*DNI*
3:28 PM	3.46	3:38 PM	3.48	10	0.02	41.67	0.33	0.66
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/19/2020	Infiltration Test No.:	IT-6
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	3.6
Test Area (ft^2)	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
2:13 PM	3.13	2:23 PM	3.15	10	0.02	40.00	0.46	0.57
2:23 PM	3.15	2:33 PM	3.15	10	0.00	*DNI*	0.45	*DNI*
2:33 PM	3.15	2:43 PM	3.17	10	0.02	40.00	0.44	0.58
2:43 PM	3.17	2:53 PM	3.17	10	0.00	*DNI*	0.43	*DNI*
2:53 PM	3.17	3:03 PM	3.19	10	0.02	40.00	0.42	0.60
3:03 PM	3.19	3:13 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
End of Test #1								
3:13 PM	3.19	3:23 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
3:23 PM	3.19	3:33 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
3:33 PM	3.19	3:43 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
3:43 PM	3.19	3:53 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
3:53 PM	3.19	4:03 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
4:03 PM	3.19	4:13 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
End of Test #2								
4:13 PM	3.19	4:23 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
4:23 PM	3.19	4:33 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
4:33 PM	3.19	4:43 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
4:43 PM	3.19	4:53 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
4:53 PM	3.19	5:03 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
5:03 PM	3.19	5:13 PM	3.19	10	0.00	*DNI*	0.41	*DNI*
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.

Test Date:	11/19/2020	Infiltration Test No.:	IT-7
Test Hole Dimensions, W x L (feet):	2 x 2	Excavation Depth (feet):	4.9
Test Area (ft²):	4	Test performed and recorded by:	DP

t_1	d_1 (feet)	t_2	d_2 (feet)	Δt (min)	ΔH (feet)	Percolation Rate (min/in)	H_{avg} (feet)	Infiltration Rate (in/hr)
2:07 PM	4.46	2:17 PM	4.48	10	0.02	40.00	0.43	0.59
2:17 PM	4.48	2:27 PM	4.50	10	0.02	40.00	0.41	0.61
2:27 PM	4.50	2:37 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
2:37 PM	4.50	2:47 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
2:47 PM	4.50	2:57 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
2:57 PM	4.50	3:07 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
End of Test #1								
3:07 PM	4.50	3:17 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
3:17 PM	4.50	3:27 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
3:27 PM	4.50	3:37 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
3:37 PM	4.50	3:47 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
3:47 PM	4.50	3:57 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
3:57 PM	4.50	4:07 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
End of Test #2								
4:07 PM	4.50	4:17 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
4:17 PM	4.50	4:27 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
4:27 PM	4.50	4:37 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
4:37 PM	4.50	4:47 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
4:47 PM	4.50	4:57 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
4:57 PM	4.50	5:07 PM	4.50	10	0.00	*DNI*	0.40	*DNI*
End of Test #3								

Notes:

DNI = did not infiltrate

t_1 = initial time when filling or refilling is completed

d_1 = initial depth to water in hole at t_1

t_2 = final time when incremental water level reading is taken

d_2 = final depth to water in hole at t_2

Δt = change in time between initial and final water level readings

ΔH = change in depth to water or change in height of water column (i.e., $d_2 - d_1$)

H_0 = Initial height of water column

in/hr = inches per hour

Percolation Rate to Infiltration Rate Conversion [1]

$$I_t = \frac{\Delta H \times 60 \times r}{\Delta t\left(r + 2H_{avg}\right)}$$

I_t = tested infiltration rate, inches/hour

ΔH = change in head over the time interval, inches

Δt = time interval, minutes

r = effective radius of test hole

H_{avg} = average head over the time interval, inches

[1] Based on the "Porchet Method" as presented in: Riverside County Flood Control, 2011, Design Handbook for Low Impact Development Best Management Practices: dated September.



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Geotechnical & Environmental Sciences Consultants

Appendix G
Noise Data

FIELD NOISE MEASUREMENT DATA

PROJECT: Alpine Park PROJ. # 000 98.20

SITE IDENTIFICATION: ST 1 OBSERVER(S): JCR

ADDRESS: Near 2501 Engelmann Oak Ln

START DATE / TIME: 3/31/20 - 9:45 AM END DATE / TIME: 3/31/20 - 10:05 AM

METEROLOGICAL CONDITIONS:

TEMP: 62 °F HUMIDITY: 70.0 %R.H. WIND: (CALM) LIGHT MODERATE VARIABLE

WINDSPEED: 0-1 MPH DIR: N NE E SE S SW W NW STEADY GUSTY

SKY: SUNNY CLEAR (OVRCST) PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:

INSTRUMENT: LD LXT TYPE: (G) 2 SERIAL #: 4005

CALIBRATOR: CAL 200 SERIAL #: 2916

CALIBRATION CHECK, BEFORE: 114.0 AFTER 113.98 WINDSCREEN X

SETTINGS: (A-WEIGHTED) (SLOW) FAST FRONTAL (RANDOM) (ANSI) OTHER:

FILE / MEAS #	START TIME	END TIME	L_{eq}	max	1.67	8.33	L 25	50	90	99	min
.814	9:45 AM	10:05 AM	46.5	57.3	55.4	51.5	46.6	41.7	34.7	31.7	29.6

COMMENTS:

NOISE SOURCE INFO:

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL (AMBIENT) OTHER:

ROADWAY TYPE:

OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / (BIRDS) / DIST. INDUSTRIAL

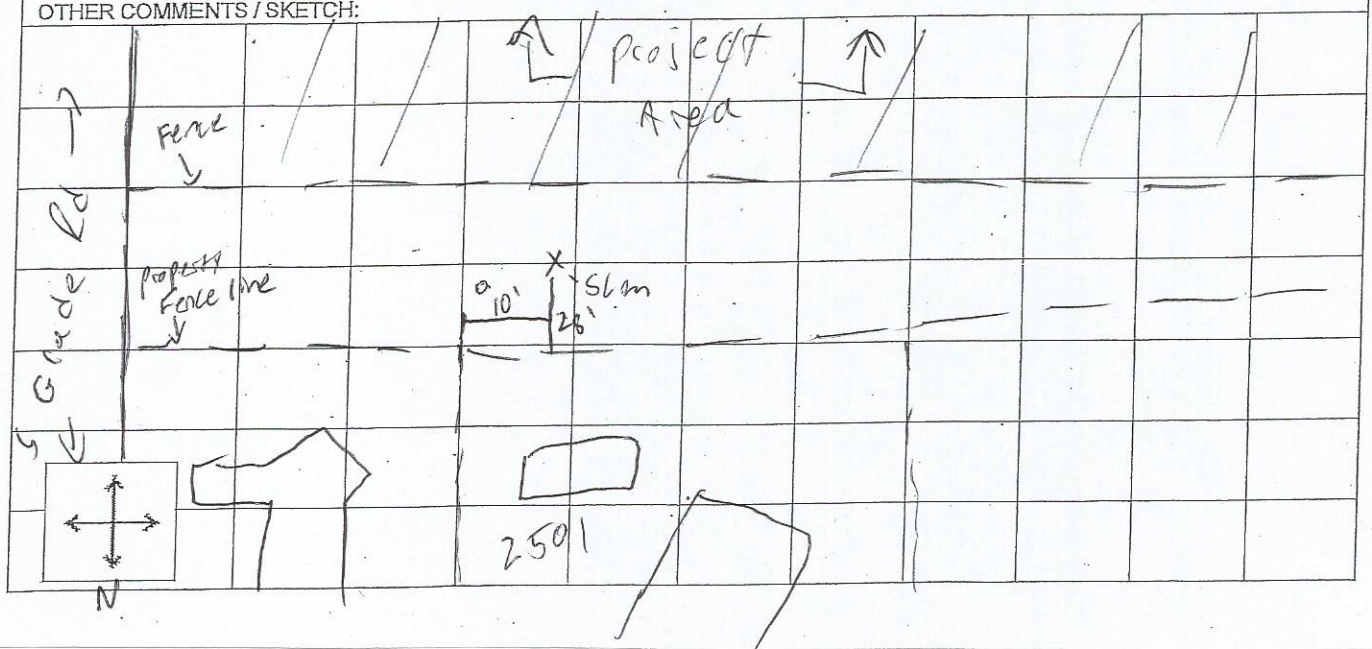
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. (LANDSCAPING ACTIVITIES) / OTHER:

DESCRIPTION / SKETCH:

TERRAIN: HARD SOFT MIXED FLAT OTHER:

PHOTOS:

OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

PROJECT: Alpine Park PROJ. #00098.20

SITE IDENTIFICATION: ST2 OBSERVER(S): JCR

ADDRESS: near 2620 via Viejas

START DATE / TIME: 3/31/20 10:48 Am END DATE / TIME: 3/31/20 11:08 Am

METEROLOGICAL CONDITIONS:

TEMP: 68 °F HUMIDITY: 52.0 %R.H. WIND: (CALM) LIGHT MODERATE VARIABLE

WINDSPEED: 0-1 MPH DIR: N NE E SE S SW W NW STEADY GUSTY

SKY: SUNNY CLEAR (OVRCST) PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:

INSTRUMENT: LD LXT TYPE: (1) 2 SERIAL #: 4005

CALIBRATOR: CAL 200 SERIAL #: 2916

CALIBRATION CHECK, BEFORE: 114.0 AFTER 113.96 WINDSCREEN X

SETTINGS: A-WEIGHTED (SLOW) FAST FRONTAL RANDOM (ANSI) OTHER:

FILE / MEAS #	START TIME	END TIME	L_{eq}	max	1.67	8.33	25	50	90	99	min
							L				
815	10:48 Am	11:08	51.2	68.5	61.8	54.6	50.3	45.3	37.7	35.3	33.1

COMMENTS:

NOISE SOURCE INFO:

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL (AMBIENT) OTHER:

ROADWAY TYPE:

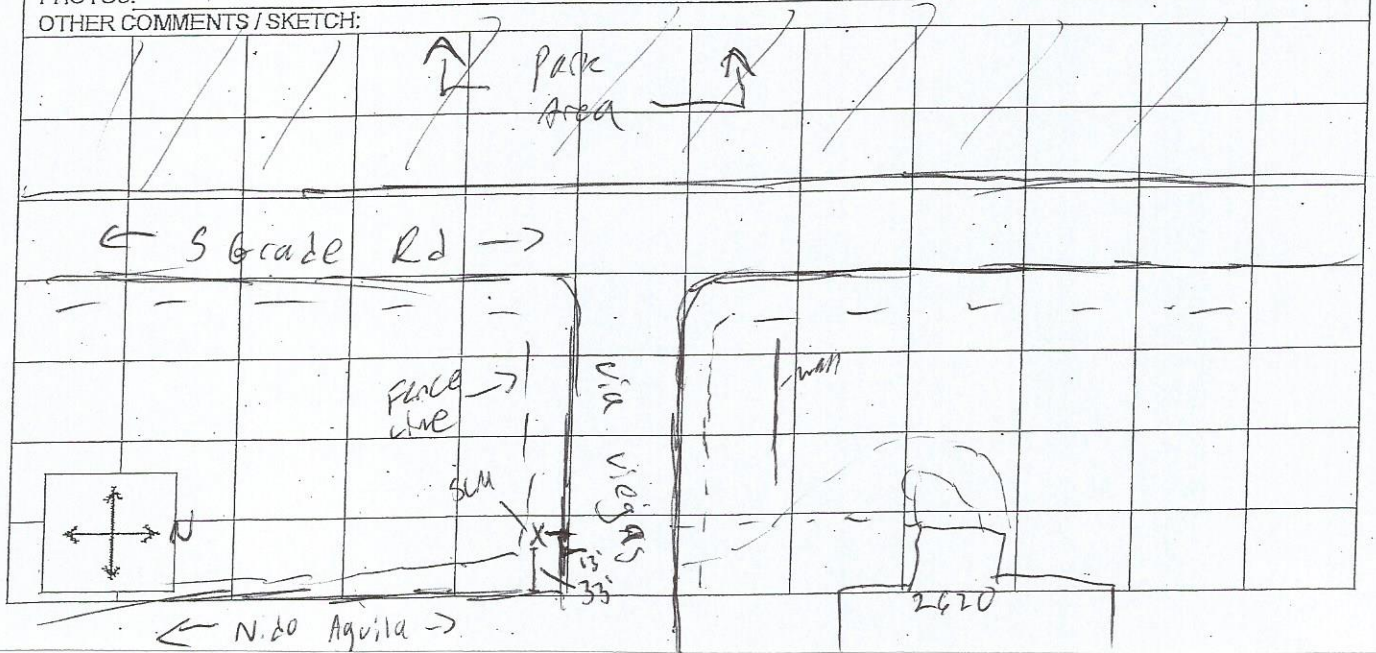
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / (BIRDS) / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:

TERRAIN: (HARD) SOFT MIXED FLAT OTHER:

PHOTOS:

OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

PROJECT: Alpine Park PROJ. # 000 98.20

SITE IDENTIFICATION: ST3 OBSERVER(S): JCR

ADDRESS: Park Area North of Grade Rd

START DATE / TIME: 3/31/20 · 11:48 am END DATE / TIME: 3/31/20 · 12:08 pm

METEROLOGICAL CONDITIONS:

TEMP: 68 °F HUMIDITY: 49.0 %R.H. WIND: CALM LIGHT MODERATE VARIABLE

WINDSPEED: 0-1 MPH DIR: N NE E SE S SW W NW STEADY GUSTY

SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:

INSTRUMENT: LD LXT TYPE: 1 2 SERIAL #: 4605

CALIBRATOR: CAL 200 SERIAL #: 2916

CALIBRATION CHECK, BEFORE: 114.0 AFTER 113.93 WINDSCREEN X

SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

FILE / MEAS #	START TIME	END TIME	L_{eq}	max	1.67	8.33	L 25	50	90	99	min
1816	11:48	12:08	45.6	55.1	52.5	50.2	46.8	42.1	37.7	34.4	32.3

COMMENTS:

NOISE SOURCE INFO:

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:

ROADWAY TYPE:

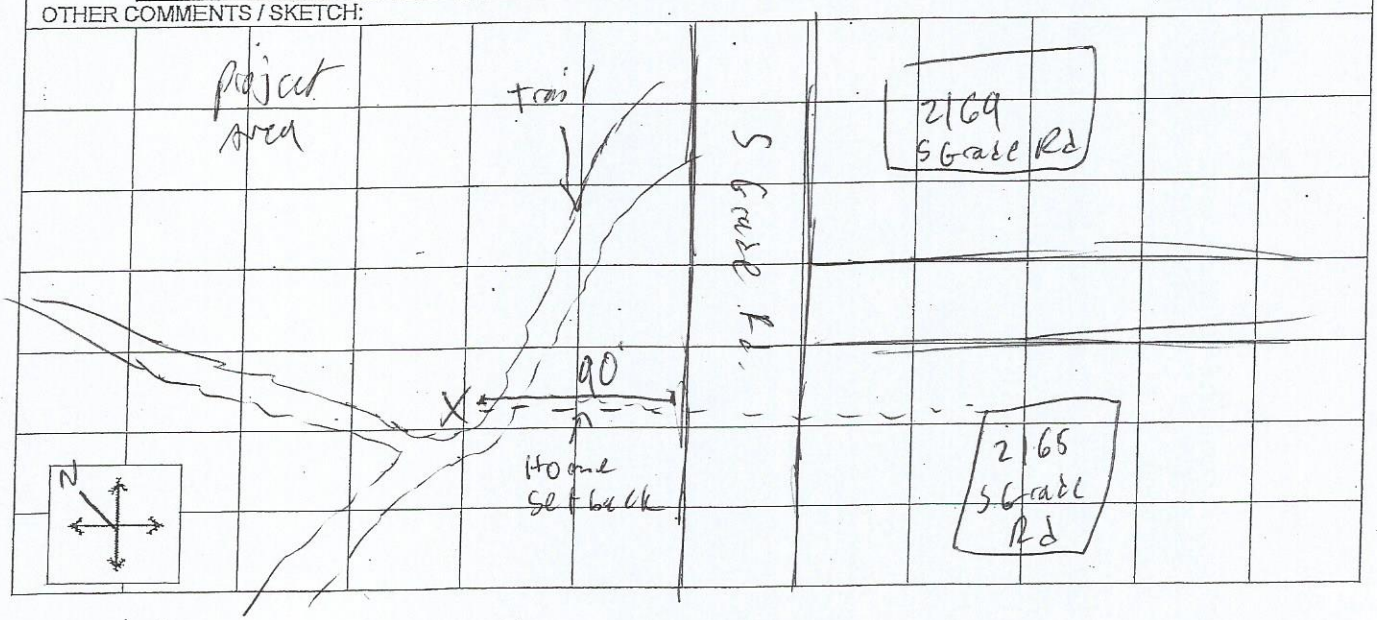
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:

TERRAIN: HARD SOFT MIXED FLAT OTHER:

PHOTOS:

OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

PROJECT: Alpine Park PROJ. # 00098.20

SITE IDENTIFICATION: LT1 OBSERVER(S): JCK

ADDRESS: Ofer park near Grass Rd & Calle de compadres

START DATE / TIME: 3/27/20 - 11:05 AM END DATE / TIME: 3/31/20 · 10:20 Am

METEROLOGICAL CONDITIONS:

TEMP: ____ °F HUMIDITY: ____ %R.H. WIND: CALM LIGHT MODERATE VARIABLE

WINDSPEED: ____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY

SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:

INSTRUMENT: ~~Piccolo~~ Piccolo II - D TYPE: 1 (2) SERIAL #: 2602

CALIBRATOR: CAL 200 SERIAL #: 2916

CALIBRATION CHECK, BEFORE: 94.0 AFTER 94.2 WINDSCREEN X

SETTINGS: ~~A-WEIGHTED~~ ~~SLOW~~ FAST FRONTAL ~~RANDOM~~ ~~ANSI~~ OTHER: ____

FILE / MEAS #	START TIME	END TIME	L_{eq}	max	1.67	8.33	25	L 50	90	99	min

COMMENTS: mounted @ 11:40, Cleared @ 11:50 Am
pick up: 10:20 Am

NOISE SOURCE INFO:

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: ____

ROADWAY TYPE: ____

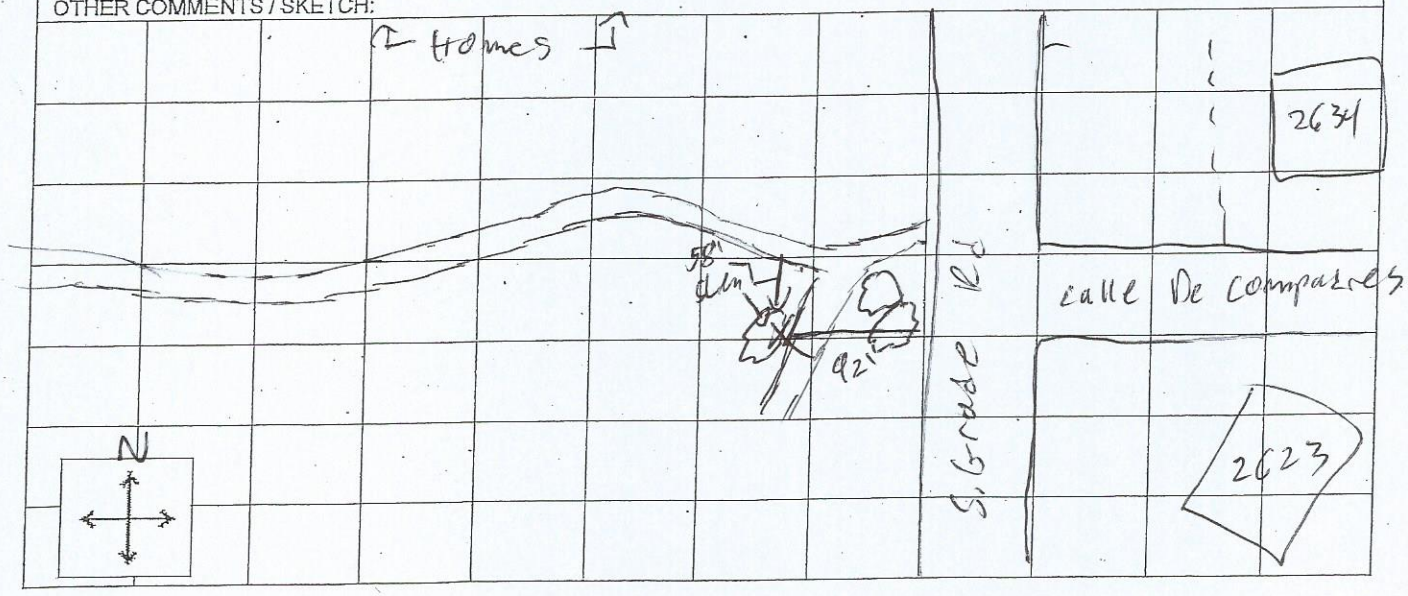
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:

TERRAIN: HARD ~~SOFT~~ MIXED FLAT OTHER: ____

PHOTOS: ____

OTHER COMMENTS / SKETCH:



FIELD NOISE MEASUREMENT DATA

PROJECT: Alpine park PROJ. # 00098.20

SITE IDENTIFICATION: LT2 OBSERVER(S): JCK

ADDRESS: Near 2387 S Grade Rd

START DATE / TIME: 3/27/20 11:07 am END DATE / TIME: 3/31/20 11:28

METEROLOGICAL CONDITIONS:

TEMP: ____ °F HUMIDITY: ____ %R.H. WIND: CALM LIGHT MODERATE VARIABLE

WINDSPEED: ____ MPH DIR: N NE E SE S SW W NW STEADY GUSTY

SKY: SUNNY CLEAR OVRCST PRTLY CLOUDY FOG RAIN OTHER:

ACOUSTIC MEASUREMENTS:

INSTRUMENT: Piccolo II - E TYPE: 1 (2) SERIAL #: 2502

CALIBRATOR: CAL200 SERIAL #: 2916

CALIBRATION CHECK, BEFORE: 94.0 AFTER 94.2 WINDSCREEN X

SETTINGS: A-WEIGHTED (SLOW) FAST FRONTAL RANDOM (ANSI) OTHER: ____

FILE / MEAS #	START TIME	END TIME	L_{eq}	max	1.67	8.33	L_{25}	L_{50}	L_{90}	L_{99}	min

COMMENTS: clears @ 1:30

pick up: 11:20 am

NOISE SOURCE INFO:

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: ____

ROADWAY TYPE: ____

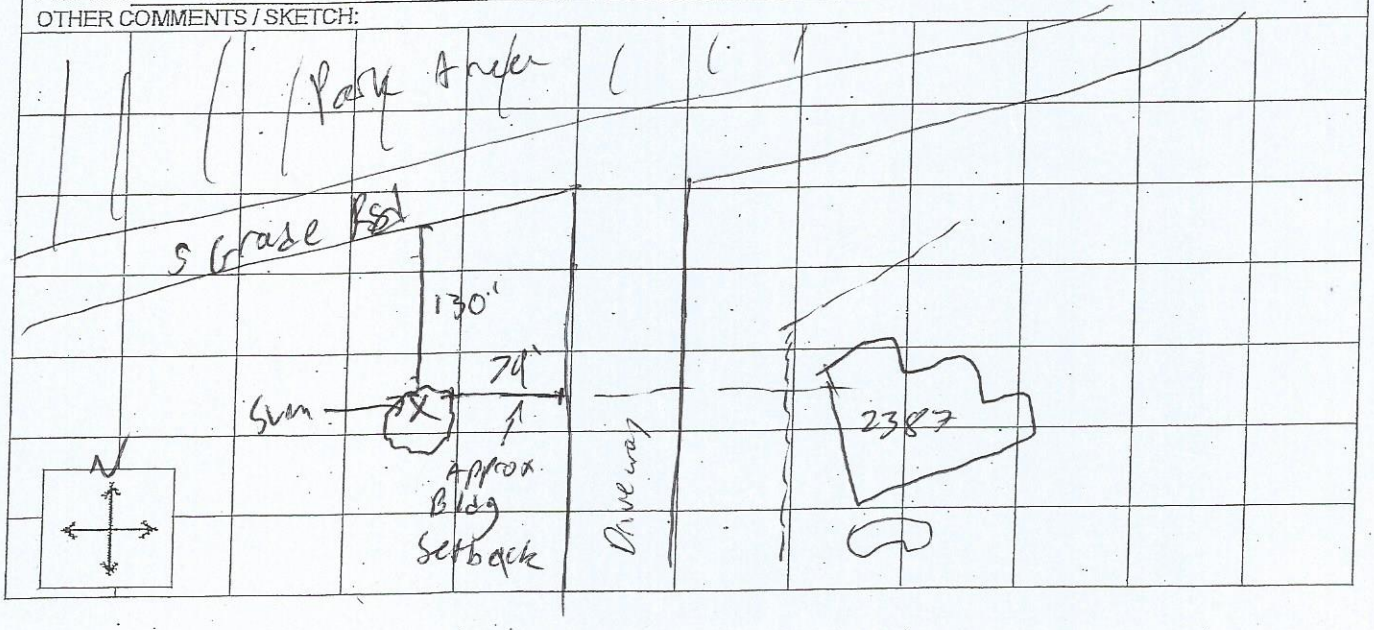
OTHER SOURCES: DIST. AIRCRAFT / RUSTLING LEAVES / DIST. BARKING DOGS / BIRDS / DIST. INDUSTRIAL
DIST. CHILDREN PLAYING / DIST. TRAFFIC / DIST. LANDSCAPING ACTIVITIES / OTHER:

DESCRIPTION / SKETCH:

TERRAIN: HARD (SOFT) MIXED FLAT OTHER: ____

PHOTOS:

OTHER COMMENTS / SKETCH:



General

1st measurement - Reference Measurement 131

11:49 Am start

- 10:00 am session Ended @ 11:45 Am, Skate park was cleared for Sanitation and 12pm session

Skate park is empty

- noise sources: Traffic on 241, music from skate park sound system, Distant skate activity near parking lot, Birds

SLM is positioned at the eastern end (least amount of traffic noise from lake forest and parking lot, various rails and ledges, skaters ride or grind across these features)

Start - 11:49 Am Pre-cal 114.0

End - 12:00 pm

- Measured empty skate park as a reference

Leq	Max	1.67	8.33	25	50	90	99 min
57.0	65.5	61.5	59.5	57.9	56.4	53.5	51.2	49.3

File #: .131

Measurement 2 - active park

Pre cal : 114.0

Notes: 12:00 pm session
SLM placed on eastern end
~ 15 active skaters in park

12:08 pm start ~ 4 active skaters at this end of the park

12:09. Skaters riding up ramp and jumping over bench. Talking / shouting. Music / speech from speakers
Skater landing ~ 69-71 dBA

12:11 : | limited activity, skaters preparing for tricks

12:13: multiple skaters attempting the same trick. Riding up a ramp and jumping over a bench. Skater starts near the middle of the park, heads toward SLM, lands near sewer cap.

12:14: Group of skaters passed near SLM, outside of the park.

12:15 - Skaters attempt tricks on the flat surface part of the grease park

General note
Primary noise sources are skateboards landing or sliding across flat concrete, ledges or metal rails.
- music is present, some traffic noise and talking / shouting

Weather Data

68°F 49% humidity Sunny, clear

wind: 3-4 mph SSW

12:21 pm

10 active skaters at eastern end, near SLM
- skater is instructing younger skaters. having them jump off a short ledge.

12:24

~ 6 skaters jumping and landing near SLM
~ 12-15 ft from SLM
- some talking and shouting
t_{eq}(10s) Range 65-72 dBA at skaters jumping off ledge near SLM

12:28 ~ 19-20 total skaters in park.
~ 7 skaters active near SLM

12:30 less activity
~ 3 skaters attempting to jump and land off ledge

12:32 - Skaters pass near SLM, outside of park.

12:33 - low activity at eastern end
~ 3 active skaters attempting various tricks
- music is constant, ~ 57 - 58 dBA
- traffic nearly inaudible

12:35
~ 5 skaters, similar activity

12:36 - Roller skaters show up
~ 4 Roller skaters, activity not very loud.

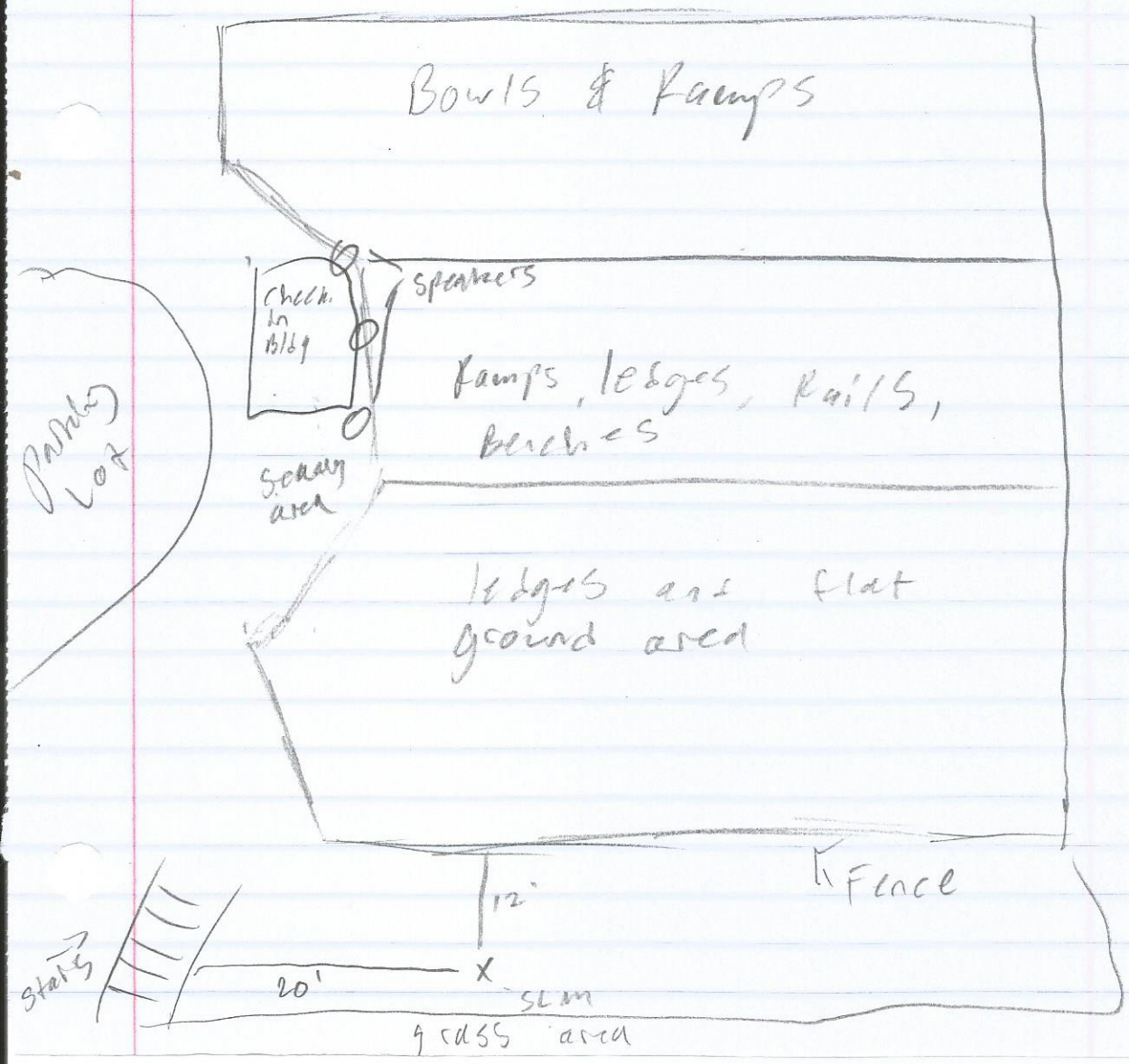
12:37 - limited activity 1 skater near SLM

12:38pm measurement stopped

File #: .132

Leq: 66.5
Max: 85.0
min: 53.0

70'
12'



weather
65°F
wind: 2-6 mph SSE
Ladera Ranch

63% hum.
Sunny, clear

5

Start 1:30 pm pre-cal 114.0

- 1:30
3 scooters & 2 skate boarders
scooters are very quiet, nearly inaudible
- skateboarders occasionally pass by slow

noise sources include traffic noise (~53-56 dBA)

1:32 - 1 additional skate boarder (3 total)
- skaters start skating from southern side into northern side, where there are bowls

1:34
- active skateboarder skating in bowl for about 1 min

notes
skaters drop into and out of bowls, creating wheel on concrete noise and noise from the board landing on pavement

1:36 - 1:37
Single skater riding inside bowl

1:39 pm limited to no activity, single skater to riding around the whole park
1:40 pm

1:41 - 2 active skaters in the bowl area

1:42 - more scooters showed up. 5 total.

1:43 - limited activity, talking and shouting from visitors.

1:44 - limited activity, 1 skateboarder left the park

1:46 activity is calm, mostly scooters near SLM

1:47 - 2 skateboarders active at southern end of park, further from SLM

1:47 to 1:52.
skateboarders are active near southern end.
4 scooters active near SLM but activity is quiet. occasional scooter noise occurs when the body strikes the metal rail on the bowl

1:52 - 1:54
Motor bike active behind SLM

1:55 8 scooters active near SLM in bowl area. Some scooter noise, mostly speech, traffic noise

1:56 - another skateboarder arrived 3 total
11 active visitors total.

1:57 - 1:58 - contaminated, spoke with park visitor

End at 2:00 pm
File# .133.
Leq 37.1
max: 54.1
min: 44.2

111

2nd measurement - southern end
2:02pm start

- 2 active skateboarders riding around the ramp/ledge/rail area.

Noise sources: skateboards impacting with the ground, boards sliding on ground, ledges and rails, boards landing on rails, skate activity is the primary noise source.

2:06 1 active skateboarder, 3-4 scooters riding around creating minimal noise.

2:07 - motor bike passed SLM.

2:09 - single skateboarder doing tricks near south corner of skate park, occasional scooter noise.

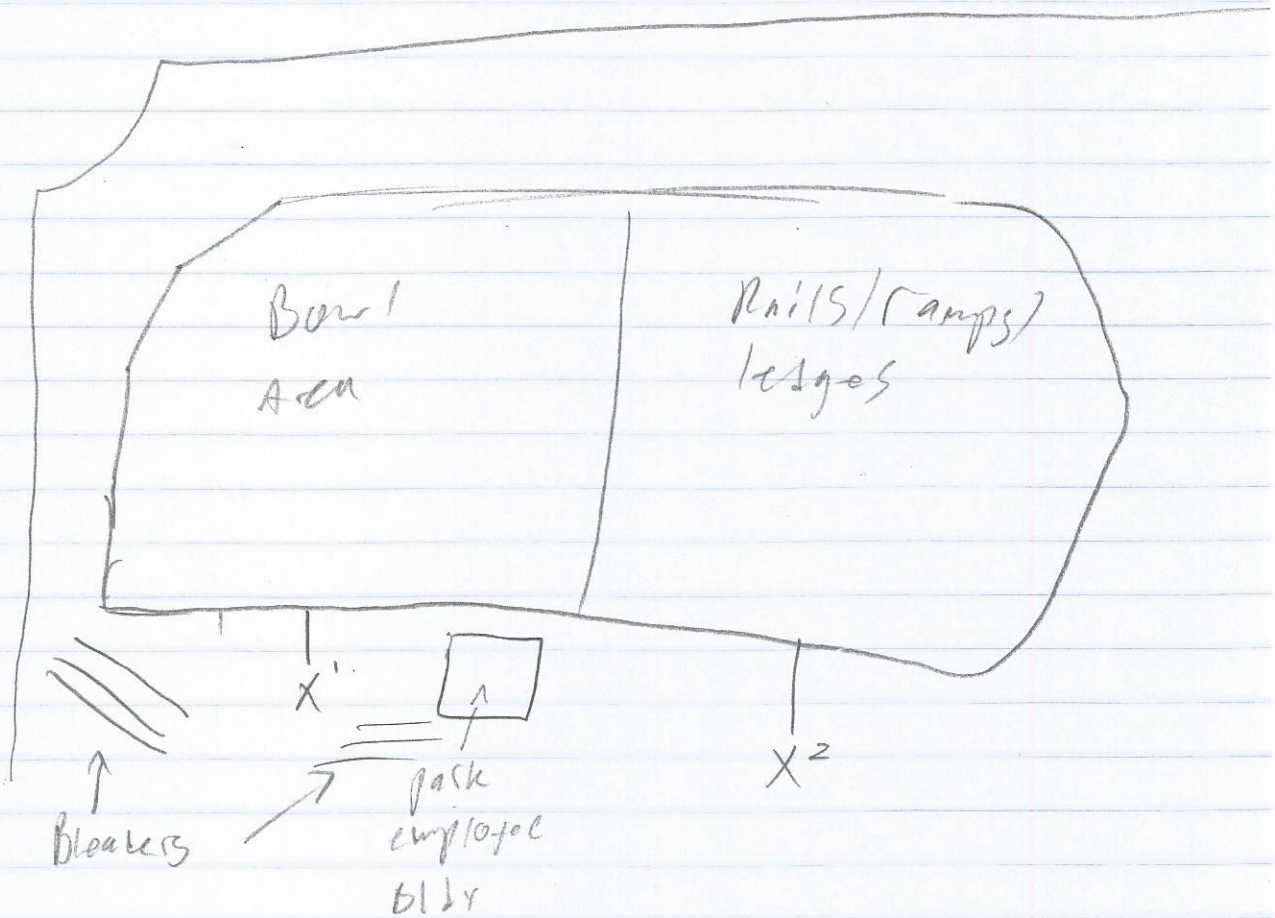
2:12 - motor bike passes by SLM

2:13 - 2 scooters exit park
- 3 skateboarders enter park, passing near SLM.

2:15 - 1 skater leaves and 1 arrives,
2 scooters leave

2:17 landscaping activity started near SLM. Stopped measurement
File #: 134
Leq 59.6
Lmax 75.1
Lmin 46.3

Post Cal: 113.9



Noise Measurement Photographs



LT01 Looking North



LT01 Looking East



LT01 Looking South



LT01 Looking West

Noise Measurement Photographs



LT02 Looking North



LT02 Looking East



LT02 Looking South



LT02 Looking West

Noise Measurement Photographs



ST1 Looking North



ST01 Looking East



ST01 Looking South



ST01 Looking West

Noise Measurement Photographs



ST02 Looking North



ST02 Looking East



ST02 Looking South



ST02 Looking West

Noise Measurement Photographs



ST03 Looking Northeast



ST03 Looking Northwest



ST03 Looking Southeast



ST03 Looking Southwest

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2021
Case Description: Grubbing

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
North	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Excavator	No	40		80.7	310	0

Results

Equipment	Calculated (dBA) *Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	64.9	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.8	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Excavator	No	40		80.7	225	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		67.6	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	68.6	70.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Excavator	No	40		80.7	283	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.6	68.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50'	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Excavator	No	40		80.7	50	0

				Results												
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	81.7	83.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2021
Case Description Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
North	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Excavator	No	40		80.7	310	0
Roller	No	20		80	310	0
Front End Loader	No	40		79.1	310	0
Backhoe	No	40		77.6	310	0
Scraper	No	40		83.6	310	0

	Results Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	64.9	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.2	57.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	61.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	67.7	63.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.7	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Excavator	No	40		80.7	225	0
Roller	No	20		80	225	0
Front End Loader	No	40		79.1	225	0
Backhoe	No	40		77.6	225	0
Scraper	No	40		83.6	225	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	67.6	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	66.9	59.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	64.5	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	70.5	66.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.5	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Excavator	No	40		80.7	283	0
Roller	No	20		80	283	0
Front End Loader	No	40		79.1	283	0
Backhoe	No	40		77.6	283	0
Scraper	No	40		83.6	283	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.9	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	68.5	64.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.5	70.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50'	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Excavator	No	40		80.7	50	0
Roller	No	20		80	50	0
Front End Loader	No	40		79.1	50	0
Backhoe	No	40		77.6	50	0
Scraper	No	40		83.6	50	0

			Results											
	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80	73	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	83.6	85.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2021
Case Description: Drainage

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
North	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Compressor (air)	No	40	80		310	0
Backhoe	No	40		77.6	310	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	64.2	60.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	61.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.8	67.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
East	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Compressor (air)	No	40	80		225	0
Backhoe	No	40		77.6	225	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		64.5	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	68.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
South	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Compressor (air)	No	40	80		283	0
Backhoe	No	40		77.6	283	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		64.9	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		62.5	58.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	66.6	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
50'	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Compressor (air)	No	40	80		50	0
Backhoe	No	40		77.6	50	0

Results

		Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		80	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	81.7	83.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2021
Case Description: Construction

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
North	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	310	0
Dozer	No	40		81.7	310	0
Crane	No	16		80.6	310	0
Compressor (air)	No	40	80		310	0
Generator	No	50		80.6	310	0
Front End Loader	No	40		79.1	310	0
Front End Loader	No	40		79.1	310	0
Front End Loader	No	40		79.1	310	0

			Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		65.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		64.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		64.2	60.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator		64.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	65.8	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Crane	No	16		80.6	225	0
Compressor (air)	No	40	80		225	0
Generator	No	50		80.6	225	0
Front End Loader	No	40		79.1	225	0
Front End Loader	No	40		79.1	225	0
Front End Loader	No	40		79.1	225	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	67.5	59.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	66.9	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	67.6	64.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	66	62.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.6	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
South	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dozer	No	40		81.7	283	0
Dozer	No	40		81.7	283	0
Crane	No	16		80.6	283	0
Compressor (air)	No	40	80		283	0
Generator	No	50		80.6	283	0
Front End Loader	No	40		79.1	283	0
Front End Loader	No	40		79.1	283	0
Front End Loader	No	40		79.1	283	0

				Results												
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)						
				Day		Evening		Night		Day		Evening		Night		
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Crane		65.5	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Compressor (air)		64.9	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Generator		65.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Front End Loader		64.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Total	66.6	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
50'	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Crane	No	16		80.6	50	0
Compressor (air)	No	40	80		50	0
Generator	No	50		80.6	50	0
Front End Loader	No	40		79.1	50	0
Front End Loader	No	40		79.1	50	0
Front End Loader	No	40		79.1	50	0

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	80	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	80.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	81.7	85.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/3/2021
Case Description: Trenching

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
North	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	50	0
Front End Loader	No	40		79.1	50	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	80.7	79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
East	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50	0
Front End Loader	No	40		79.1	50	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.7	79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
South	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50	0
Front End Loader	No	40		79.1	50	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.7	79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
50'	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50	0
Front End Loader	No	40		79.1	50	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	80.7	79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Alpine Park Project Construction Assumptions

Phase	Equipment	CalEEMod Equivalent	Quantity	Start Date	End Date	# of Workdays	Personnel Ave Daily	Worker Trips per day (In/Out)	Total Haul Trucks	Total Haul Truck Trips (In/Out)	Haul Truck Trips per day (In/Out)
Grubbing/Land Clearing	Crawler Tractors	Crawler Tractors	3	10/1/2022	10/15/2022	10	8	16			
Grubbing/Land Clearing	Excavators	Excavators	1	10/1/2022	10/15/2022	10					
Grading/Excavation	Crawler Tractors	Crawler Tractors	3	10/1/2022	5/31/2023	173	18	36	518	1,036	6
Grading/Excavation	Excavators	Excavators	1	10/1/2022	5/31/2023	173					
Grading/Excavation	Rollers	Rollers	1	10/1/2022	5/31/2023	173					
Grading/Excavation	Rubber Tired Loaders	Rubber Tired Loaders	1	10/1/2022	5/31/2023	173					
Grading/Excavation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	10/1/2022	5/31/2023	173					
Grading/Excavation	Wheel Tractor Scraper	Scrapers	2	10/1/2022	5/31/2023	173					
Drainage/Utilities/Subgrade	Air Compressors	Air Compressors	1	5/1/2023	8/31/2023	89	12	24			
Drainage/Utilities/Subgrade	Generator Sets	Generator Sets	1	5/1/2023	8/31/2023	89					
Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	5/1/2023	8/31/2023	89					
Sewer Line Installation	Excavators	Excavators	1	10/1/2022	6/1/2023	174	6	12			
Sewer Line Installation	Rollers	Rollers	1	10/1/2022	6/1/2023	174					
Sewer Line Installation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	10/1/2022	6/1/2023	174					
Construction	Air Compressors	Air Compressors	1	6/1/2023	1/31/2024	175	16	32	328	656	4
Construction	Cranes	Cranes	1	6/1/2023	1/31/2024	175					
Construction	Forklifts	Forklifts	3	6/1/2023	1/31/2024	175					
Construction	Generator Sets	Generator Sets	1	6/1/2023	1/31/2024	175					
Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6/1/2023	1/31/2024	175					
Paving	Pavers	Pavers	1	11/30/2023	1/31/2024	45	6	12			
Paving	Paving Equipment	Paving Equipment	1	11/30/2023	1/31/2024	45					
Paving	Rollers	Rollers	1	11/30/2023	1/31/2024	45					
Architectural Coating	Air Compressors	Air Compressors	1	12/14/2023	1/31/2024	35	2	4			

This spreadsheet calculates traffic noise levels based on TNM Version 2.5 Lookup Tables.

**** Type in yellow cells only.**

Traffic Data:

- ☐ Enter ADT Traffic
- ☐ Enter Loudest-hour Traffic

Units:

- ☐ Metric
- ☐ English

Calculate

ICF INTERNATIONAL®

Link	Roadway	Segment Location	Hard or Soft Ground (H or S)	BARRIER			Total Daily Traffic Volumes **(ADT)**	Traffic Mix		Vehicle Speed	Sound Levels at Receiver Locations			
				Present 1=yes	Height min. 7 ft. max. 32 ft.	Distance 35 ft. or 100 ft.		Number #	Description	mph max. 80	Distance feet, min. 33 max. 1000	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)
1	Existing south Grade Rd	west of Via Viejas	S				4,042	4	Generic - Local (From Local/Lodi)	40	50	60.8	61.2	59.1
2	Existing south Grade Rd	east of Via Viejas	S				3,097	4	Generic - Local (From Local/Lodi)	40	50	59.7	60.1	58.0
3	Existing+project south Grade Rd	west of Via Viejas	S				4,282	4	Generic - Local (From Local/Lodi)	40	50	61.1	61.5	59.4
4	Existing+project south Grade Rd	east of Via Viejas	S				3,337	4	Generic - Local (From Local/Lodi)	40	50	60.0	60.4	58.3
5	near-term south Grade Rd	west of Via Viejas	S				4,130	4	Generic - Local (From Local/Lodi)	40	50	60.9	61.3	59.2
6	near-term south Grade Rd	east of Via Viejas	S				3,185	4	Generic - Local (From Local/Lodi)	40	50	59.8	60.2	58.1
7	near-term+project south Grade Rd	west of Via Viejas	S				4,370	4	Generic - Local (From Local/Lodi)	40	50	61.1	61.6	59.5
8	near-term+project south Grade Rd	east of Via Viejas	S				3,425	4	Generic - Local (From Local/Lodi)	40	50	60.1	60.5	58.4
9														
10														
11														
12														

Appendix H

Alpine Community Park VMT Analysis

TO: Mary Bilse, ICF

FROM: Jonathan Sanchez, PE, TE, PTOE; CR Associates

DATE: September 24, 2021

RE: Alpine Community Park – Vehicle Miles Traveled Analysis

The purpose of this memorandum is to document the results of the Vehicle Miles Traveled (VMT) Analysis conducted for the Alpine Community Park project (the "Proposed Project"). The analysis is based on the revised (2021) State of California Environmental Quality Act (CEQA) Guidelines Section 15064.3. Under Section 15064.3, VMT, which includes the amount and distance of automobile traffic attributable to a project, is identified as the "most appropriate measure of transportation impacts". This methodology is consistent with the guidance provided in the Technical Advisory on Evaluating Transportation Impacts in CEQA, December 2018, authored by the Governor's Office of Planning and Research (OPR).

Project Description

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of community park including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Figures 1** and **2** illustrate the project's regional location and site plan, respectively, while **Figure 3** displays the location of other County Parks in relation to the proposed project.

Analysis Methodology

On September 15th, 2021, the San Diego County Board of Supervisors took action to rescind the currently adopted County of San Diego Transportation Study Guidelines (County TSG) for analyzing VMT as part of the discretionary and CEQA review process. Therefore, the VMT analysis for this project was conducted following the State's OPR guidance.

OPR's technical advisory suggests that lead agencies may screen out VMT using project size, location, transit availability, and provision of affordable housing. Many agencies use these screening thresholds to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study, and these thresholds are identified below:

- Small Project – Projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.
- Map-Based Screening for Residential and Office Projects – Residential and office projects located in areas with low VMT per capita, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT.
- Presumption of Less Than Significant Impact Near Transit Stations – Certain projects (including residential, retail, and office projects, as well as projects that are a mix of these uses) proposed within ½ mile of an existing major transit stop or an existing stop along a high-quality transit corridor will have a less-than-significant impact on VMT.



Alpine Community Park
VMT Analysis

CHEN RYAN

Figure 1
Proposed Project Regional Location



SITE ELEMENT KEY

1. MULTI-USE TRAIL
2. ADMIN/RESTROOM
3. RESTROOM
4. SHADE PAVILION
5. SHADE SHELTER
6. SHADE SAIL
7. LEACH FIELD
8. SKATE PARK GATEWAY
9. COMMUNITY GARDEN
10. GARDEN STORAGE
11. NATURE PLAY AREA
12. 2-5 PLAY AREA
13. VOLUNTEER PAD
14. PICKLEBALL COURTS
15. BASKETBALL COURT
16. GAME TABLE PLAZA
17. PICNIC AREA
18. CORRAL
19. EQUESTRIAN STAGING
20. DROP-OFF/PICK-UP
21. BIKE PARK
22. SKATE PARK
23. BASEBALL FIELD
24. SOCCER FIELD OUTLINE
25. SECONDARY PARK ENTRANCE
26. PRIMARY PARK ENTRANCE
27. PARKING
28. DOG PARK
29. EXISTING TRAIL
30. EXISTING TREE/SHRUB
31. BERMED LANDSCAPE SCREEN
32. PARK MONUMENT SIGN
33. OPEN LAWN AREA
34. FITNESS STATIONS
35. ENGINEERED WOOD FIBER
36. TRASH ENCLOSURE
37. RETENTION BASIN
38. EXISTING LANDSCAPE/TERRAIN

PARKING SUMMARY

229	STANDARD SPACES
10	ADA SPACES
2	VOLUNTEER PAD SPACE
5	EQUESTRIAN STAGING SPACES
246	TOTAL SPACES

DPR DIRECTOR SIGNATURE/APPROVAL DATE

NORTH

Alpine Community Park
VMT Analysis
CHEN RYAN

Figure 2
Proposed Project Site Plan



Alpine Community Park
VMT Analysis
C+R

Figure 3
County Parks Relative to the Project Site

- Presumption of Less Than Significant Impact for Affordable Residential Development – Adding affordable housing to infill locations generally improves jobs-housing match in turn shortening commutes and reducing VMT per capita. In areas where existing jobs-housing match is closer to optimal, affordable housing nevertheless generates less VMT than market-rate housing. Therefore, a project consisting of a high percentage of affordable housing may be a basis for the lead agency to find a less-than-significant impact on VMT.

Based upon the criterion provided at above, the Proposed Project would not be screened out from conducting a VMT Analysis because of the following reasons:

- Project is anticipated to generate 480 ADT (more than 110 ADT);
- Project is not a residential nor office project in a VMT efficient area;
- Project is not located near a high-quality transit station; and
- Project is not an affordable residential development.

Transportation Impact Analysis

The Proposed Project will construct 24 acres of much-needed park space in a community where there currently is no other park space with the same amenities. The proposed park is a locally serving public facility that will serve the community of Alpine and surrounding communities. While a "local serving public facility" category is not included in OPR's Technical Advisory screening criteria, the technical advisory does state the following for local serving land uses, such as local serving retail:

> "Because new retail development typically redistributes shopping trips rather than creating new trips, estimating the total change in VMT (i.e., the difference in total VMT in the area affected with and without the project) is the best way to analyze a retail project's transportation impacts. By adding retail opportunities into the urban fabric and thereby improving retail destination proximity, local-serving retail development tends to shorten trips and reduce VMT. Thus, lead agencies generally may presume such development creates a less-than-significant transportation impact."

Similar to local serving retail, local serving public facilities would redistribute trips rather than creating new trips. Thus, trips are generally shortened as longer trips from a regional facility are redistributed to the local serving public facility.

Based on a GIS exercise as well as aerial imagery, the nearest parks to the residents of Alpine and surrounding communities with comparable amenities are Flinn Springs County Park and Pine Valley County Park (See Figure 3), located approximately 8.2 miles (driving distance – one way) and 15.1 miles (driving distance – one way) away from the community of Alpine.

Therefore, with the construction of the Proposed Project, trips made by Alpine residents associated with parks would be largely internalized within the community of Alpine, hence, shortening trips and reducing their VMT per capita. Reduction in VMT per capita helps the County of San Diego to achieve its long-term climate goals of reducing GHG emissions.

Finally, according to Section 15064.3 "Determining the Significance of Transportation Impacts" of the 2021 CEQA Statute & Guidelines, projects that decrease VMT in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

Conclusion

Based on the analysis results documented above, the Proposed Project is presumed to have a less than significant VMT impact, and no additional analysis would be required.

Appendix I

Alpine Community Park Transportation Impact Study

Alpine Community Park

Transportation Impact Study

July 2020

Prepared for

ICF
525 B Street, Suite 1700
San Diego, CA 92101

Prepared by

CHEN RYAN
3900 Fifth Avenue, Suite 310
San Diego, CA 92103

ES.1 Project Setting

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park space including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot.

Trip generation rates for the Proposed Project were derived from the SANDAG's (not so) Brief Guide to Vehicular Traffic Generation Rates for the San Diego Region (April 2002). Trip generation calculations are provided in Chapter 3. The Proposed Project would generate a total of 480 daily trips, including 20 trips (10-in / 10-out) during the AM peak hour and 39 trips (20-in / 19-out) during the PM peak hour.

Project access will be provided via two driveways located along South Grade Road. The first driveway will be located on the eastern side of the property as a new intersection leg of the South Grade Road and Calle de Compadres intersection and it will operate as an all-way stop-controlled intersection. The second driveway will be a new intersection located at the southern end of the property and it will operate as a side-street stop-controlled intersection. Both driveways will allow for full access.

The following two (2) roadway segments and five (5) intersections were analyzed in the study:

Roadway Segments

- South Grade Road, between Alpine Boulevard and Via Viejas
- South Grade Road, between Via Viejas and Tavern Road

After implementation of the Proposed Project, the roadway segment of South Grade Road, between Alpine Boulevard and Tavern Road will be divided as follows:

- South Grade Road, between Alpine Boulevard and Project Driveway #1 / Calle de Compadres
- South Grade Road, between Project Driveway #1 / Calle de Compadres and Via Viejas
- South Grade Road, between Via Viejas and Project Driveway #2
- South Grade Road, between Project Driveway #2 and Tavern Road

Intersections

1. East Victoria Road / South Grade Road & Alpine Boulevard (Signal)
2. South Grade Road & Project Driveway #1 / Calle De Compadres (SSSC)
3. South Grade Road & Via Viejas (SSSC)
4. Tavern Road & South Grade Road (AWSC)
5. Project Driveway #2 & South Grade Road (SSSC) [1]

[1] Project driveway does not exist under Existing conditions; therefore, it is only analyzed under "With Project" scenarios.

Freeway mainline segments were not analyzed since the Proposed Project is not anticipated to add more than 50 peak hour trips, in either direction, to a freeway mainline segment.

ES.2 Significant Impacts to Roadway Network and Mitigation Measures

The Proposed Project will not have a significant impact on any of the study roadway segments and intersections under each of the studied scenarios.

Existing Conditions

Roadway Segment Analysis

All roadway segments within the project study area currently operate at acceptable LOS B under Existing Conditions.

All roadway segments are also projected to operate at LOS C or better with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, since the traffic associated with the Proposed Project would not cause a Circulation Element Road to operate at LOS E or F, the Proposed Project would not be associated with a significant impact to these roadway segments.

Intersection Analysis

All intersections within the project study area currently operate at acceptable LOS B during both the AM and PM peak hours.

All intersections are also projected to operate at LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, the traffic associated with the Proposed Project would not add more than five peak hour trips to the critical movement of an unsignalized intersection and/or add more than one second of delay to a signalized intersection operating at a substandard level under Near-Term Year 2023 Base with Project conditions. Therefore, no significant project related impacts were identified, and no mitigation is required.

Near-Term Year 2023 Base Conditions

Roadway Segment Analysis

All roadway segments within the project study area would operate at acceptable LOS C or better under Near-Term Year 2023 Base Conditions.

All roadway segments are also projected to operate at LOS C or better with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, since the traffic associated with the Proposed Project would not cause a Circulation Element Road to operate at LOS E or F, the Proposed Project would not be associated with a significant impact to these roadway segments.

Intersection Analysis

All intersections within the project study area would operate at acceptable LOS B during both the AM and PM peak hours under Near-Term Year 2023 Base conditions.

All intersections are also projected to operate at LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

Based on the County of San Diego significance criteria outlined in Section 2.5 of this report, the traffic associated with the Proposed Project would not add more than five peak hour trips to the critical movement of an unsignalized intersection and/or add more than one second of delay to a signalized intersection operating at a substandard level under Near-Term Year 2023 Base with Project conditions. Therefore, no significant project related impacts were identified, and no mitigation is required.

ES.3 Site Access

The Proposed Project will be located north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. Project access will be provided via the following two (2) driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans California Manual on Uniform Traffic Control Devices (MUTCD) (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

All project driveways are projected to operate at LOS A during both the AM and PM peak hours with the addition of Proposed Project traffic.

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1.0 Introduction

The purpose of this Transportation Impact Study (TIS) is to identify and document potential transportation related impacts associated with the Alpine Community Park Project (Proposed Project), as well as to recommend mitigation measures, as necessary, for any identified impacts to roadway segments, intersections, and freeway on-ramps associated with the Proposed Project.

1.1 Project Background

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park uses including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Table 1.1** provides more detailed information about the proposed amenities. **Figure 1.1** displays the Proposed Project regional location.

Proposed Project access will be provided via two driveways located along South Grade Road. The first driveway will be located on the eastern side of the property as a new leg of the South Grade Road and Calle de Compadres intersection and will operate as an all-way stop-controlled intersection. The second driveway will be a new intersection located at the southern end of the property and it will operate as a new side-street stop-controlled intersection. Both driveways will allow for full access.

Table 1.1 Project Amenities

Amenity	Count	Size
Baseball Field	1	90,000 sf
Basketball Courts	2	5,000 sf
Bike Skills Park	1	20,000 sf
Community Garden	1	5,000 sf
Concession Building	1	1,500 sf
Equestrian Staging Area	1	20,000 sf
Dog Park	1	2.5 acres
Multi-use trails	TBD	TBD
Open Lawn Area	TBD	TBD
Parking Lot	1	215,000 sf
Playground	2	(1) Playground 2-5 = 13,000 sf (1) Playground 5-12 = 21,000 sf
Ranger Office/Restroom	1	2,000 sf
Restroom	2	1,000 sf
RV Host Site	1	1,200 sf
Shaded Picnic Area	TBD	1,000 sf
Skate Park	1	20,000 sf
Soccer/Multi-use Field	4	(2) U12 - 49,500 sf (165x300) (2) U8 - 21,600 sf (120x180)
Softball Field	2	45,000 sf
Tennis Court	2	7,200 sf

1.2 Report Organization

Following this introduction chapter, this report is organized into the following sections:

2.0 Analysis Methodology – This chapter describes the methodologies and standards utilized to analyze the intersection traffic conditions.

3.0 Project Description – This chapter describes the Proposed Project including project trip generation, trip distribution, trip assignment, and study area.

4.0 Existing Conditions – This chapter describes the existing traffic network within the study area and provides analysis results for existing traffic conditions and existing traffic conditions with the addition of the Proposed Project. Mitigation measures, if necessary, for project related impacts are also identified.

5.0 Near-Term Traffic Conditions – This chapter describes near-term developments anticipated to generate additional study area trips by year 2023, the Proposed Project's opening year. Analysis results are provided for the No-Project (Year 2023 Base) and Year 2023 Base with Project conditions, along with recommended mitigation measures, if necessary.

6.0 Site Access, On-Site Circulation, Parking, and Queuing – This chapter addresses access and internal circulation within the project site, parking provided, and driveway queuing.

7.0 Pedestrian, Bicycle, and Transit Assessment – This chapter discusses the Proposed Project site's alternative transportation modes (walking, bicycling, and transit).



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Figure 1.1
Proposed Project Regional Location

2.0 Analysis Methodology

This TIS was performed in accordance with the requirements of the County of San Diego Traffic Study Guidelines and in conformance with the enhanced California Environmental Quality Act (CEQA) project review process. Detailed information on roadway and intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 Level of Service Definition

Level of Service (LOS) is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations.

Table 2.1 Level of Service Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: Highway Capacity Manual 6th Edition

2.2 Roadway Segment Level of Service Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.2** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report. The actual capacity of a roadway facility varies according to its physical attributes. LOS D is considered acceptable within the County of San Diego. Typically, the performance and level of service of a roadway segment is heavily influenced by the ability of the arterial intersections to accommodate peak hour volumes.

Table 2.2 County of San Diego – Roadway Classifications and LOS Standards

No.	Travel Lanes	Design Speed	Road Classification	Level of Service (in ADT)		
				LOS C	LOS D	LOS E
6.1	6	65 mph	Expressway	70,000	**86,000**	108,000
6.2			Prime Arterial	44,600	**50,000**	57,000
4.1A	4	55 mph	Major Road with Raised Median	29,600	**33,400**	37,000
4.1B			Major Road with Intermittent Turn Lanes	27,400	**30,800**	34,200
4.2A		40 mph	Boulevard with Raised Median	24,000	**27,000**	30,000
4.2B			Boulevard with Intermittent Turn Lane	22,500	**25,000**	28,000
2.1A	2	45 mph	Community Collector with Raised Median	13,400	**15,000**	19,000
2.1B			Community Collector w/ Continuous Turn Lane	9,500	**13,500**	19,000
2.1C			Community Collector w/ Intermittent Turn Lane	9,500	**13,500**	19,000
2.1D			Community Collector with Improvement Options	9,500	**13500**	19,000
2.1E			Community Collector	7,100	**10,900**	16,200
2.2A	2	40 mph	Light Collector with Raised Median	9,500	**13,500**	19,000
2.2B			Light Collector with Continuous Turn Lane	9,500	**13,500**	19,000
2.2C			Light Collector with Intermittent Turn Lanes	9,500	**13,500**	19,000
2.2D			Light Collector with Improvement Options	9,500	**13,500**	19,000
2.2E			Light Collector	7,100	**10,900**	16,200
2.2F			Light Collector with Reduced Shoulder	7,800	**8,700**	9,700
2.3A	2	35 mph	Minor Collector with Raised Median	7,000	**8,000**	9,000
2.3B			Minor Collector with Intermittent Turn Lane	7,000	**8,000**	9,000
2.3C			Minor Collector	6,000	**7,000**	8,000

Source: County of San Diego, August 2011

Notes:
Bold numbers indicate the ADT thresholds for acceptable LOS.

These standards are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for circulation element roadway segments.

2.3 Peak Hour Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis for signalized intersections and unsignalized intersections. The following assumptions were utilized in conducting all intersection level of service analysis:

- Peak Hour Factor: Based on existing peak hour counts and applied to existing and near-term conditions.
- Signal Timing: Based on existing signal timing plans (as of April 2020), provided in **Appendix A**.

2.3.1 Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedure as outlined in the Highway Capacity Manual (HCM) 6th Edition signalized intersection analysis methodology. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure

of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for the analysis of signalized intersections are described in **Table 2.3**, identifying the thresholds of control delays and the associated LOS. The computerized analysis of intersection operations was performed utilizing the Synchro Version 10 traffic analysis software by Trafficware Ltd.

Table 2.3 Signalized Intersection LOS Operational Analysis

Average Stopped Delay Per Vehicle	Level of Service (LOS) Characteristics
≤10	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
>10 – 20	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
>20 – 35	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
>35 – 55	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
>55 – 80	LOS E is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 6th Edition

2.3.2 Unsignalized Intersection Analysis

Unsignalized intersections, including side street and all way stop controlled intersections, were analyzed using the Highway Capacity Manual 6th Edition unsignalized intersection analysis methodology. The Synchro Version 10 traffic analysis software supports this methodology and was utilized to produce LOS results. The LOS for a side street stop controlled (SSSC) intersection is determined by the computed control delay and is defined for each minor movement. **Table 2.4** summarizes the LOS criteria for unsignalized intersections.

Table 2.4 LOS Criteria for Stop-Controlled Unsignalized Intersections

Average Stopped Delay Per Vehicle (sec/veh)	LOS
<10	A
>10 to <15	B
>15 to <25	C
>25 to <35	D
>35 to <50	E
>50	F

Source: Highway Capacity Manual 6th Edition

2.4 Determination of Study Area

County Guidelines require that the project study area includes all County Mobility Element roadways and intersections where the Proposed Project is projected to add 200 or more ADT and/or 25 or more peak hour trips.

2.5 Determination of Significant Impacts

This section outlines the thresholds for determination of significant project-related impacts on study area facilities.

2.5.1 Roadway Segments

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume of Level of Service traffic impact on a roadway segment, unless specific facts show that there are other circumstances that mitigate or avoid such impacts:

- The additional or redistributed ADT generated by the Proposed Project will significantly increase congestion on a Circulation Element Road or State Highway currently operating at LOS E or LOS F as identified in **Table 2.5**, or will cause a Circulation Element Road or State Highway to operate at LOS E or LOS F as a result of the Proposed Project, or

- The additional or redistributed ADT generated by the Proposed Project will cause a residential street to exceed its design capacity.

Table 2.5 Measures of Significant Project Impacts to Congestion on Roadway Segments – Allowable Increases on Congested Roadway Segments

Level of Service	Two-Lane Road	Four-Lane Road	Six-Lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

Source: County of San Diego, August 2011

Notes:

1. By adding Proposed Project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
2. The County may also determine impacts have occurred on roads even when a project's traffic or cumulative impacts do not trigger an unacceptable Level of Service, when such traffic uses a significant amount of remaining road capacity.

2.5.2 Signalized Intersections

Table 2.6 displays the measures of significant project impacts to congestion at signalized intersections.

Table 2.6 Measures of Significant Project Impacts to Congestion at Intersections – Allowable Increases at Congested Intersections

Level of Service	Signalized	Unsignalized
LOS E	Delay of 2 seconds	20 peak hour trips on a critical movement
LOS F	Delay of 1 second, or 5 peak hour trips on a critical movement	5 peak hour trips on a critical movement

Source: County of San Diego, August 2011

Notes:

1. A critical movement is an intersection movement (right turn, left turn, and through-movement) that experiences excessive queues, which typically operate at LOS F. Additionally, if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway.
2. By adding Proposed Project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
3. The County may also determine impacts have occurred on roads even when a project's direct or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.
4. For determining significance at signalized intersections with LOS F conditions, the analysis must evaluate both the delay and the number of trips on a critical movement, exceedance of either criteria result in a significant impact.

2.5.3 Unsignalized Intersections

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or Level of Service traffic impact on a roadway segment:

- The additional or redistributed ADT generated by the Proposed Project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate below LOS D, or
- The additional or redistributed ADT generated by the Proposed Project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed ADT generated by the Proposed Project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F.
- The additional or redistributed ADT generated by the Proposed Project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F.
- Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.

3.0 Project Traffic

This section describes the Proposed Project including the project's trip generation, trip distribution, and trip assignment.

3.1 Project Description

The Proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of regional park use including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Figure 3.1** illustrates the Proposed Project site plan.

3.2 Project Trip Generation, Distribution, and Assignment

3.2.1 Project Trip Generation

Trip generation rates for the Proposed Project were derived from the SANDAG's (not so) Brief Guide to Vehicular Traffic Generation Rates for the San Diego Region (April 2002). The project site is currently inactive open space; therefore, no existing trips were credited towards the project's net vehicle trip generation.

Table 3.1 displays the projected daily, as well as AM and PM peak hour, project trip generation.

Table 3.1 Project Trip Generation

Land Use	Units	Trip Rate	ADT	AM Peak Hour					PM Peak Hour				
				%	Trips	Split	In	Out	%	Trips	Split	In	Out
Regional Park (developed)	24 acres	20 / acre	480	4%	20	5:5	10	10	8%	39	5:5	20	19

Source: SANDAG (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002

As shown in Table 3.1, the Proposed Project would generate a total of 480 daily trips, including 20 trips (10-in / 10-out) during the AM peak hour and 39 trips (20-in / 19-out) during the PM peak hour.

3.2.2 Project Trip Distribution

In accordance to County of San Diego guidelines, since the Proposed Project is estimated to generate 480 daily trips, the project trip distribution was manually developed based upon project land uses, location, proximity to freeway access points, and corresponding land uses in the vicinity of the project site. **Figure 3.2** displays the trip distribution patterns associated with the Proposed Project.

3.2.3 Project Trip Assignment

Based upon the project trip generation and distribution, AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figure 3.3**.



SITE ELEMENT KEY

1. MULTI-USE TRAIL
2. ADMIN/RESTROOM
3. RESTROOM
4. SHADE PAVILION
5. SHADE SHELTER
6. SHADE SAIL
7. LEACH FIELD
8. SKATE PARK GATEWAY
9. COMMUNITY GARDEN
10. GARDEN STORAGE
11. NATURE PLAY AREA
12. 2-5 PLAY AREA
13. VOLUNTEER PAD
14. PICKLEBALL COURTS
15. BASKETBALL COURT
16. GAME TABLE PLAZA
17. PICNIC AREA
18. CORRAL
19. EQUESTRIAN STAGING
20. DROP-OFF/PICK-UP
21. BIKE PARK
22. SKATE PARK
23. BASEBALL FIELD
24. SOCCER FIELD OUTLINE
25. SECONDARY PARK ENTRANCE
26. PRIMARY PARK ENTRANCE
27. PARKING
28. DOG PARK
29. EXISTING TRAIL
30. EXISTING TREE/SHRUB
31. BERMED LANDSCAPE SCREEN
32. PARK MONUMENT SIGN
33. OPEN LAWN AREA
34. FITNESS STATIONS
35. ENGINEERED WOOD FIBER
36. TRASH ENCLOSURE
37. RETENTION BASIN
38. EXISTING LANDSCAPE/TERRAIN

PARKING SUMMARY

229	STANDARD SPACES
10	ADA SPACES
2	VOLUNTEER PAD SPACE
5	EQUESTRIAN STAGING SPACES
246	TOTAL SPACES

DPR DIRECTOR SIGNATURE/APPROVAL DATE

NORTH

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Figure 3.1
Proposed Project Site Plan

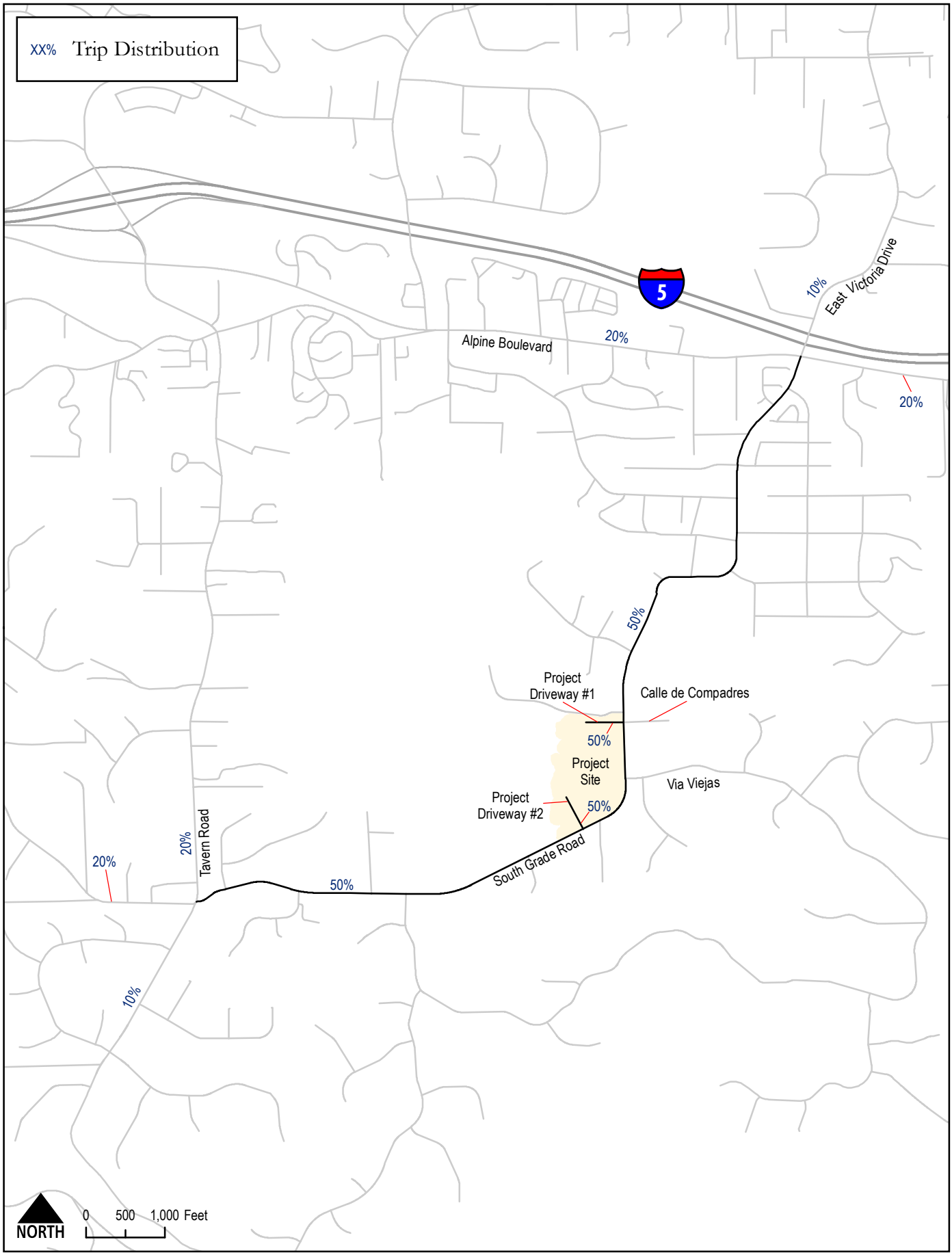

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Figure 3.2
Project Trip Distribution

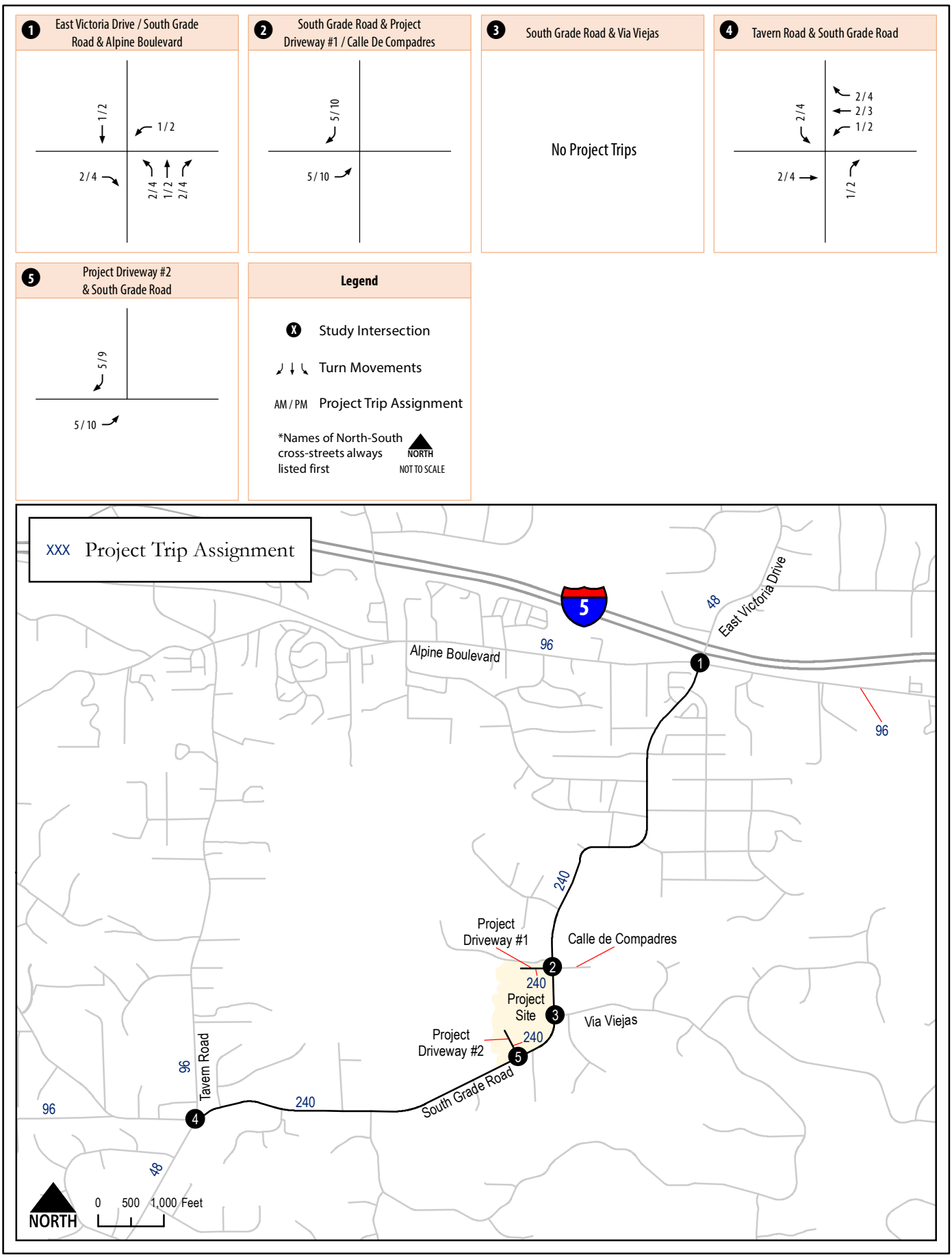

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Figure 3.3
Project Trip Assignment

3.3 Project Study Area

Based on the criteria previously outlines in Section 2.5 and the project trips assignment shown in Figure 3.3, the following two (2) roadway segments and five (5) intersections were analyzed in the study:

Roadway Segments

- South Grade Road, between Alpine Boulevard and Via Viejas
- South Grade Road, between Via Viejas and Tavern Road

After implementation of the proposed project, the roadway segment of South Grade Road, between Alpine Boulevard and Tavern Road will be divided as follows:

- South Grade Road, between Alpine Boulevard and Project Driveway #1 / Calle de Compadres
- South Grade Road, between Project Driveway #1 / Calle de Compadres and Via Viejas
- South Grade Road, between Via Viejas and Project Driveway #2
- South Grade Road, between Project Driveway #2 and Tavern Road

Intersections

1. East Victoria Road / South Grade Road & Alpine Boulevard (Signal)
2. South Grade Road & Project Driveway #1 / Calle De Compadres (SSSC)
3. South Grade Road & Via Viejas (SSSC)
4. Tavern Road & South Grade Road (AWSC)
5. Project Driveway #2 & South Grade Road (SSSC) [1]

[1] Project driveway does not exist under Existing conditions; therefore, it is only analyzed under "With Project" scenarios.

Additionally, the Proposed Project would not contribute 50 or more peak hour trips in either direction on Interstate 8 (I-8). Similarly, the Proposed Project would not add 20 or more peak hour trips to I-8 on/off ramps. Therefore, freeway and ramp impact analyses were not conducted. **Figure 3.4** illustrates the project study area.

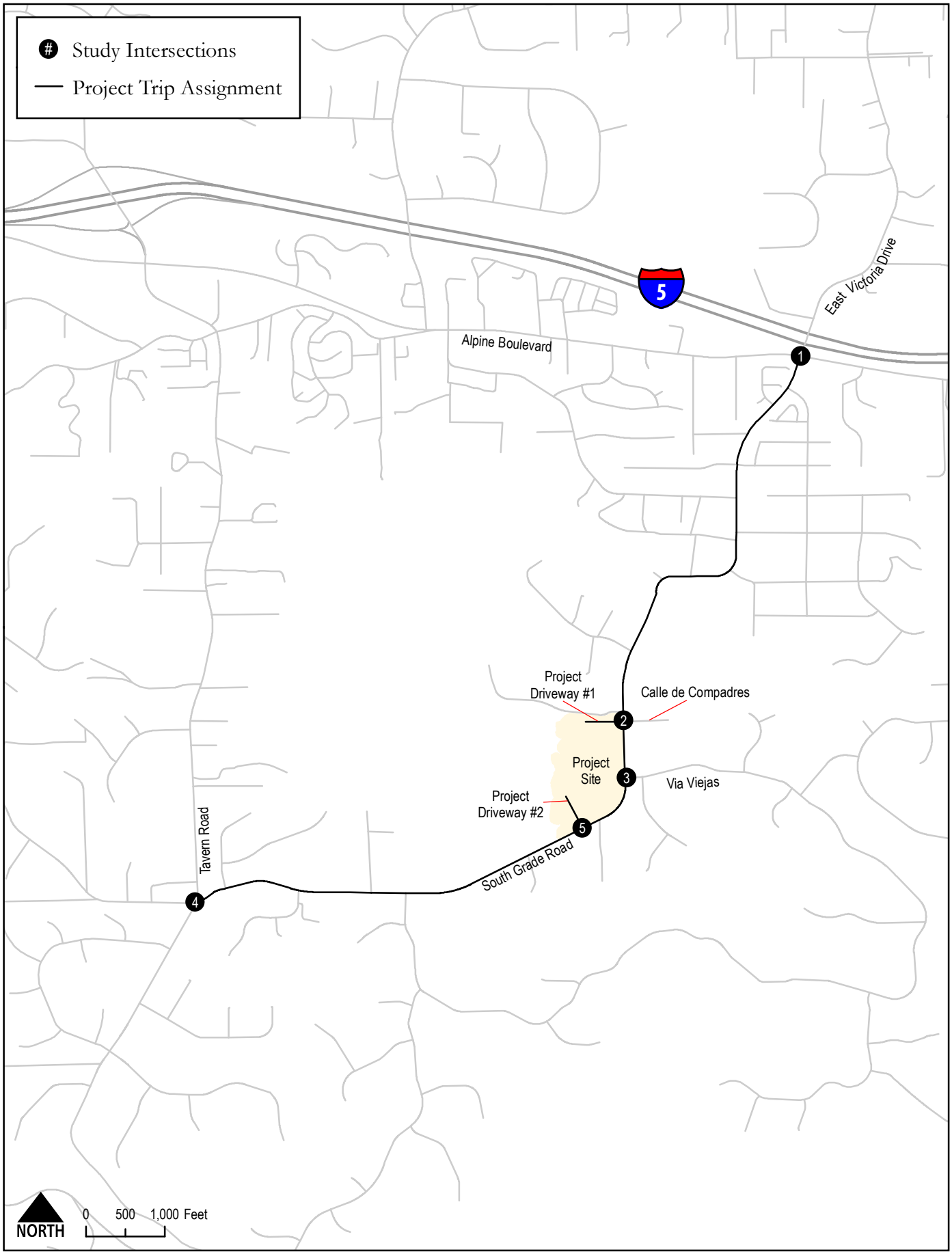

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Figure 3.4
Project Study Area

4.0 Existing Conditions

This section describes key study roadway segments, key study intersections, and daily roadway and peak hour intersection traffic volume information. Additionally, this section provides an analysis of Existing conditions both with and without the addition of project traffic. The scenarios analyzed in this section include:

- Existing
- Existing with Project

4.1 Existing Roadway Network

The following regional and locally significant roadway traverses the study area. The roadway characteristics are described below.

South Grade Road – Within the project study area, South Grade Road is a two-lane undivided roadway between Alpine Boulevard and Tavern Road with a posted speed limit of 40 miles per hour. Sidewalk facilities are intermittently present along both sides of the roadway. Additionally, there are no bicycle facilities along the roadway and parking is prohibited along both sides of the roadway. According to the County of San Diego General Plan Update, South Grade Road is classified as a Two-Lane Light Collector Roadway.

Table 4.1 provides a summary of the roadway characteristics for roadway that traverse the study area.

Table 4.1 Existing Roadway Characteristics

Roadway	From	To	Number of Lanes	Median Type	Sidewalk?	Bike lanes?	Transit Route	Posted Speed Limit
South Grade Road	Alpine Boulevard	Tavern Road	1 NB / 1 SB	None	Mostly Non-contiguous	None	None	40

As documented in Section 3.3, four intersections are included as part of the study area. **Figure 4.1** displays the existing functional classifications and intersection geometrics for the study area roadways and intersections.

4.2 Existing Roadway and Intersection Volumes

Traffic counts for roadway segments and intersections were conducted in March 2020 (prior to the shelter-in-place order associated with COVID-19) and June 2020 (during the shelter-in-place order) by Elite Traffic Dynamics, LLC. Traffic counts conducted in June reflected a decrease of at least 10% when compared to counts from March. Therefore, counts from June were adjusted to reflect normal conditions. Roadway segment counts from March were compared to those from June, and the average percent difference between both traffic counts was utilized to adjust counts from June.

Figure 4.2 shows both existing daily traffic volumes for study area roadway segments and the AM/PM peak hour turning movements for the study intersections. Traffic counts, including the adjusted traffic counts, are provided in **Appendix B**.

4.3 Existing Traffic Conditions

LOS analyses under Existing conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed below.

4.3.1 Roadway Segment Analysis

Table 4.2 displays roadway segment LOS and analysis results for key study roadway segments under Existing conditions.

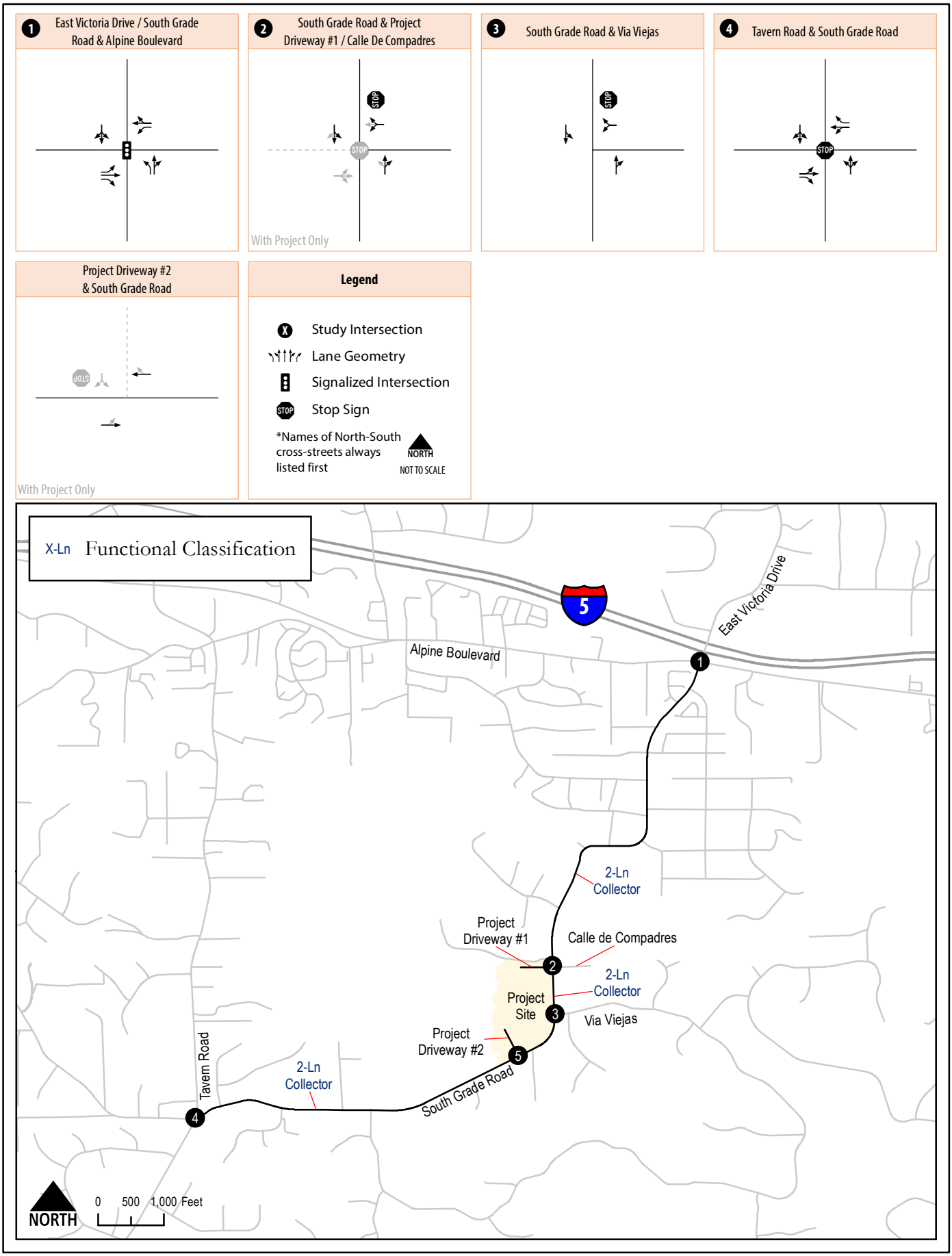

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Figure 4.1
Roadway and Intersection Geometrics

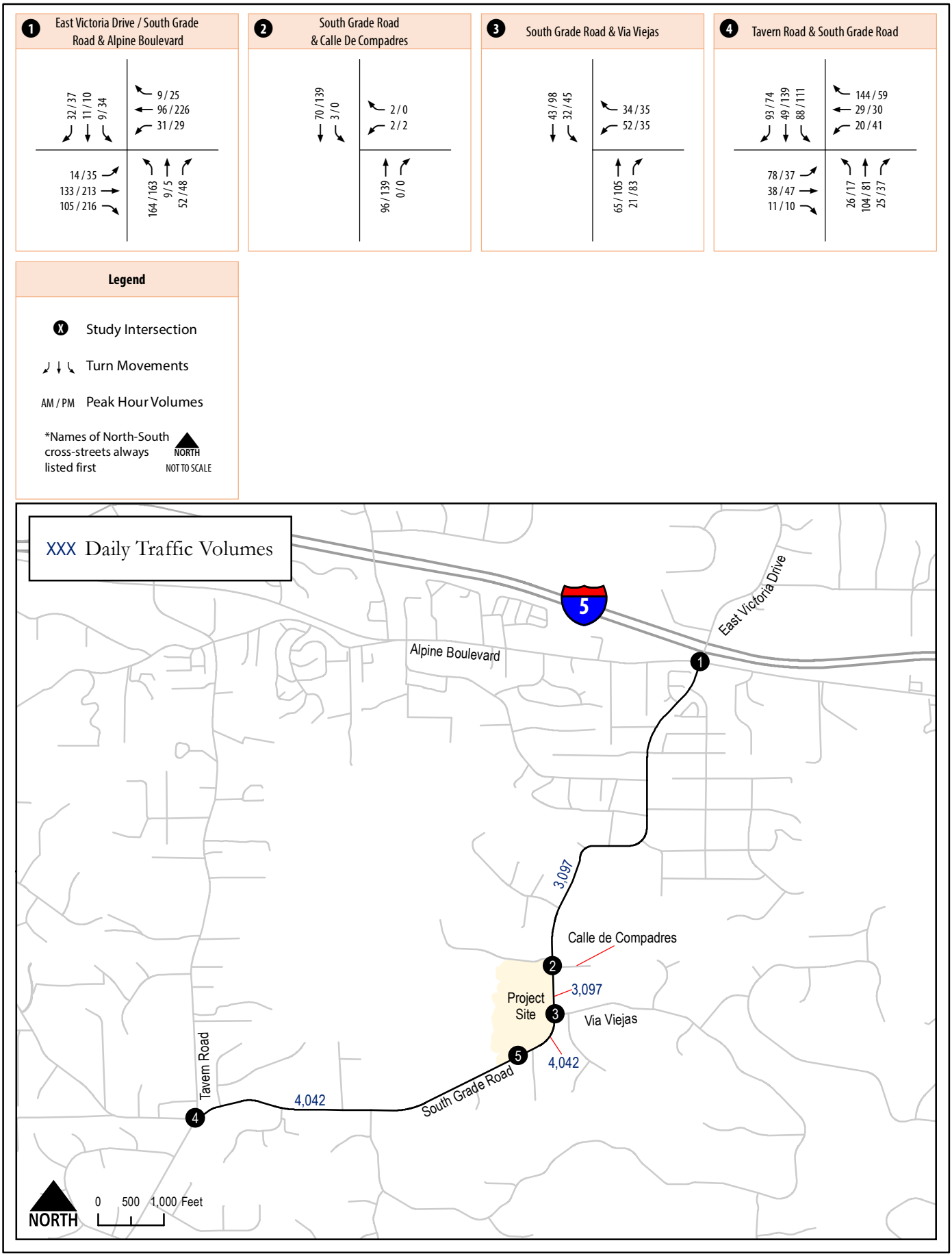

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Figure 4.2
Traffic Volumes
Existing Conditions

Table 4.2 Roadway Segment Level of Service Results – Existing Conditions

Roadway	Segment	Functional Classification	Daily Volume	LOS Threshold (LOS E)	V/C	LOS
South Grade Road	Alpine Boulevard to Via Viejas	2-Lane Light Collector	3,097	16,200	0.191	B
South Grade Road	Via Viejas to Tavern Road	2-Lane Light Collector	4,042	16,200	0.250	B

Notes:
V/C = Volume / Capacity

As shown in Table 4.2, all of the study roadway segments currently operate at acceptable LOS B.

4.3.2 Intersection Analysis

Table 4.3 displays intersection LOS and average vehicle delay results for the key study area intersections under Existing conditions. LOS calculation worksheets for Existing conditions are provided in **Appendix C**.

Table 4.3 Peak Hour Intersection Level of Service Results – Existing Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.3	B	16.9	B
2	South Grade Road / Calle De Compadres	SSSC	9.2	A	10.3	B
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B
4	Tavern Road & South Grade Road	AWSC	13.4	B	10.6	B

Notes:
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.

As shown in Table 4.3, all study area intersections currently operate at an acceptable LOS B during both the AM and PM peak hours.

4.4 Existing with Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Existing with Project conditions were assumed to be identical to existing geometrics (displayed in Figure 4.1) with the addition of the following two project driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to

Caltrans California Manual on Uniform Traffic Control Devices (MUTCD) (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

Existing with Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4.2) and the project trip assignment volumes (displayed in Figure 3.3). Daily roadway and peak hour intersection volumes for this scenario are displayed in **Figure 4.3**.

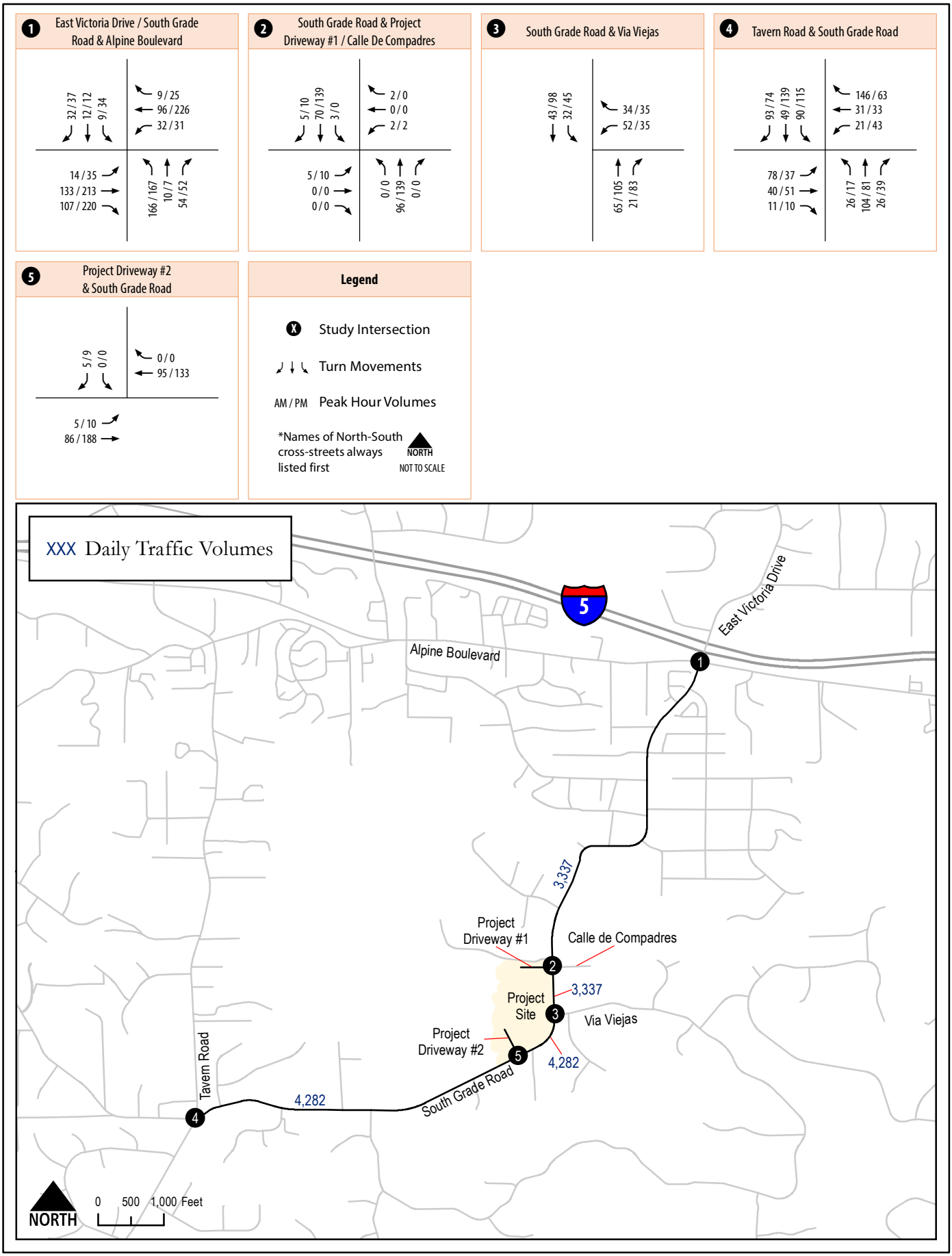

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Figure 4.3
Traffic Volumes
Existing with Project Conditions

4.5 Existing with Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed below.

4.5.1 Roadway Segment Analysis

Table 4.5 displays the LOS analysis results for key study area roadway segments under Existing with Project conditions.

Table 4.4 Roadway Segment Level of Service Results – Existing with Project Conditions

Roadway	Segment	Functional Classification	ADT	LOS Threshold (LOS E)	V/C	LOS	LOS w/o Project	ΔV/C	SI?
South Grade Road	Alpine Boulevard to Project Driveway #1 / Calle de Compadres	2-Lane Light Collector	3,337	16,200	0.206	B	B	0.015	N
South Grade Road	Project Driveway #1 / Calle de Compadres to Via de Viejas	2-Lane Light Collector	3,337	16,200	0.206	B	B	0.015	N
South Grade Road	Via de Viejas to Project Driveway #2	2-Lane Light Collector	4,282	16,200	0.264	C	B	0.015	N
South Grade Road	Project Driveway #2 to Tavern Road	2-Lane Light Collector	4,282	16,200	0.264	C	B	0.015	N

Notes:
V/C = Volume / Capacity
LOS = Level of Service
SI? = Significant Impact?

As shown in Table 4.5, all study area roadway segments are anticipated to operate at acceptable LOS C or better under Existing with Project conditions.

4.5.2 Intersection Analysis

Table 4.5 displays intersection LOS and average vehicle delay results under Existing with Project conditions. LOS calculation worksheets for Existing with Project conditions are provided in **Appendix D**.

Table 4.5 Peak Hour Intersection Level of Service Results – Existing with Project Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec) AM/PM	SI?
			Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS				
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.4	B	17.1	B	16.3 / 16.9	B / B	0.1 / 0.2	N
2	South Grade Road & Project Driveway #1 / Calle De Compadres	AWSC	7.6	A	8.0	A	9.2 / 10.3	A / B	-1.6 / -2.3	N
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B	10.2 / 11.0	B / B	0.0 / 0.0	N
4	Tavern Road & South Grade Road	AWSC	13.6	B	10.8	B	13.4 / 10.6	B / B	0.2 / 0.2	N
5	Project Driveway #2 & South Grade Road	SSSC	8.8	A	9.0	A	N/A	N/A	N/A	N

Notes:
LOS = Level of Service
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
SI = Significant Impact?

As shown in Table 4.5, all of the study area intersections are anticipated continue to operate at acceptable LOS B or better during both the AM and PM peak hours with the addition of Proposed Project traffic.

4.6 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of Proposed Project traffic would not cause a significant impact to study area roadway segments and intersections under Existing with Project conditions.

5.0 Near-Term Year Traffic Conditions

This section provides an analysis of Near-Term Base conditions both with and without the Proposed Project. The scenarios analyzed in this section include:

- Near-Term Year 2023 Base
- Near-Term Year 2023 Base with Project

5.1 Cumulative Project Traffic

The following project was identified by County of San Diego staff as a cumulative project, since it is anticipated to contribute traffic within the project study area:

- Rancho Nuevo Major Subdivision – This project is located at the eastern terminus of Via Tesoro in the Rancho Palo Verde Estates, a residential development in the Alpine community of unincorporated San Diego County. This project proposes to create 14 residential parcels on a 60.15-acre site.

The traffic generated from the project listed above was included in the Near-Term Year 2023 Base scenario. **Figure 5.1** displays the location of the cumulative project identified above.

5.2 Cumulative Projects Trip Generation

Table 5.1 displays the projected trip generation for the cumulative project described above. The trip generation assumptions were developed using trip generation rates outlined in SANDAG's (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region (April, 2002). Trip distribution patterns and trip assignments were manually derived based on the geographical location of the cumulative project, the characteristics of the proposed land uses, and the nearest freeway facilities. Relevant excerpts from the source of information regarding the cumulative project are provided in **Appendix E**.

Table 5.1 Cumulative Project Trip Generation

Cumulative Project	Land Use	Daily Trips	AM Peak Hour (In / Out)	PM Peak Hour (In / Out)
Rancho Nuevo Major Subdivision	Estate	168	14 (4-in / 10-out)	17 (12-in / 5-out)

Source: SANDAG (not so) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002

As shown, the cumulative project is anticipated to generate 168 daily trips, including 14 trips during the AM peak hour and 17 trips during the PM peak hour that will be dispersed throughout the Alpine community and beyond the Proposed Project's study area.

Figure 5.1 displays the location of the cumulative project and **Figure 5.2** displays the cumulative project trip assignment.

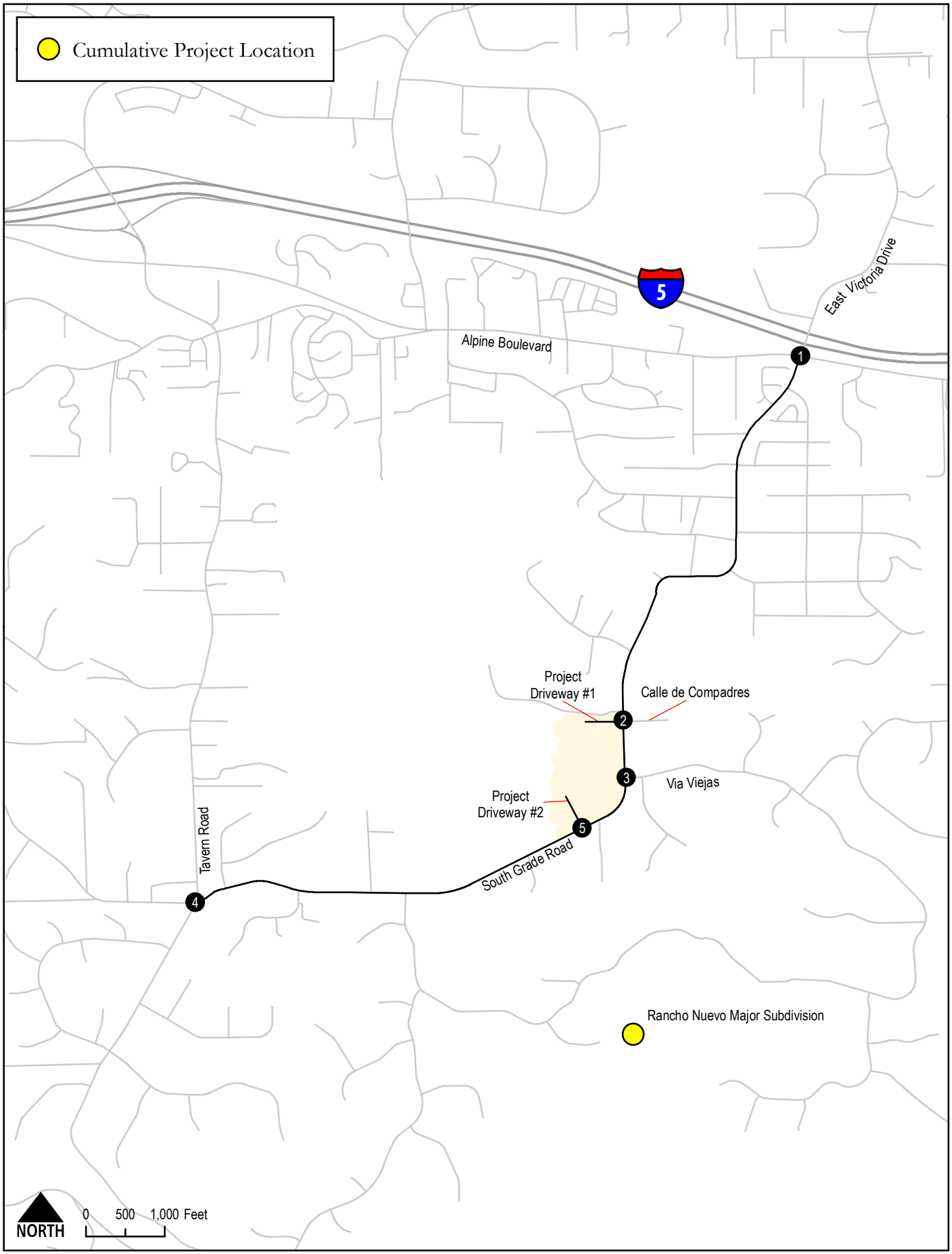

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Figure 5.1
Cumulative Project Location

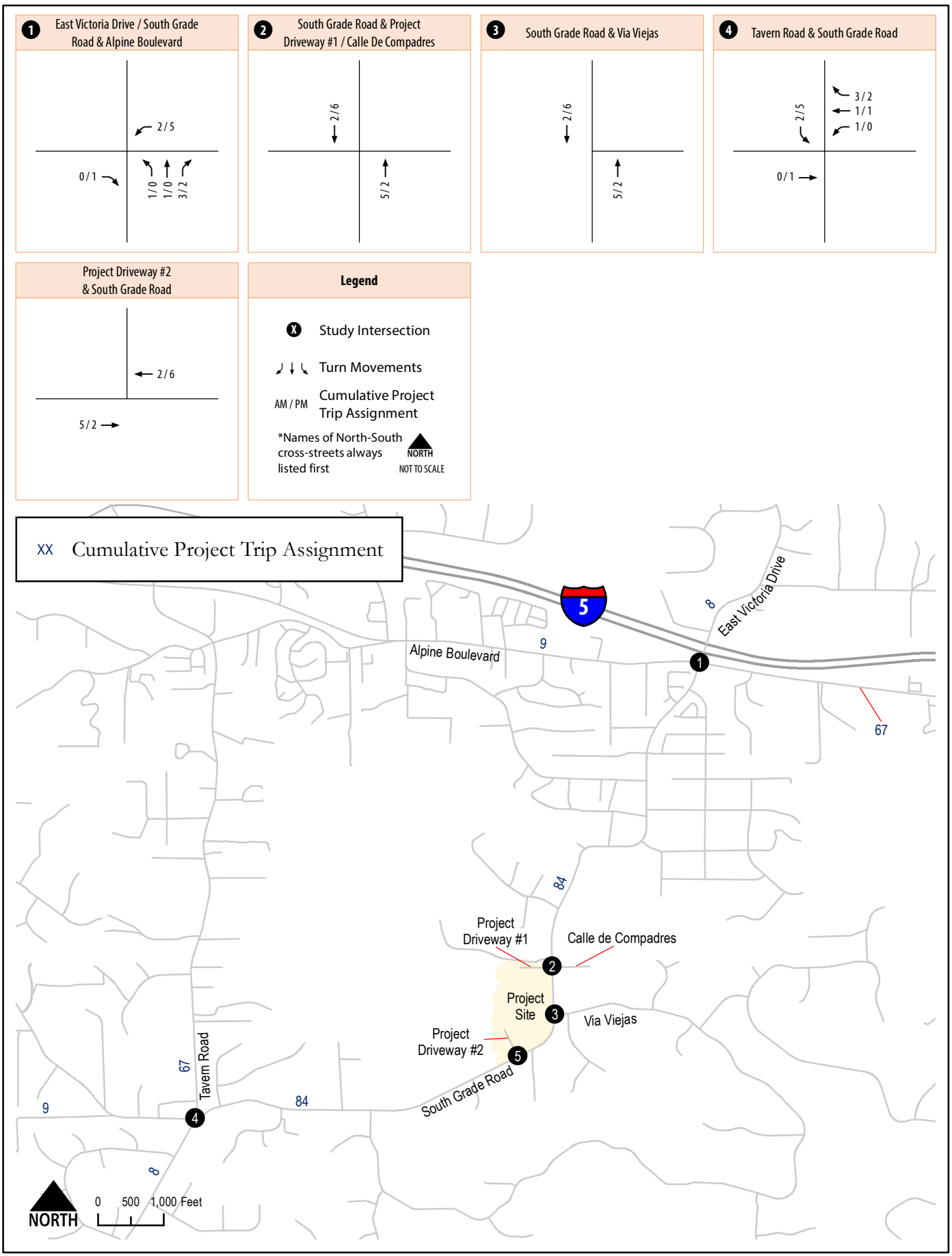

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Figure 5.2
Cumulative Project Trip Assignment

5.3 Near-Term Year 2023 Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Base conditions were assumed to be identical to the existing roadway geometrics, as shown in Figure 4.1.

The Near-Term Base scenario traffic volumes were derived by adding the additional trips generated by the cumulative projects listed in Section 5.1 (Figure 5.2) to the existing traffic volumes (Figure 4.2). **Figure 5.3** displays the average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Near-Term Base conditions.

5.4 Near-Term Year 2023 Base Traffic Conditions

LOS analyses for Near-Term Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed separately below.

5.4.1 Roadway Segment Analysis

Table 5.2 displays the LOS analysis results for key roadway segments under Near-Term Year 2023 Base conditions.

Table 5.2 Roadway Segment Level of Service Results – Near-Term Year 2023 Base Conditions

Roadway	Segment	Functional Classification	Daily Volume	LOS Threshold (LOS E)	V/C	LOS
South Grade Road	Alpine Boulevard to Via Viejas	2-Lane Light Collector	3,185	16,200	0.197	B
South Grade Road	Via Viejas to Tavern Road	2-Lane Light Collector	4,130	16,200	0.255	C

Notes:
V/C = Volume / Capacity
LOS = Level of Service

As shown in Table 5.2, all of the study area roadway segments are anticipated to operate at acceptable LOS C or better under Near-Term Year 2023 Base conditions.

5.4.2 Intersection Analysis

Table 5.3 displays intersection LOS and average vehicle delay results for the key study area intersections under Near-Term Year Base conditions. LOS calculation worksheets for Near-Term Year 2023 Base conditions are provided in **Appendix F**.

Table 5.3 Peak Hour Intersection Level of Service Results – Near-Term Year 2023 Base Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	16.3	B	17.0	B
2	South Grade Road / Calle De Compadres	SSSC	9.3	A	10.4	B
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B
4	Tavern Road & South Grade Road	AWSC	13.5	B	10.7	B

Notes:
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.

As shown in Table 5.3, all study area intersections are anticipated to operate at an acceptable LOS B during both AM and PM peak hours under Near-Term Year 2023 Base conditions.

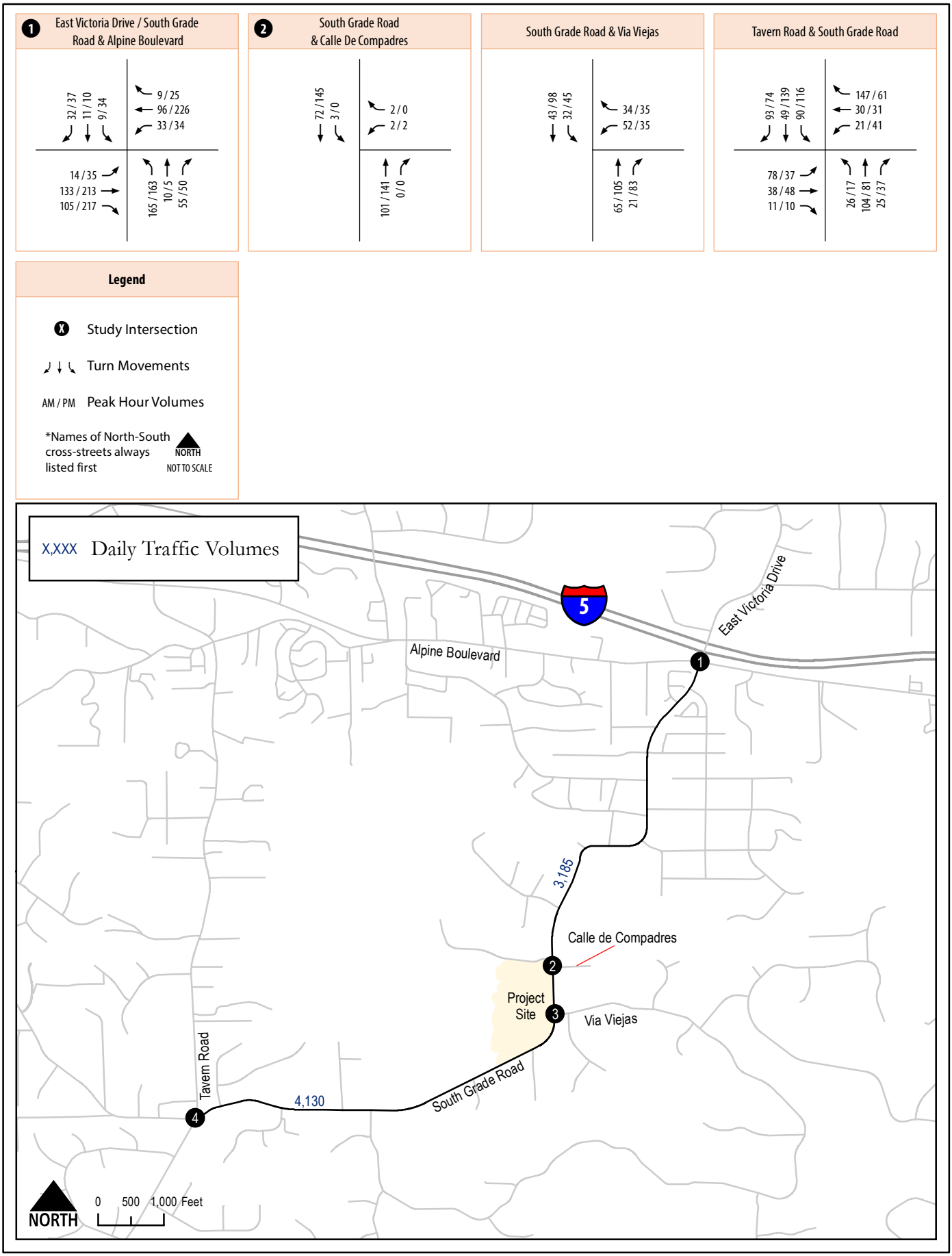

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Figure 5.3
Traffic Volumes
Near-Term Year 2023 Base Conditions

5.5 Near-Term Year 2023 Base with Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Year 2023 Base with Project conditions were assumed to be identical to existing geometrics (displayed in Figure 4.1) with the addition of the following two project driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (Opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans MUTCD (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

Near-Term Year 2023 Base with Project traffic volumes were derived by combining the Near-Term Year 2023 Base traffic volumes (displayed in Figure 5.3) and the project trip assignment volumes (displayed in Figure 3.3). Daily roadway and peak hour intersection volumes for this scenario are displayed in **Figure 5.4**.

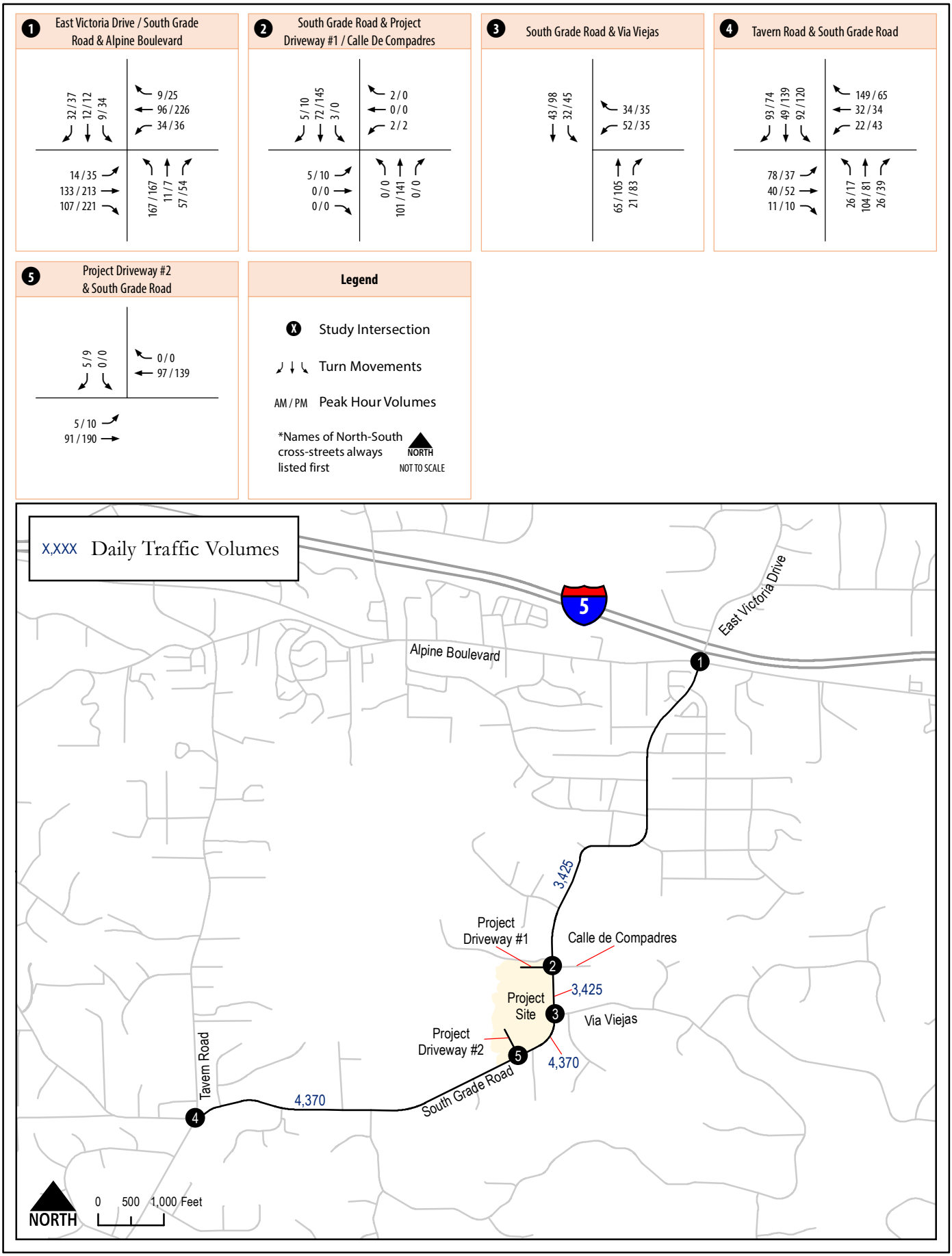

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Figure 5.4
Traffic Volumes
Near-Term Year 2023 Base with Project Conditions

5.6 Near-Term Year Base with Project Traffic Conditions

LOS analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment and intersection LOS analysis results are discussed separately in the following sections.

5.6.1 Roadway Segment Analysis

Table 5.4 displays the LOS analysis results for key study area roadway segments under Near-Term Year 2023 Base with Project.

Table 5.4 Roadway Segment Level of Service Results – Near-Term Year 2023 Base with Project Conditions

Roadway	Segment	Functional Classification	ADT	LOS Threshold (LOS E)	V/C	LOS	LOS w/o Project	ΔV/C	SI?
South Grade Road	Alpine Boulevard to Project Driveway #1 / Calle de Compadres	2-Lane Light Collector	3,425	16,200	0.211	B	B	0.015	N
South Grade Road	Project Driveway #1 / Calle de Compadres to Via de Viejas	2-Lane Light Collector	3,425	16,200	0.211	B	B	0.015	N
South Grade Road	Via de Viejas to Project Driveway #2	2-Lane Light Collector	4,370	16,200	0.270	C	C	0.015	N
South Grade Road	Project Driveway #2 to Tavern Road	2-Lane Light Collector	4,370	16,200	0.270	C	C	0.015	N

Notes:
V/C = Volume / Capacity
LOS = Level of Service
SI? = Significant Impact?

As shown in Table 5.4, similar to Near-Term Year 2023 Base conditions, all study area roadway segments are anticipated to operate at acceptable LOS C or better under Near-Term Year 2023 Base conditions.

5.6.2 Intersection Analysis

Table 5.6 displays intersection LOS and average vehicle delay results under Near-Term Year 2023 Base with Project conditions. LOS calculation worksheets for Near-Term Year 2023 Base with Project conditions are provided in **Appendix G**.

Table 5.5 Peak Hour Intersection Level of Service Results – Near-Term Year 2023 Base with Project Conditions

#	Intersection	Control Type	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec) AM/PM	SI?
			Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS				
1	East Victoria Road / South Grade Road & Alpine Boulevard	Signal	14.2	B	17.2	B	16.3 / 17.0	B / B	-3.0 / 0.2	N
2	South Grade Road & Project Driveway #1 / Calle De Compadres	AWSC	7.6	A	8.1	A	9.3 / 10.4	A / B	-1.7 / - 2.3	N
3	South Grade Road / Via Viejas	SSSC	10.2	B	11.0	B	10.2 / 11.0	B / B	0.0 / 0.0	N
4	Tavern Road & South Grade Road	AWSC	13.7	B	10.9	B	13.5 / 10.7	B / B	0.2 / 0.2	N
5	Project Driveway #2 & South Grade Road	SSSC	8.8	A	9.1	A	N/A	N/A	N/A	N

Notes:
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.
SI? = Significant Impact?

As shown in Table 5.5, all of the study intersections are anticipated to operate at acceptable LOS B or better during both the AM and PM peak hours with the addition of project traffic.

5.7 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.5 of this report, the addition of Proposed Project traffic would not cause a significant impact to study area roadway segments and intersections under Near-Term Year 2023 Base with Project conditions. Therefore, no mitigation measures are required.

6.0 Site Access, On-Site Circulation, Driveway Queuing, and Parking

This chapter addresses access to the project site. Topics discussed include site-access and on-site circulation, parking, and driveway queuing.

6.1 Site Access and On-Site Vehicle Circulation

The Proposed Project will be located north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. Project access will be provided via the following two (2) driveways:

- South Grade Road & Project Driveway #1 / Calle de Compadres – This driveway would be a new leg of the South Grade Road / Calle Compadres intersection (Opposing Calle de Compadres). It is located at the northern end of the property and would allow for full access. This would be an unsignalized all-way stop-controlled intersection. This driveway would include one inbound lane and one outbound lane.

  It is important to note that under Existing conditions, this intersection is a three-legged T-intersection functioning as side-street stop-controlled with South Grade Road being uncontrolled and Calle De Compadres being stop-controlled. Thus, all-way stop-controlled intersection guidelines and options were considered to determine if the peak hour volumes at the intersection justified the installation of stop signs at the intersection for all directions of traffic. According to Caltrans MUTCD (2014), the intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to a number of pedestrian collisions occurring in the vicinity of this intersection, and since the project driveway at this intersection is considered an important and integral safety design feature of the Proposed Project, it is suggested that this intersection to be converted to an all-way stop-controlled intersection with implementation of the Alpine Community Park. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrians and motorists.

- Project Driveway #2 & South Grade Road – This driveway would be a new intersection located on the southern end of the property and would allow for full-access. This is an unsignalized, side street stop-controlled intersection, with South Grade Road as uncontrolled and Project Driveway #2 being stop-controlled. This driveway would include one inbound lane and one outbound lane.

The site is bisected by a primary internal north/south roadway that provides parking along sides and connects the two project driveways.

Table 6.1 displays intersection LOS and average vehicle delay results for the two analyzed project driveways under Existing with Project and Near-Term Year 2023 Base with Project conditions, as shown previously in Chapter 4 and Chapter 5, respectively, of this report.

Table 6.1 Peak Hour Project Driveway Level of Service Results

#	Intersection	Control Type	Existing with Project				Near-Term Base with Project			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
15	South Grade Road & Project Driveway #1 / Calle de Compadres	AWSC	8.0	A	8.9	A	8.0	A	8.9	A
16	Project Driveway #2 & South Grade Road	SSSC	9.1	A	9.8	A	9.1	A	9.8	A

Notes:
AWSC = All-Way Stop-Controlled. For AWSC, the delay shown is the average delay experienced by all approaches.
SSSC = Side-Street Stop-Controlled. For SSSC, the delay shown is the worst delay experienced by any of the approaches.

As shown in Table 6.1, the project driveways are projected to operate at LOS A during both the AM and PM peak hours with the addition of Proposed Project traffic.

6.2 Driveway Queueing

A queuing analysis was conducted for the Proposed Project's two driveways and the movements on South Grade Road to determine if extensive queues that impede with driveway operations could form along the roadways.

Table 6.2 shows the 95th percentile queue at the intersections of the project driveways and South Grade Road.

Table 6.2 Project Driveways and South Grade Road Queuing Analysis

Intersection	Movement	Storage (ft)[1]	95th Percentile Queue[2]			
			Existing + Project		Near Term + Project	
			AM	PM	AM	PM
South Grade Road & Project Driveway #1 / Calle de Compadres	NB	100	25	25	25	25
	SB	100	25	50	25	50
Project Driveway #2 & South Grade Road	SBR	100	0	0	0	0

Notes:
[1] Queues are rounded to the nearest 25 feet to represent one vehicle length.

As shown in Table 6.2, the vehicle queues at the project driveways and South Grade Road are expected to fit within the existing storage and would not impede traffic at the driveways or adjacent roadway system. Queuing analysis results are provided in **Appendix H**.

6.3 Parking

Parking will be incorporated within the proposed development. Per the County of San Diego Ordinance No. 10251, adopted in 2013, the Proposed Project is required to supply 240 vehicle spaces for the regional park. **Table 6.3** displays the Proposed Project's parking requirements.

Table 6.3 Parking Requirements

Type of Occupancy	Units	Requirement	Parking Spaces Required
County of San Diego Ordinance No. 10251			
Park with Structured Active Uses (e.g. basketball, ball fields, tennis, etc.)	24 acres	10 spaces / acre	240 spaces

7.0 Pedestrian, Bicycle, and Transit Assessment

This chapter discusses the project site's alternative transportation modes (walking, bicycling, and transit).

7.1 Pedestrian Facilities

There are no sidewalks directly adjacent to the project site along South Grade Road. As mentioned previously, the Project proposes to convert the intersection of South Grade Road & Calle De Compadres to an all-way stop-controlled and add Project Driveway #1 as the west leg. This would provide for an enhanced pedestrian safety route from the adjacent residential neighborhood as well as reduce the potential severity conflict between pedestrians and motorists.

Additionally, the intersection of South Grade Road & Via Viejas was considered to be converted to an all-way stop-controlled intersection and a warrant analysis was conducted based on all-way stop-control guidelines and options. According to Caltrans MUTCD (2014), this intersection does not meet the minimum peak hour volumes for an all-way stop-controlled intersection. However, due to the high pedestrian volumes that the Alpine Community Park is anticipated to generate, it is recommended to convert the intersection to an all-way stop-controlled intersection to control vehicle/pedestrian conflicts. All-way stop-controls would provide for an enhanced pedestrian safety route from the residential neighborhood on the east side of South Grade Road to the park as well as reduce the potential severity conflict between pedestrian and motorists. It is important to note that "STOP AHEAD" signs are recommended to be installed on the south leg of the intersection as the stopping sight distance at this approach is not met (360 feet required). All work shall be designed to the County's Traffic Engineer satisfaction.

Based on the preliminary review of the Proposed Project's site plan, the Proposed Project would not result in any impacts to pedestrians and would not conflict with existing or planned pedestrian facilities.

7.2 Bicycle Facilities

There are no bicycle lanes directly adjacent to the project site along South Grade Road. However, the County of San Diego General Plan Update specifies proposed Class II bike lanes along both sides of South Grade Road.

Based on the preliminary review of the Proposed Project's site plan, the Proposed Project would not result in any impacts to bicyclists and would not conflict with existing or planned bicycle facilities.

7.3 Transit

There are no transit facilities within a one-mile walking distance of the project site. Additionally, there are no future planned transit projects within the study area. Therefore, the Proposed Project would not conflict with existing or planned transit facilities and would not result in any impacts to transit facilities.

Appendix A
Signal Timing Sheets

Phase Timing - Bank 1								
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Min Green	**4**	**6**	**0**	**0**	**4**	**6**	**4**	**4**
Extension	**2.0**	**2.0**	**0.0**	**0.0**	**2.0**	**2.0**	**2.0**	**3.0**
Max	**17**	**40**	**0**	**0**	**17**	**40**	**25**	**25**
Max 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Cond Serve Check	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Clearance Timing								
Yellow Change	**4.1**	**4.8**	**0.0**	**0.0**	**4.1**	**4.8**	**4.4**	**4.4**
Red Clear	**0.5**	**1.0**	**0.0**	**0.0**	**0.5**	**1.0**	**1.0**	**1.0**
Pedestrian Timing								
Walk	**0**	**7**	**0**	**0**	**0**	**7**	**7**	**7**
Pedestrian Change	**0**	**18**	**0**	**0**	**0**	**14**	**27**	**20**
Advance/Delay Walk	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PE Min. Ped. Change	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Volume-Density								
Type 3 Disconnect	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Add per Vehicle	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Max Added Initial	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Min Gap	**2.0**	**1.5**	**0.0**	**0.0**	**2.0**	**1.5**	**2.0**	**3.0**
Max Gap	**2.0**	**2.1**	**0.0**	**0.0**	**2.0**	**2.1**	**2.0**	**3.0**
Reduce Every	**0.0**	**6.2**	**0.0**	**0.0**	**0.0**	**6.2**	**0.0**	**0.0**
Alternate Timing								
Alternate Walk	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Ped. Change	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Minimum	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Extension	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Phase Timing - Exclusive Pedestrian	
Exclusive Ped Assignment	_____
Exclusive Walk	**0**
Exclusive Pedestrian Change	**0**
Red Clear	**0.0**
Walk Output	**0**
Don't Walk Output	**0**

Phase Functions - Page 1	
Red Lock	_____
Yellow Lock	_____
Simultaneous Gap	_____
Rest In Walk	_____
Advance Walk	_____
Flashing Walk	_____
Max Extension	_____
Red Rest	_____
Dual Entry	_____
Sequential Timing	_____
Inhibit Ped Reservice	_____
Delay Walk	_____
Guaranteed Passage	_____
Conditional Service	_____

Phase Functions - Page 2	
Minimum Recall	**2 6**
Ped Recall	_____
Maximum Recall	_____
Green Flash	_____
Overlap Green Flash	_____
Flashing Yellow Arrow for PPLT	_____
Max2	_____
Soft Recall	_____
External Recall	_____
Manual Control Calls	_____
Fast Green Flash	_____
Fast Overlap Green Flash	_____
Semi-Actuated	_____

Appendix B
Traffic Counts

WEDNESDAY - MARCH 11, 2020 AREA: ALPINE PROJECT: ETD20-0313-02

S GRADE - ALPINE PARK TO ALPINE BL

AM	NB		SB		EB	WB		PM	NB		SB		EB	WB	
00:00	2		1					12:00	21		27				
00:15	2		1					12:15	26		23				
00:30	0		2					12:30	24		22				
00:45	1	5	4	8			13	12:45	23	94	24	96			190
01:00	1		3					13:00	19		31				
01:15	0		1					13:15	16		25				
01:30	0		0					13:30	34		25				
01:45	1	2	0	4			6	13:45	24	93	28	109			202
02:00	1		3					14:00	21		34				
02:15	0		3					14:15	15		43				
02:30	0		0					14:30	44		28				
02:45	3	4	2	8			12	14:45	28	108	40	145			253
03:00	1		1					15:00	55		43				
03:15	2		0					15:15	75		49				
03:30	1		0					15:30	35		38				
03:45	0	4	0	1			5	15:45	36	201	29	159			360
04:00	1		0					16:00	23		26				
04:15	0		1					16:15	31		30				
04:30	1		2					16:30	29		25				
04:45	3	5	2	5			10	16:45	24	107	27	108			215
05:00	1		0					17:00	28		31				
05:15	2		1					17:15	14		39				
05:30	7		2					17:30	31		33				
05:45	2	12	5	8			20	17:45	17	90	24	127			217
06:00	10		7					18:00	23		29				
06:15	9		6					18:15	18		27				
06:30	12		10					18:30	21		19				
06:45	9	40	11	34			74	18:45	19	81	24	99			180
07:00	19		20					19:00	26		26				
07:15	16		20					19:15	16		12				
07:30	19		37					19:30	15		12				
07:45	26	80	28	105			185	19:45	12	69	18	68			137
08:00	24		13					20:00	11		15				
08:15	12		24					20:15	14		11				
08:30	50		45					20:30	9		10				
08:45	70	156	30	112			268	20:45	6	40	15	51			91
09:00	39		29					21:00	4		13				
09:15	41		17					21:15	7		11				
09:30	19		18					21:30	5		13				
09:45	24	123	19	83			206	21:45	5	21	11	48			69
10:00	14		19					22:00	5		5				
10:15	19		23					22:15	5		4				
10:30	22		19					22:30	2		5				
10:45	31	86	20	81			167	22:45	1	13	2	16			29
11:00	25		18					23:00	1		1				
11:15	15		26					23:15	3		2				
11:30	20		23					23:30	1		3				
11:45	20	80	25	92			172	23:45	1	6	4	10			16
Total Vol.		597		541			1138			923		1036			1959

Daily Totals

NB	SB	EB	WB	Combined
1520	1577			3097

	AM			PM		
Split %	52.5%	47.5%	36.7%	47.1%	52.9%	63.3%
Peak Hour	08:30	08:15	08:30	14:30	14:45	14:45
Volume	200	128	321	202	170	363
P.H.F.	0.71	0.71	0.80	0.83	0.87	0.73

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

WEDNESDAY - MARCH 11, 2020 AREA: ALPINE PROJECT: ETD20-0313-02

S GRADE - ALPINE PARK TO TAVERN RD

AM	NB	SB	EB		WB			PM	NB	SB	EB		WB		
00:00			3		2			12:00			19		21		
00:15			2		2			12:15			36		21		
00:30			0		2			12:30			37		24		
00:45			1	6	2	8	14	12:45			30	122	33	99	221
01:00			1		4			13:00			24		42		
01:15			1		2			13:15			27		35		
01:30			1		1			13:30			44		28		
01:45			1	4	0	7	11	13:45			31	126	31	136	262
02:00			1		2			14:00			36		33		
02:15			0		0			14:15			26		55		
02:30			1		1			14:30			55		35		
02:45			2	4	2	5	9	14:45			38	155	40	163	318
03:00			1		2			15:00			68		46		
03:15			2		0			15:15			95		50		
03:30			2		0			15:30			37		45		
03:45			2	7	2	4	11	15:45			59	259	39	180	439
04:00			1		1			16:00			38		19		
04:15			0		4			16:15			46		28		
04:30			1		6			16:30			42		25		
04:45			3	5	6	17	22	16:45			38	164	19	91	255
05:00			1		10			17:00			44		38		
05:15			2		6			17:15			38		34		
05:30			7		13			17:30			46		23		
05:45			3	13	20	49	62	17:45			29	157	32	127	284
06:00			6		22			18:00			27		29		
06:15			4		25			18:15			35		30		
06:30			13		25			18:30			34		17		
06:45			11	34	28	100	134	18:45			41	137	22	98	235
07:00			22		36			19:00			43		20		
07:15			26		52			19:15			28		18		
07:30			19		55			19:30			29		12		
07:45			32	99	45	188	287	19:45			18	118	10	60	178
08:00			32		25			20:00			28		14		
08:15			29		46			20:15			15		11		
08:30			51		68			20:30			31		10		
08:45			65	177	43	182	359	20:45			17	91	14	49	140
09:00			46		33			21:00			15		10		
09:15			31		42			21:15			8		8		
09:30			26		35			21:30			15		12		
09:45			20	123	31	141	264	21:45			6	44	13	43	87
10:00			17		23			22:00			6		3		
10:15			18		31			22:15			9		5		
10:30			25		31			22:30			3		4		
10:45			16	76	28	113	189	22:45			3	21	2	14	35
11:00			20		27			23:00			5		0		
11:15			20		21			23:15			5		3		
11:30			23		33			23:30			1		3		
11:45			28	91	32	113	204	23:45			2	13	3	9	22
Total Vol.				639		927	1566					1407		1069	2476

Daily Totals				
NB	SB	EB	WB	Combined
		2046	1996	4042

	AM			PM		
Split %	40.8%	59.2%	38.7%	56.8%	43.2%	61.3%
Peak Hour	08:30	08:15	08:15	15:00	14:45	15:00
Volume	193	190	381	259	181	439
P.H.F.	0.74	0.70	0.80	0.68	0.91	0.76

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

DATE:	LOCATION:	ALPINE	PROJECT #:	ETD20-0313-02
3/11/20	NORTH & SOUTH:	S GRADE	LOCATION #:	1
WEDNESDAY	EAST & WEST:	ALPINE BL	CONTROL:	SIGNAL

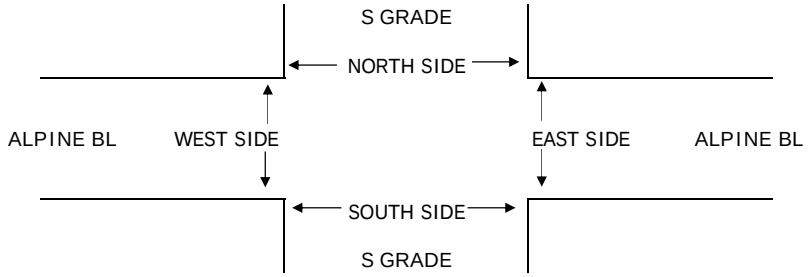
NOTES:

INCLUDES BIKE & PED

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, ▼ S

		NORTHBOUND S GRADE			SOUTHBOUND S GRADE			EASTBOUND ALPINE BL			WESTBOUND ALPINE BL			
	LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
AM	7:00 AM	18	3	15	4	2	7	2	22	8	6	21	0	108
	7:15 AM	28	2	9	5	4	8	1	19	11	6	25	4	122
	7:30 AM	24	1	11	2	5	7	1	23	14	10	28	4	130
	7:45 AM	22	1	9	6	2	2	7	31	17	9	22	1	129
	8:00 AM	32	3	11	2	2	3	2	34	21	6	21	0	137
	8:15 AM	36	1	4	1	5	11	2	23	26	6	25	4	144
	8:30 AM	45	3	13	1	2	6	5	32	27	10	28	4	176
	8:45 AM	51	2	24	5	2	12	5	44	31	9	22	1	208
	VOLUMES	256	16	96	26	24	56	25	228	155	62	192	18	1,154
	APPROACH %	70%	4%	26%	25%	23%	53%	6%	56%	38%	23%	71%	7%	
	APP/DEPART	368	/	59	106	/	241	408	/	350	272	/	504	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	164	9	52	9	11	32	14	133	105	31	96	9	665
	APPROACH %	73%	4%	23%	17%	21%	62%	6%	53%	42%	23%	71%	7%	
	PEAK HR FACTOR		0.731			0.684			0.788			0.810		0.799
	APP/DEPART	225	/	32	52	/	147	252	/	194	136	/	292	0
PM	4:00 PM	38	3	13	5	3	4	7	58	51	9	46	6	243
	4:15 PM	47	0	15	4	2	4	5	69	47	7	37	7	244
	4:30 PM	29	5	7	0	0	7	9	62	54	11	44	8	236
	4:45 PM	45	2	12	6	2	8	12	57	41	6	51	6	248
	5:00 PM	49	0	15	8	1	10	11	51	58	4	54	5	266
	5:15 PM	28	2	11	11	4	8	7	57	62	9	62	10	271
	5:30 PM	41	1	10	9	3	11	5	48	55	10	59	4	256
	5:45 PM	32	4	7	10	2	12	10	46	44	9	50	7	233
	VOLUMES	309	17	90	53	17	64	66	448	412	65	403	53	1,997
	APPROACH %	74%	4%	22%	40%	13%	48%	7%	48%	44%	12%	77%	10%	
	APP/DEPART	416	/	136	134	/	494	926	/	591	521	/	776	0
	BEGIN PEAK HR		4:45 PM											
	VOLUMES	163	5	48	34	10	37	35	213	216	29	226	25	1,041
	APPROACH %	75%	2%	22%	42%	12%	46%	8%	46%	47%	10%	81%	9%	
	PEAK HR FACTOR		0.844			0.880			0.921			0.864		0.960
	APP/DEPART	216	/	65	81	/	255	464	/	295	280	/	426	0

U-TURNS					
	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM					0
7:15 AM					0
7:30 AM					0
7:45 AM			1		1
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
VOLUMES	0	0	1	0	1
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM			1		1
5:00 PM					0
5:15 PM			1		1
5:30 PM					0
5:45 PM					0
VOLUMES	0	0	2	0	2



		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM		1		1	2					0	1				1
	7:30 AM				1	1					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM				1	1					0					0
	8:30 AM					0					0		1			1
	8:45 AM		1			1					0	1				1
	TOTAL	0	2	0	3	5	0	0	0	0	0	2	1	0	0	3
PM	4:00 PM		1			1					0					0
	4:15 PM					0					0		1			1
	4:30 PM		2		1	3					0	1	2			3
	4:45 PM					0					0					0
	5:00 PM					0					0		1			1
	5:15 PM		1		1	2					0					0
	5:30 PM					0					0	1				1
	5:45 PM					0					0					0
	TOTAL	0	4	0	2	6	0	0	0	0	0	2	4	0	0	6

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

DATE:	LOCATION:	ALPINE	PROJECT #:	ETD20-0313-02
3/11/20	NORTH & SOUTH:	TAVERN RD	LOCATION #:	2
WEDNESDAY	EAST & WEST:	S GRADE	CONTROL:	STOP

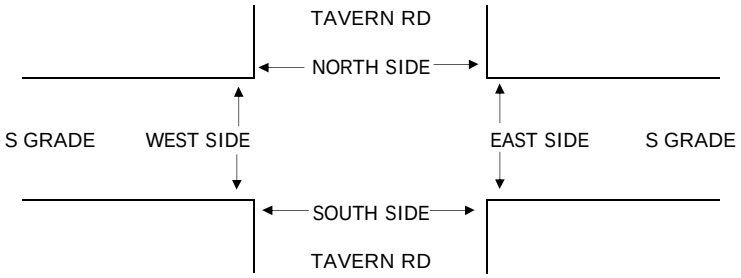
NOTES:

INCLUDES BIKE & PED

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND TAVERN RD			SOUTHBOUND TAVERN RD			EASTBOUND S GRADE			WESTBOUND S GRADE			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
7:00 AM	1	23	7	6	9	6	13	6	4	5	5	26	111
7:15 AM	5	33	6	7	14	5	12	3	2	13	4	33	137
7:30 AM	1	42	2	16	13	14	31	2	4	9	4	47	185
7:45 AM	2	40	12	22	24	13	25	5	2	8	3	36	192
8:00 AM	3	23	7	9	15	8	6	5	3	0	5	19	103
8:15 AM	9	30	1	9	7	11	17	1	2	5	8	35	135
8:30 AM	10	29	10	26	13	39	31	16	2	9	12	48	245
8:45 AM	4	22	7	44	14	35	24	16	4	6	4	42	222
AM VOLUMES	35	242	52	139	109	131	159	54	23	55	45	286	1,330
AM APPROACH %	11%	74%	16%	37%	29%	35%	67%	23%	10%	14%	12%	74%	
AM APP/DEPART	329	/	687	379	/	187	236	/	245	386	/	211	0
AM BEGIN PEAK HR		8:00 AM											
AM VOLUMES	26	104	25	88	49	93	78	38	11	20	29	144	705
AM APPROACH %	17%	67%	16%	38%	21%	40%	61%	30%	9%	10%	15%	75%	
AM PEAK HR FACTOR		0.791			0.618			0.648			0.699		0.719
AM APP/DEPART	155	/	326	230	/	80	127	/	151	193	/	148	0
4:00 PM	4	20	6	26	33	14	13	12	3	6	3	9	149
4:15 PM	3	16	10	33	37	27	11	9	2	3	10	16	177
4:30 PM	2	19	3	27	19	16	8	8	1	7	6	13	129
4:45 PM	1	14	11	21	23	10	8	6	4	4	6	11	119
5:00 PM	4	22	9	33	33	18	5	15	3	13	9	18	182
5:15 PM	3	13	14	22	35	20	8	6	1	10	9	20	161
5:30 PM	5	23	7	28	36	18	12	12	3	9	6	11	170
5:45 PM	5	23	7	28	35	18	12	14	3	9	6	10	170
PM VOLUMES	27	150	67	218	251	141	77	82	20	61	55	108	1,257
PM APPROACH %	11%	61%	27%	36%	41%	23%	43%	46%	11%	27%	25%	48%	
PM APP/DEPART	244	/	335	610	/	332	179	/	367	224	/	223	0
PM BEGIN PEAK HR		5:00 PM											
PM VOLUMES	17	81	37	111	139	74	37	47	10	41	30	59	683
PM APPROACH %	13%	60%	27%	34%	43%	23%	39%	50%	11%	32%	23%	45%	
PM PEAK HR FACTOR		0.964			0.964			0.810			0.813		0.938
PM APP/DEPART	135	/	177	324	/	190	94	/	195	130	/	121	0

U-TURNS	NB	SB	EB	WB	TTL
	X	X	X	X	
7:00 AM		1			1
7:15 AM					0
7:30 AM					0
7:45 AM					0
8:00 AM					0
8:15 AM					0
8:30 AM					0
8:45 AM					0
AM VOLUMES	0	1	0	0	1
4:00 PM					0
4:15 PM					0
4:30 PM					0
4:45 PM					0
5:00 PM					0
5:15 PM					0
5:30 PM					0
5:45 PM					0
PM VOLUMES	0	0	0	0	0



	PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
7:00 AM					0					0					0
7:15 AM					0					0					0
7:30 AM					0					0					0
7:45 AM					0					0			1		1
8:00 AM					0					0					0
8:15 AM				1	1					0					0
8:30 AM					0					0	1				1
8:45 AM					0					0			1		1
AM TOTAL	0	0	0	1	1	0	0	0	0	0	1	0	2	0	3
4:00 PM				1	1					0					0
4:15 PM			1	2	3					0	1			1	2
4:30 PM					0					0					0
4:45 PM					0					0					0
5:00 PM			1		1					0					0
5:15 PM					0					0				1	1
5:30 PM					0					0					0
5:45 PM					0					0					0
PM TOTAL	0	0	2	3	5	0	0	0	0	0	1	0	0	2	3

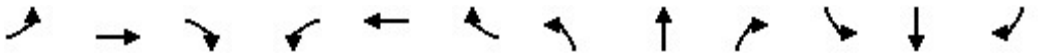
Roadway	Segment	ADT March	ADT June	Δ%
South Grade Road	Alpine Park to Alpine Boulevard	3097	2787	-10%
South Grade Road	Alpine Park to Tavern Road	4042	3468	-14%
			Average	**-12%**

Intersection	Peak Hour	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
South Grade Road & Calle De Compadres	AM	0	85	0	2	62	0	0	0	0	1	0	1
	PM	0	124	0	0	124	0	0	0	0	1	0	0
Adjusted Traffic Counts	AM	0	96	0	3	70	0	0	0	0	2	0	2
	PM	0	139	0	0	139	0	0	0	0	2	0	0

Intersection	Peak Hour	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
South Grade Road & Via Viejas	AM	0	58	18	28	38	0	0	0	0	46	0	30
	PM	0	93	74	40	87	0	0	0	0	31	0	31
Adjusted Traffic Counts	AM	0	65	21	32	43	0	0	0	0	52	0	34
	PM	0	105	83	45	98	0	0	0	0	35	0	35

*Traffic counts conducted June 2020 were adjusted to display an increase of 12% to account for traffic reduction since pre-COVID19 (March 2020 traffic counts)

Appendix C
Peak Hour Intersection Capacity Worksheets Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	105	31	96	9	164	9	52	9	11	32
Future Volume (veh/h)	14	133	105	31	96	9	164	9	52	9	11	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	106	38	119	10	225	12	64	13	16	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	295	245	62	296	25	338	49	260	18	22	60
Arrive On Green	0.02	0.16	0.16	0.03	0.17	0.17	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	256	1368	302	371	997
Grp Volume(v), veh/h	18	168	106	38	0	129	225	0	76	72	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1624	1670	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.5	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.5	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.84	0.18		0.60
Lane Grp Cap(c), veh/h	32	295	245	62	0	321	338	0	308	100	0	0
V/C Ratio(X)	0.55	0.57	0.43	0.61	0.00	0.40	0.67	0.00	0.25	0.72	0.00	0.00
Avail Cap(c_a), veh/h	984	2264	1875	984	0	2227	1359	0	1239	1274	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.5	14.8	14.5	18.1	0.0	13.9	14.3	0.0	13.1	17.6	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.6	0.5	3.6	0.0	0.3	2.3	0.0	0.4	3.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.2	0.7	0.3	0.0	0.8	1.7	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.5	14.9	21.7	0.0	14.2	16.5	0.0	13.5	21.2	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		292			167			301			72	
Approach Delay, s/veh		15.8			15.9			15.8			21.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	11.8		7.7	5.3	12.4		12.6				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	5.2		3.6	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		16.3	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	96	0	3	70
Future Vol, veh/h	2	2	96	0	3	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	50	92	92	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	104	0	4	96

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	208	104	0	0	104	0
Stage 1	104	-	-	-	-	-
Stage 2	104	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	780	951	-	-	1488	-
Stage 1	920	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	778	951	-	-	1488	-
Mov Cap-2 Maneuver	778	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	917	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	856	1488	-
HCM Lane V/C Ratio	-	-	0.009	0.003	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

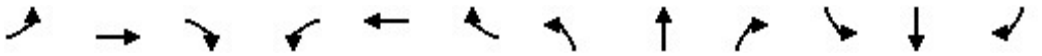
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	38	11	20	29	144	26	104	25	88	49	93
Future Vol, veh/h	78	38	11	20	29	144	26	104	25	88	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	58	17	29	41	206	33	132	32	142	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.1	11.3	11.9	15.8
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	67%	0%	41%	0%	38%
Vol Thru, %	67%	33%	0%	59%	0%	21%
Vol Right, %	16%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	116	11	49	144	230
LT Vol	26	78	0	20	0	88
Through Vol	104	38	0	29	0	49
RT Vol	25	0	11	0	144	93
Lane Flow Rate	196	178	17	70	206	371
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.324	0.346	0.028	0.131	0.333	0.57
Departure Headway (Hd)	5.954	6.975	5.916	6.759	5.836	5.535
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	598	512	600	527	611	649
Service Time	4.041	4.761	3.701	4.541	3.617	3.607
HCM Lane V/C Ratio	0.328	0.348	0.028	0.133	0.337	0.572
HCM Control Delay	11.9	13.5	8.9	10.6	11.5	15.8
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.5	0.1	0.4	1.5	3.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	216	29	226	25	163	5	48	34	10	37
Future Volume (veh/h)	35	213	216	29	226	25	163	5	48	34	10	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	188	34	263	26	194	6	51	39	11	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	420	348	56	371	37	288	27	233	53	15	51
Arrive On Green	0.03	0.22	0.22	0.03	0.22	0.22	0.16	0.16	0.16	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	170	1441	761	215	722
Grp Volume(v), veh/h	38	232	188	34	0	289	194	0	57	87	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1611	1698	0	0
Q Serve(g_s), s	0.9	4.5	4.4	0.8	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.5	4.4	0.8	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.89	0.45		0.43
Lane Grp Cap(c), veh/h	61	420	348	56	0	407	288	0	261	119	0	0
V/C Ratio(X)	0.62	0.55	0.54	0.61	0.00	0.71	0.67	0.00	0.22	0.73	0.00	0.00
Avail Cap(c_a), veh/h	903	2077	1718	903	0	2039	1247	0	1128	1189	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.7	14.2	14.2	19.8	0.0	14.9	16.3	0.0	15.1	18.9	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.4	0.5	4.0	0.0	0.9	2.7	0.0	0.4	3.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.6	1.3	0.3	0.0	2.2	1.7	0.0	0.4	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.6	14.7	23.8	0.0	15.7	19.0	0.0	15.5	22.0	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		458			323			251			87	
Approach Delay, s/veh		15.4			16.6			18.2			22.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	15.1		8.3	6.0	15.0		12.1				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	6.5		4.1	2.9	8.0		6.2				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		16.9	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	0	139	0	0	139
Future Vol, veh/h	2	0	139	0	0	139
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	25	25	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	156	0	0	156

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	312	156	0	0	156	0
Stage 1	156	-	-	-	-	-
Stage 2	156	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	681	890	-	-	1424	-
Stage 1	872	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	681	890	-	-	1424	-
Mov Cap-2 Maneuver	681	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	872	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	681	1424	-
HCM Lane V/C Ratio	-	-	0.012	-	-
HCM Control Delay (s)	-	-	10.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

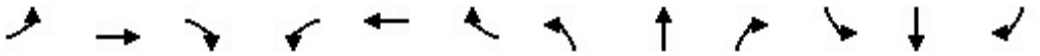
Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	47	10	41	30	59	17	81	37	111	139	74
Future Vol, veh/h	37	47	10	41	30	59	17	81	37	111	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	58	12	51	37	73	18	84	39	116	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.1	9.4	9.3	11.8
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	44%	0%	58%	0%	34%
Vol Thru, %	60%	56%	0%	42%	0%	43%
Vol Right, %	27%	0%	100%	0%	100%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	84	10	71	59	324
LT Vol	17	37	0	41	0	111
Through Vol	81	47	0	30	0	139
RT Vol	37	0	10	0	59	74
Lane Flow Rate	141	104	12	88	73	338
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.199	0.179	0.018	0.152	0.106	0.449
Departure Headway (Hd)	5.082	6.227	5.292	6.241	5.237	4.792
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	710	579	679	577	687	743
Service Time	3.082	3.941	3.006	3.953	2.949	2.884
HCM Lane V/C Ratio	0.199	0.18	0.018	0.153	0.106	0.455
HCM Control Delay	9.3	10.3	8.1	10.1	8.6	11.8
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.7	0.6	0.1	0.5	0.4	2.3

Appendix D
Peak Hour Intersection Capacity Worksheets Existing with Project Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	107	32	96	9	166	10	54	9	12	32
Future Volume (veh/h)	14	133	107	32	96	9	166	10	54	9	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	108	40	119	10	227	14	67	13	18	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	293	243	64	297	25	342	54	258	18	25	59
Arrive On Green	0.02	0.16	0.16	0.04	0.17	0.17	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	281	1347	294	407	973
Grp Volume(v), veh/h	18	168	108	40	0	129	227	0	81	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1628	1675	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.6	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.8	0.0	2.4	4.5	0.0	1.6	1.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.58
Lane Grp Cap(c), veh/h	32	293	243	64	0	322	342	0	312	102	0	0
V/C Ratio(X)	0.56	0.57	0.44	0.62	0.00	0.40	0.66	0.00	0.26	0.73	0.00	0.00
Avail Cap(c_a), veh/h	978	2250	1864	978	0	2214	1351	0	1234	1270	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	14.9	14.6	18.2	0.0	14.0	14.3	0.0	13.1	17.6	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.7	0.5	3.6	0.0	0.3	2.2	0.0	0.4	3.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.2	0.7	0.4	0.0	0.8	1.7	0.0	0.5	0.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	15.6	15.1	21.8	0.0	14.3	16.5	0.0	13.6	21.3	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		294			169			308			74	
Approach Delay, s/veh		15.9			16.1			15.8			21.3	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.7				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	5.2		3.7	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary		
HCM 6th Ctrl Delay		16.4
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	0	2	0	2	0	96	0	3	70	5
Future Vol, veh/h	5	0	0	2	0	2	0	96	0	3	70	5
Peak Hour Factor	0.92	0.92	0.92	0.50	0.50	0.50	0.92	0.92	0.92	0.73	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	0	4	0	4	0	104	0	4	96	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	50%	4%
Vol Thru, %	100%	0%	0%	90%
Vol Right, %	0%	0%	50%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	96	5	4	78
LT Vol	0	5	2	3
Through Vol	96	0	0	70
RT Vol	0	0	2	5
Lane Flow Rate	104	5	8	107
Geometry Grp	1	1	1	1
Degree of Util (X)	0.117	0.007	0.009	0.119
Departure Headway (Hd)	4.037	4.504	4.1	4.005
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	783	859	894
Service Time	2.065	2.596	2.193	2.033
HCM Lane V/C Ratio	0.117	0.006	0.009	0.12
HCM Control Delay	7.6	7.6	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	40	11	21	31	146	26	104	26	90	49	93
Future Vol, veh/h	78	40	11	21	31	146	26	104	26	90	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	62	17	30	44	209	33	132	33	145	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.2	11.4	12.1	16.2
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	66%	0%	40%	0%	39%
Vol Thru, %	67%	34%	0%	60%	0%	21%
Vol Right, %	17%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	118	11	52	146	232
LT Vol	26	78	0	21	0	90
Through Vol	104	40	0	31	0	49
RT Vol	26	0	11	0	146	93
Lane Flow Rate	197	182	17	74	209	374
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.329	0.353	0.028	0.14	0.34	0.58
Departure Headway (Hd)	5.999	7.008	5.954	6.789	5.868	5.577
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	510	596	524	607	644
Service Time	4.092	4.802	3.747	4.578	3.655	3.653
HCM Lane V/C Ratio	0.332	0.357	0.029	0.141	0.344	0.581
HCM Control Delay	12.1	13.6	8.9	10.7	11.7	16.2
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.6	0.1	0.5	1.5	3.7

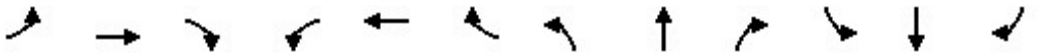
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	86	95	0	0	5
Future Vol, veh/h	5	86	95	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	93	103	0	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	206	103
Stage 1	-	-	-	-	103	-
Stage 2	-	-	-	-	103	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1489	-	-	-	782	952
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1489	-	-	-	779	952
Mov Cap-2 Maneuver	-	-	-	-	779	-
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	921	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	952
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	220	31	226	25	167	7	52	34	12	37
Future Volume (veh/h)	35	213	220	31	226	25	167	7	52	34	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	192	36	263	26	199	8	56	39	14	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	416	344	58	369	37	296	34	235	54	19	51
Arrive On Green	0.03	0.22	0.22	0.03	0.22	0.22	0.17	0.17	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	202	1414	738	265	700
Grp Volume(v), veh/h	38	232	192	36	0	289	199	0	64	90	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1616	1703	0	0
Q Serve(g_s), s	0.9	4.6	4.6	0.8	0.0	6.1	4.4	0.0	1.4	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.6	0.8	0.0	6.1	4.4	0.0	1.4	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	0.43		0.41
Lane Grp Cap(c), veh/h	61	416	344	58	0	406	296	0	269	124	0	0
V/C Ratio(X)	0.63	0.56	0.56	0.62	0.00	0.71	0.67	0.00	0.24	0.73	0.00	0.00
Avail Cap(c_a), veh/h	892	2053	1698	892	0	2015	1232	0	1118	1178	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	14.5	14.5	20.0	0.0	15.1	16.4	0.0	15.2	19.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.4	0.5	3.9	0.0	0.9	2.6	0.0	0.5	3.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	14.9	15.0	23.9	0.0	16.0	19.0	0.0	15.6	22.0	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		462			325			263			90	
Approach Delay, s/veh		15.7			16.8			18.2			22.0	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	15.1		8.4	6.0	15.1		12.4				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.8	6.6		4.2	2.9	8.1		6.4				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		17.1	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	0	2	0	0	0	139	0	0	139	10
Future Vol, veh/h	10	0	0	2	0	0	0	139	0	0	139	10
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	0	8	0	0	0	156	0	0	156	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.9	8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	100%	0%
Vol Thru, %	100%	0%	0%	93%
Vol Right, %	0%	0%	0%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	10	2	149
LT Vol	0	10	2	0
Through Vol	139	0	0	139
RT Vol	0	0	0	10
Lane Flow Rate	156	11	8	167
Geometry Grp	1	1	1	1
Degree of Util (X)	0.178	0.015	0.011	0.188
Departure Headway (Hd)	4.092	4.84	4.844	4.044
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	744	743	882
Service Time	2.144	2.841	2.845	2.095
HCM Lane V/C Ratio	0.179	0.015	0.011	0.189
HCM Control Delay	8	7.9	7.9	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0	0	0.7

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	51	10	43	33	63	17	81	39	115	139	74
Future Vol, veh/h	37	51	10	43	33	63	17	81	39	115	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	63	12	53	41	78	18	84	41	120	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.3	9.5	9.5	12.2
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	42%	0%	57%	0%	35%
Vol Thru, %	59%	58%	0%	43%	0%	42%
Vol Right, %	28%	0%	100%	0%	100%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	88	10	76	63	328
LT Vol	17	37	0	43	0	115
Through Vol	81	51	0	33	0	139
RT Vol	39	0	10	0	63	74
Lane Flow Rate	143	109	12	94	78	342
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.203	0.189	0.018	0.164	0.114	0.469
Departure Headway (Hd)	5.123	6.266	5.341	6.275	5.277	4.944
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	701	574	670	572	680	735
Service Time	3.154	3.999	3.074	4.005	3.006	2.944
HCM Lane V/C Ratio	0.204	0.19	0.018	0.164	0.115	0.465
HCM Control Delay	9.5	10.5	8.2	10.2	8.7	12.2
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.8	0.7	0.1	0.6	0.4	2.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	188	133	0	0	9
Future Vol, veh/h	10	188	133	0	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	204	145	0	0	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	145	0	-	0	371	145
Stage 1	-	-	-	-	145	-
Stage 2	-	-	-	-	226	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1437	-	-	-	630	902
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1437	-	-	-	624	902
Mov Cap-2 Maneuver	-	-	-	-	624	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1437	-	-	-	902
HCM Lane V/C Ratio	0.008	-	-	-	0.011
HCM Control Delay (s)	7.5	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix E
Cumulative Project Information

Rancho Nuevo Major Subdivision; 3100 5475 (TM)

Summary

SCH Number	2011021015
Lead Agency	San Diego County
Document Title	Rancho Nuevo Major Subdivision; 3100 5475 (TM)
Document Type	NOD - Notice of Determination
Received	7/26/2012
Posted	7/26/2012
Present Land Use	A 70; Limited Agriculture; (1) Residential
Document Description	The proposed project is a major subdivision to create 14 residential parcels on a 60.15-acre site; three additional lots are proposed for private roads that would be maintained in accordance with a Private Road Maintenance Agreement. The project site is located at the eastern terminus of Via Tesoro in the Rancho Palo Verde Estates residential development, which is located south of Interstate 8 in the Alpine Community Planning area of unincorporated San Diego County.
Contact Information	Kristina Jeffers San Diego County 5201 Ruffin Road, Suite B San Diego, CA 92123 Phone : (858) 694-2604

Location

Coordinates	32°48'41"N 116°45'21"W
Counties	San Diego
Cross Streets	Via Viejas Oeste/ Via Tesoro
Zip	91901
Total Acres	60.15
Parcel #	520-060-08-00, 520-160-02-00
State Highways	I-8
Schools	Boulder Oaks ES, Joan MacQueen MS, Alpine Community Day
Township	16S
Range	02E
Section	3
Base	SBB&M
Other Location Info	City/Nearest Community: Alpine
Other Information	Cont. Schools: Alpine Christian, Day-McKellar Preparatory

Notice of Determination

Approving Agency	County of San Diego Planning Commission

Approving Agency Role Lead Agency

Approved On 7/20/2012

Final Environmental Document Available at
County of San Diego Department of Planning and Land Use, M.S. O650 5201 Ruffin Road, Suite B, San Diego, CA 92123

Determinations

(1) The project will have a significant impact on the environment
No

(2a) An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA
No

(2b) A Mitigated or a Negative Declaration was prepared for this project pursuant to the provisions of CEQA
Yes

(2c) An other document type was prepared for this project pursuant to the provisions of CEQA
No

(3) Mitigated measures were made a condition of the approval of the project
Yes

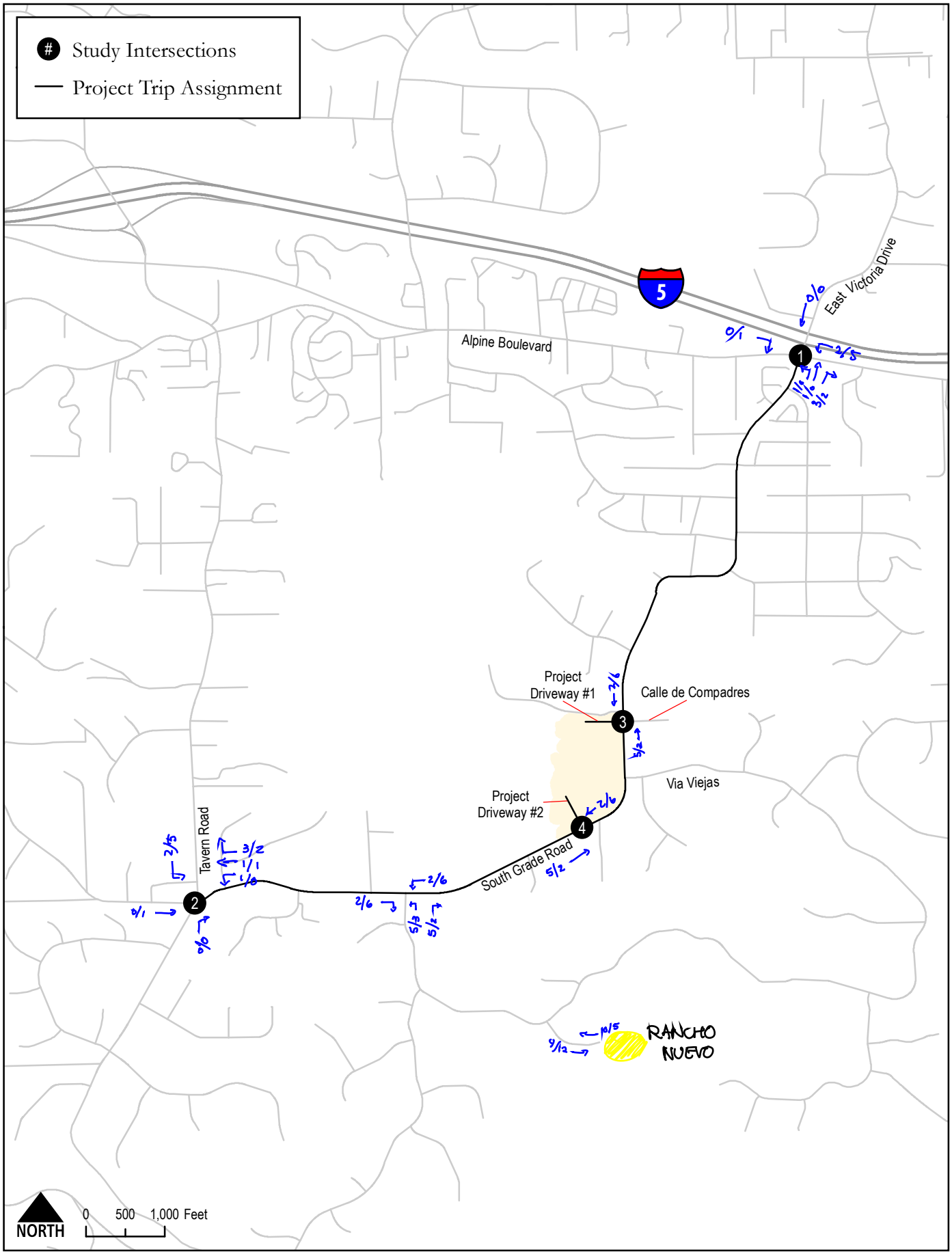
(4) A mitigation reporting or monitoring plan was adopted for this project
N/A

(5) A Statement of Overriding Considerations was adopted for this project
N/A

(6) Findings were made pursuant to the provisions of CEQA
N/A

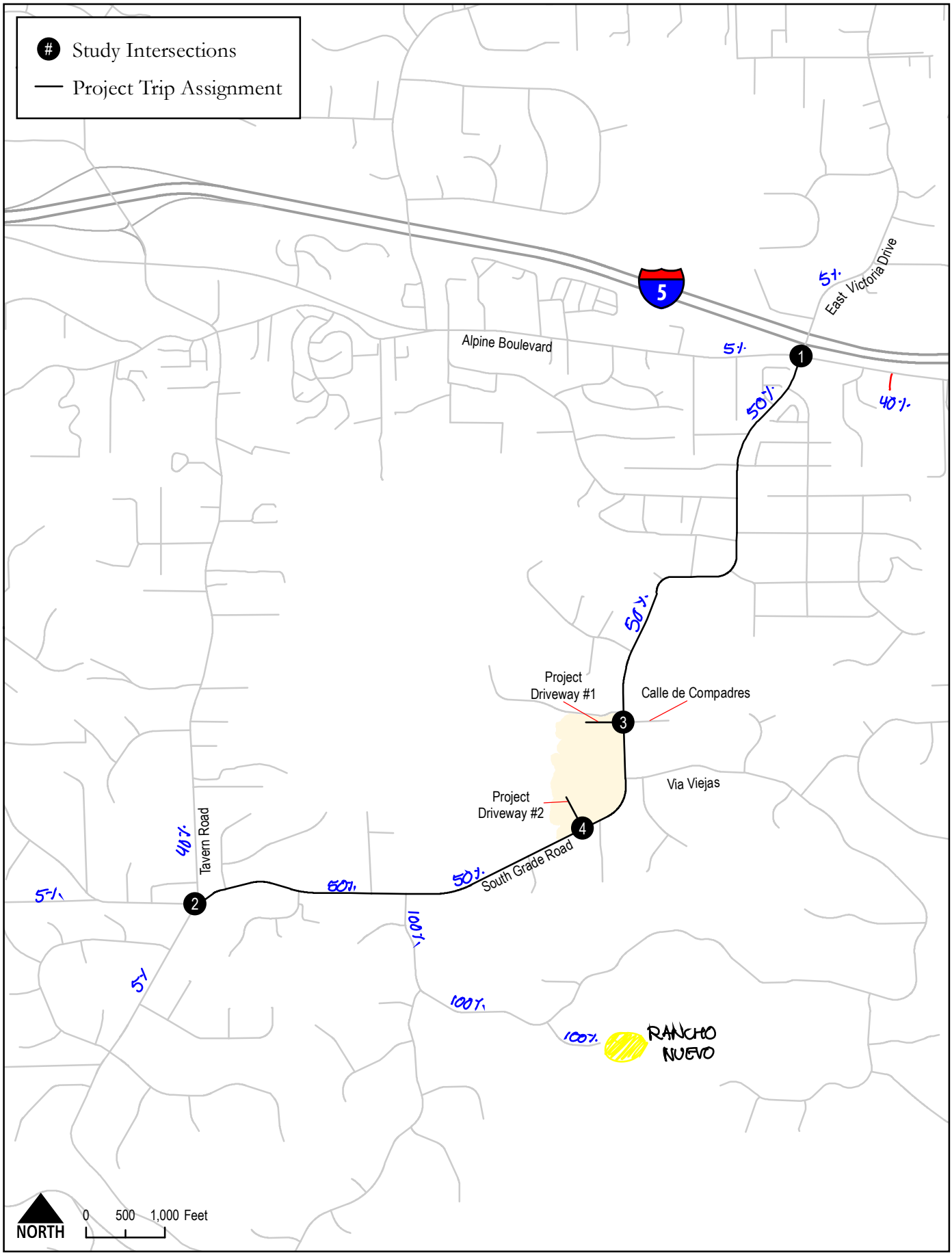
Disclaimer: The document was originally posted before CEQAnet had the capability to host attachments for the public. To obtain the original attachments for this document, please contact the lead agency at the contact information listed above. You may also contact the OPR via email at state.clearinghouse@opr.ca.gov or via phone at (916) 445-0613.

CB



Alpine Community Park
Traffic Analysis Memorandum
CHEN RYAN

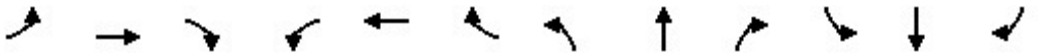
Figure 5
~~*Project Study Area*~~
Cum. Proj. Trip Assign.



Alpine Community Park
Traffic Analysis Memorandum
CHEN RYAN

Figure 5
~~*Project Study Area*~~
Cumulative Project Trip Dist.

Appendix F
Peak Hour Intersection Capacity Worksheets Near-Term Base Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	105	33	96	9	165	10	55	9	11	32
Future Volume (veh/h)	14	133	105	33	96	9	165	10	55	9	11	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	106	41	119	10	226	14	68	13	16	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	32	294	243	66	298	25	341	53	258	18	22	60
Arrive On Green	0.02	0.16	0.16	0.04	0.18	0.18	0.19	0.19	0.19	0.06	0.06	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	278	1350	302	371	997
Grp Volume(v), veh/h	18	168	106	41	0	129	226	0	82	72	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1627	1670	0	0
Q Serve(g_s), s	0.4	3.2	2.4	0.9	0.0	2.4	4.5	0.0	1.6	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.2	2.4	0.9	0.0	2.4	4.5	0.0	1.6	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.60
Lane Grp Cap(c), veh/h	32	294	243	66	0	323	341	0	312	100	0	0
V/C Ratio(X)	0.56	0.57	0.44	0.62	0.00	0.40	0.66	0.00	0.26	0.72	0.00	0.00
Avail Cap(c_a), veh/h	979	2252	1866	979	0	2216	1352	0	1235	1268	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.6	14.9	14.6	18.1	0.0	14.0	14.3	0.0	13.2	17.7	0.0	0.0
Incr Delay (d2), s/veh	5.4	0.7	0.5	3.6	0.0	0.3	2.2	0.0	0.4	3.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.2	0.7	0.4	0.0	0.8	1.7	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	15.6	15.0	21.7	0.0	14.3	16.5	0.0	13.6	21.3	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		292			170			308			72	
Approach Delay, s/veh		15.9			16.0			15.7			21.3	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.7				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	5.2		3.6	2.4	4.4		6.5				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.1				

Intersection Summary			
HCM 6th Ctrl Delay		16.3	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	2	101	0	3	72
Future Vol, veh/h	2	2	101	0	3	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	50	50	92	92	73	73
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	4	110	0	4	99

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	217	110	0	0	110	0
Stage 1	110	-	-	-	-	-
Stage 2	107	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	771	943	-	-	1480	-
Stage 1	915	-	-	-	-	-
Stage 2	917	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	769	943	-	-	1480	-
Mov Cap-2 Maneuver	769	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	847	1480	-
HCM Lane V/C Ratio	-	-	0.009	0.003	-
HCM Control Delay (s)	-	-	9.3	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

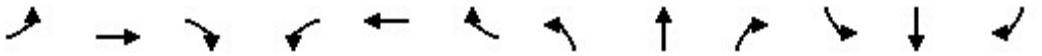
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Future Vol, veh/h	78	38	11	21	30	147	26	104	25	90	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	58	17	30	43	210	33	132	32	145	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.1	11.4	12	16.1
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	67%	0%	41%	0%	39%
Vol Thru, %	67%	33%	0%	59%	0%	21%
Vol Right, %	16%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	155	116	11	51	147	232
LT Vol	26	78	0	21	0	90
Through Vol	104	38	0	30	0	49
RT Vol	25	0	11	0	147	93
Lane Flow Rate	196	178	17	73	210	374
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.326	0.347	0.028	0.137	0.342	0.578
Departure Headway (Hd)	5.988	7.007	5.947	6.78	5.855	5.563
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	594	510	597	525	609	644
Service Time	4.079	4.798	3.737	4.565	3.638	3.637
HCM Lane V/C Ratio	0.33	0.349	0.028	0.139	0.345	0.581
HCM Control Delay	12	13.5	8.9	10.7	11.7	16.1
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.5	0.1	0.5	1.5	3.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Future Volume (veh/h)	35	213	217	34	226	25	163	5	50	34	10	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	189	40	263	26	194	6	54	39	11	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	412	341	63	371	37	290	26	235	53	15	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.16	0.16	0.16	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	161	1449	761	215	722
Grp Volume(v), veh/h	38	232	189	40	0	289	194	0	60	87	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1610	1698	0	0
Q Serve(g_s), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.5	0.9	0.0	6.0	4.2	0.0	1.3	2.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.90	0.45		0.43
Lane Grp Cap(c), veh/h	61	412	341	63	0	407	290	0	262	119	0	0
V/C Ratio(X)	0.62	0.56	0.55	0.63	0.00	0.71	0.67	0.00	0.23	0.73	0.00	0.00
Avail Cap(c_a), veh/h	902	2075	1716	902	0	2037	1246	0	1126	1187	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.8	14.4	14.4	19.7	0.0	14.9	16.3	0.0	15.1	18.9	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.5	0.5	3.8	0.0	0.9	2.7	0.0	0.4	3.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	14.8	14.9	23.5	0.0	15.8	19.0	0.0	15.5	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		459			329			254			87	
Approach Delay, s/veh		15.6			16.7			18.2			22.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	14.9		8.3	6.0	15.0		12.1				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	6.6		4.1	2.9	8.0		6.2				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		17.0	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	0	141	0	0	145
Future Vol, veh/h	2	0	141	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	25	25	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	0	158	0	0	163

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	321	158	0	0	158	0
Stage 1	158	-	-	-	-	-
Stage 2	163	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	673	887	-	-	1422	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	673	887	-	-	1422	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	673	1422	-
HCM Lane V/C Ratio	-	-	0.012	-	-
HCM Control Delay (s)	-	-	10.4	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Future Vol, veh/h	37	48	10	41	31	61	17	81	37	116	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	59	12	51	38	75	18	84	39	121	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.2	9.4	9.4	12
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	13%	44%	0%	57%	0%	35%
Vol Thru, %	60%	56%	0%	43%	0%	42%
Vol Right, %	27%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	85	10	72	61	329
LT Vol	17	37	0	41	0	116
Through Vol	81	48	0	31	0	139
RT Vol	37	0	10	0	61	74
Lane Flow Rate	141	105	12	89	75	343
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.199	0.182	0.018	0.155	0.11	0.458
Departure Headway (Hd)	5.096	6.251	5.319	6.259	5.26	4.808
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	706	576	675	575	685	740
Service Time	3.111	3.963	3.031	3.97	2.97	2.905
HCM Lane V/C Ratio	0.2	0.182	0.018	0.155	0.109	0.464
HCM Control Delay	9.4	10.4	8.1	10.1	8.6	12
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.7	0.7	0.1	0.5	0.4	2.4

Appendix G
Arterial Level of Service Analysis Worksheets Near-Term Base with Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Future Volume (veh/h)	14	133	107	34	96	9	167	11	57	9	12	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	168	108	42	119	10	229	15	71	13	18	43
Peak Hour Factor	0.79	0.79	0.79	0.81	0.81	0.81	0.73	0.73	0.73	0.68	0.68	0.68
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	382	317	95	380	32	403	64	304	29	40	95
Arrive On Green	0.03	0.20	0.20	0.05	0.22	0.18	0.23	0.23	0.19	0.10	0.10	0.06
Sat Flow, veh/h	1781	1870	1550	1781	1698	143	1781	284	1344	294	407	973
Grp Volume(v), veh/h	18	168	108	42	0	129	229	0	86	74	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1550	1781	0	1840	1781	0	1628	1675	0	0
Q Serve(g_s), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Cycle Q Clear(g_c), s	0.4	3.0	2.3	0.9	0.0	2.2	4.4	0.0	1.7	1.6	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.83	0.18		0.58
Lane Grp Cap(c), veh/h	60	382	317	95	0	412	403	0	369	163	0	0
V/C Ratio(X)	0.30	0.44	0.34	0.44	0.00	0.31	0.57	0.00	0.23	0.45	0.00	0.00
Avail Cap(c_a), veh/h	1007	2340	1940	1007	0	2303	1417	0	1296	1333	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.0	13.3	13.0	17.5	0.0	12.4	13.1	0.0	12.6	16.7	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.3	0.2	1.2	0.0	0.2	1.3	0.0	0.3	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.1	0.7	0.3	0.0	0.8	1.5	0.0	0.5	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.0	13.6	13.2	18.7	0.0	12.6	14.4	0.0	12.9	17.4	0.0	0.0
LnGrp LOS	B	B	B	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h		294			171			315			74	
Approach Delay, s/veh		13.8			14.1			14.0			17.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	11.8		7.7	5.3	12.5		12.6				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	2.9	5.0		3.6	2.4	4.2		6.4				
Green Ext Time (p_c), s	0.0	0.8		0.2	0.0	0.5		1.2				

Intersection Summary		
HCM 6th Ctrl Delay		14.2
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Future Vol, veh/h	5	0	0	2	0	2	0	101	0	3	72	5
Peak Hour Factor	0.92	0.92	0.92	0.50	0.50	0.50	0.92	0.92	0.92	0.73	0.73	0.73
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	0	4	0	4	0	110	0	4	99	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.6	7.2	7.6	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	50%	4%
Vol Thru, %	100%	0%	0%	90%
Vol Right, %	0%	0%	50%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	5	4	80
LT Vol	0	5	2	3
Through Vol	101	0	0	72
RT Vol	0	0	2	5
Lane Flow Rate	110	5	8	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.123	0.007	0.009	0.122
Departure Headway (Hd)	4.039	4.517	4.114	4.01
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	887	780	855	893
Service Time	2.068	2.613	2.21	2.039
HCM Lane V/C Ratio	0.124	0.006	0.009	0.123
HCM Control Delay	7.6	7.6	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0	0.4

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	34	65	21	32	43
Future Vol, veh/h	52	34	65	21	32	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	76	76	86	86	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	45	76	24	46	62

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	242	88	0	0	100	0
Stage 1	88	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	746	970	-	-	1493	-
Stage 1	935	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	722	970	-	-	1493	-
Mov Cap-2 Maneuver	722	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1493	-
HCM Lane V/C Ratio	-	-	0.141	0.031	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Intersection Delay, s/veh	13.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Future Vol, veh/h	78	40	11	22	32	149	26	104	26	92	49	93
Peak Hour Factor	0.65	0.65	0.65	0.70	0.70	0.70	0.79	0.79	0.79	0.62	0.62	0.62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	120	62	17	31	46	213	33	132	33	148	79	150
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	13.3	11.5	12.1	16.4
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	17%	66%	0%	41%	0%	39%
Vol Thru, %	67%	34%	0%	59%	0%	21%
Vol Right, %	17%	0%	100%	0%	100%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	118	11	54	149	234
LT Vol	26	78	0	22	0	92
Through Vol	104	40	0	32	0	49
RT Vol	26	0	11	0	149	93
Lane Flow Rate	197	182	17	77	213	377
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.331	0.355	0.028	0.146	0.348	0.587
Departure Headway (Hd)	6.03	7.039	5.985	6.81	5.887	5.603
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	590	506	592	523	607	638
Service Time	4.129	4.836	3.78	4.6	3.675	3.684
HCM Lane V/C Ratio	0.334	0.36	0.029	0.147	0.351	0.591
HCM Control Delay	12.1	13.7	9	10.8	11.8	16.4
HCM Lane LOS	B	B	A	B	B	C
HCM 95th-tile Q	1.4	1.6	0.1	0.5	1.6	3.8

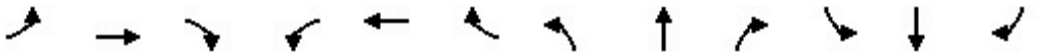
Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	91	97	0	0	5
Future Vol, veh/h	5	91	97	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	99	105	0	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	105	0	-	0	214	105
Stage 1	-	-	-	-	105	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1486	-	-	-	774	949
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	916	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1486	-	-	-	771	949
Mov Cap-2 Maneuver	-	-	-	-	771	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	916	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1486	-	-	-	949
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Future Volume (veh/h)	35	213	221	36	226	25	167	7	54	34	12	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	38	232	193	42	263	26	199	8	58	39	14	37
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.84	0.84	0.84	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	408	338	66	369	37	297	33	237	54	19	51
Arrive On Green	0.03	0.22	0.22	0.04	0.22	0.22	0.17	0.17	0.17	0.07	0.07	0.07
Sat Flow, veh/h	1781	1870	1547	1781	1671	165	1781	196	1419	738	265	700
Grp Volume(v), veh/h	38	232	193	42	0	289	199	0	66	90	0	0
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	0	1836	1781	0	1615	1703	0	0
Q Serve(g_s), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Cycle Q Clear(g_c), s	0.9	4.6	4.7	1.0	0.0	6.1	4.4	0.0	1.5	2.2	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	0.43		0.41
Lane Grp Cap(c), veh/h	61	408	338	66	0	406	297	0	269	124	0	0
V/C Ratio(X)	0.63	0.57	0.57	0.64	0.00	0.71	0.67	0.00	0.25	0.73	0.00	0.00
Avail Cap(c_a), veh/h	892	2051	1697	892	0	2014	1232	0	1117	1177	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.0	14.6	14.6	19.9	0.0	15.1	16.4	0.0	15.2	19.0	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.5	0.6	3.8	0.0	0.9	2.6	0.0	0.5	3.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	1.4	0.4	0.0	2.2	1.7	0.0	0.5	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	15.1	15.2	23.7	0.0	16.0	19.0	0.0	15.7	22.1	0.0	0.0
LnGrp LOS	C	B	B	C	A	B	B	A	B	C	A	A
Approach Vol, veh/h		463			331			265			90	
Approach Delay, s/veh		15.9			17.0			18.2			22.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	15.0		8.5	6.0	15.1		12.4				
Change Period (Y+Rc), s	4.6	5.8		5.4	4.6	5.8		5.4				
Max Green Setting (Gmax), s	21.0	46.0		29.0	21.0	46.0		29.0				
Max Q Clear Time (g_c+I1), s	3.0	6.7		4.2	2.9	8.1		6.4				
Green Ext Time (p_c), s	0.0	1.2		0.3	0.0	1.2		0.9				

Intersection Summary		
HCM 6th Ctrl Delay		17.2
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Future Vol, veh/h	10	0	0	2	0	0	0	141	0	0	145	10
Peak Hour Factor	0.92	0.92	0.92	0.25	0.25	0.25	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	0	0	8	0	0	0	158	0	0	163	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.9	7.9	8.1	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	100%	100%	0%
Vol Thru, %	100%	0%	0%	94%
Vol Right, %	0%	0%	0%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	10	2	155
LT Vol	0	10	2	0
Through Vol	141	0	0	145
RT Vol	0	0	0	10
Lane Flow Rate	158	11	8	174
Geometry Grp	1	1	1	1
Degree of Util (X)	0.18	0.015	0.011	0.196
Departure Headway (Hd)	4.097	4.858	4.863	4.047
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	870	741	740	881
Service Time	2.15	2.859	2.864	2.098
HCM Lane V/C Ratio	0.182	0.015	0.011	0.198
HCM Control Delay	8.1	7.9	7.9	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0	0	0.7

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	35	105	83	45	98
Future Vol, veh/h	35	35	105	83	45	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	79	79	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	45	133	105	51	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	399	186	0	0	238	0
Stage 1	186	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	607	856	-	-	1329	-
Stage 1	846	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	856	-	-	1329	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	2.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	693	1329	-
HCM Lane V/C Ratio	-	-	0.13	0.038	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Future Vol, veh/h	37	52	10	43	34	65	17	81	39	120	139	74
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	64	12	53	42	80	18	84	41	125	145	77
Number of Lanes	0	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.3	9.6	9.5	12.4
HCM LOS	B	A	A	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	42%	0%	56%	0%	36%
Vol Thru, %	59%	58%	0%	44%	0%	42%
Vol Right, %	28%	0%	100%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	89	10	77	65	333
LT Vol	17	37	0	43	0	120
Through Vol	81	52	0	34	0	139
RT Vol	39	0	10	0	65	74
Lane Flow Rate	143	110	12	95	80	347
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.204	0.192	0.018	0.166	0.118	0.478
Departure Headway (Hd)	5.151	6.289	5.366	6.292	5.298	4.964
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	696	571	667	570	676	732
Service Time	3.181	4.022	3.099	4.024	3.029	2.964
HCM Lane V/C Ratio	0.205	0.193	0.018	0.167	0.118	0.474
HCM Control Delay	9.5	10.5	8.2	10.3	8.7	12.4
HCM Lane LOS	A	B	A	B	A	B
HCM 95th-tile Q	0.8	0.7	0.1	0.6	0.4	2.6

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	190	139	0	0	9
Future Vol, veh/h	10	190	139	0	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	207	151	0	0	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	151	0	-	0	380	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1430	-	-	-	622	895
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	809	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1430	-	-	-	616	895
Mov Cap-2 Maneuver	-	-	-	-	616	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	809	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1430	-	-	-	895
HCM Lane V/C Ratio	0.008	-	-	-	0.011
HCM Control Delay (s)	7.5	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Appendix H
Queuing Analysis Results

HCM 6th INTERSECTION	
Node #	3
Zone:	
X East (ft):	-2231
Y North (ft):	-4666
Z Elevation (ft):	0
Description	
Control Type	Unsig
HCM Control Type	AWSC
HCM Intersection Delay (s)	8
HCM Intersection LOS	A

HCM 6th LANE	NBLn1	EBLn1	WBLn1	SBLn1
Sign Control	Stop	Stop	Stop	Stop
Traffic Volume by Lane (vph)	151	5	0	152
Left Turning Volume (vph)	0	5	0	0
Through Volume (vph)	151	0	0	147
Right Turning Volume (vph)	0	0	0	5
Lane Flow Rate (vph)	164	5	0	165
Geometry Group	1	1	1	1
Degree of Utilization, X	0.185	0.007	0	0.186
Departure Headway, Hd	4.067	4.836	4.645	4.046
Convergence (Y/N)	Yes	Yes	Yes	Yes
Capacity (vph)	880	745	0	884
Service Time (s)	2.103	2.836	2.645	2.083
HCM Lane V/C Ratio	0.186	0.007	0	0.187
HCM Control Delay (s)	8	7.9	7.6	8
HCM Lane LOS	A	A	N	A
HCM 95th Percentile Queue (veh)	0.7	0	0	0.7

HCM 6th INTERSECTION	
Node #	4
Zone:	
X East (ft):	-2850
Y North (ft):	-6115
Z Elevation (ft):	0
Description	
Control Type	Unsig
HCM Control Type	TWSC
HCM Intersection Delay (s)	0.2
HCM Intersection LOS	—
Analysis Period (Hr)	0.25
Ped Walking Speed (ft/s)	3.5
Include Upstream Signal?	No

MOVEMENT S
Lanes and Sharing
Traffic Volume (vph
Future Volume (vph
Conflicting Peds. (#
Sign Control
Storage Length (ft)
Vehicles in median
Grade (%)
Peak Hour Factor
Growth Factor
Adjusted Flow (vph
Heavy Vehicles (%
Right Turn Channe
Curb Radius (ft)
Approach Data
Major/Minor
Conflicting Flow Ra
Critical Headway
Critical Headway S
Critical Headway S
Follow-up Headwa

HCM 6th LANE	EBL	EBT	WBT	WBR	SBLn1
Capacity (vph)	1419	-	-	-	885
HCM Lane V/C Ratio	0.004	-	-	-	0.006
HCM Control Delay (s)	7.547	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th Percentile Queue (veh)	0	-	-	-	0

Appendix I1

Addendum to the Alpine Community Park Transportation Impact Study

TO: Yara Fisher, HELIX Environmental Planning, Inc.

FROM: Phuong Nguyen, TE; CR Associates
Jorge Muradas, EIT; CR Associates

DATE: July 29, 2026

RE: Addendum to Address Vehicle Traffic Public Safety Impacts for the Alpine Community Park Project in the County of San Diego

This memo serves as an addendum to the Alpine Community Park Project Traffic Impact Analysis (TIA) to comply with a court order related to vehicle traffic public safety in the Writ of Mandate issued on January 23, 2026, for CASE NO: 37-2024-00000536-CU-WM-CTL (Writ), and as further detailed in the Minute Order issued on June 9, 2025, in the same proceeding (Minute Order). The court determined that the Environmental Impact Report (State Clearinghouse #2021030196, County of San Diego [County] 2023) (EIR) required further analysis and disclosure of traffic hazard impacts along South Grade Road, including driveway sight distance, traffic control device analysis, and pedestrian and bicyclist safety.

Project Background

The County of San Diego (County) Department of Parks and Recreation (DPR) is proposing to construct the approximately 25-acre Alpine Community Park project (project) in the community of Alpine, California. The project site encompasses 96.6 acres of undeveloped land, of which approximately 70 acres will be preserved as open space. The project is located adjacent to Back Country Land Trust (BCLT) Wright's Field Preserve, north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard.

The project falls within the boundary of the Alpine Community Plan and has a land use designation of Semi-Rural Residential (SR-2) and is zoned as A70, Limited Agricultural Use, and as S80, Open Space. The property Assessor's Parcel Numbers (APNs) for the proposed park and open space are: 404-171-12 and a portion of 404-170-61.

Access to the park and its planned 240-off-street parking supply will be provided via two driveways located along South Grade Road. The primary park entrance (Driveway #1) would be located on the eastern side of the property as a new intersection leg of the South Grade Road and Calle de Compadres intersection, and it would operate as a side-street, stop-controlled intersection. The second driveway (Driveway #2) would include a new intersection at the southern end of the property that would operate as a side-street, stop-controlled intersection. Both driveways would allow full access to the project site.

Writ

The language included in the Writ regarding vehicle traffic public safety is included below:

> *Vehicle Traffic Public Safety. Respondent shall analyze and disclose the traffic hazard impacts concerning South Grade Road, in particular, whether the project will substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections). In doing so, Respondent shall not delay reasonably feasible analysis and potential impacts of the project's driveway, the driveway's traffic control device, and sight distance analysis on traffic collisions, including as to pedestrians and bicyclists.*

Minute Order

The language included in the Minute Order regarding vehicle traffic public safety, which provides further details regarding the Writ's directive, is included below:

> *The petition alleges the project is adjacent to a high-speed roadway that contains areas of low visibility and has been the location of multiple fatal accidents. The petition alleges the project would create a multi-way stop in a low visibility area, increasing traffic risks. Pet. ¶¶35, 55.*
>
> *Petitioners argue the EIR does not contain any analysis of the project's potential traffic hazard impacts to pedestrians and bicyclists. MPA at pp.24–25. They argue that the project is anticipated to draw approximately 300–500 people per day on weekdays, 1,000 per day on weekends, and up to 2,000 at the same time during special events. AR 2314. They argue the visitors who park on the shoulder of South Grade Road would need to walk on the road shoulder, and that South Grade Road is known for several accidents, including some fatal. MPA at p.24, citing AR 2462 (240 parking space lot); AR 5544 (noting three crashes along South Grade Road, with two involving pedestrians and two of the three resulting in fatalities).*
>
> *The County argues substantial evidence supports the EIR's determination that the project will not substantially increase hazards because the project does not conflict with the circulation system of transit, roadway, bike and pedestrian facilities. Oppo. at p.25, citing AR 75, AR 2843–44. The County also contends the project does not include any "incompatible uses" such as farm equipment that might increase congestion on the road. Id., citing AR 2846. Additionally, argues the County, the project is anticipated to generate a number of trips onto South Grade Road that will not "degrade" the road to a "substandard level of service." Id., citing AR 76. It plans to install traffic control devices at a later date for the project's driveway and South Grade Road, but the type of device has not yet been determined because the location of the driveway is not yet known. Id. at p.26.*
>
> *CEQA requires that an EIR include a "detailed statement" setting forth the "significant effects on the environment of the proposed project." (Pub. Res. Code, § 21100, subd. (b)(1).) It also requires that an EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail." (Guidelines, § 15128.) "[A] 'significant effect on the environment' under CEQA is a substantial or potentially substantial adverse change in the physical conditions existing within the area affected by the project. City of Maywood v. Los Angeles Unified School Dist. (2012) 208 Cal.App.4th 362, 390–391.*
>
> *Appendix G to the CEQA Guidelines recommends that, in determining whether a project will have significant traffic impacts, lead agencies consider whether it will "[s]ubstantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?" 14 Cal. Code Regs. ("Guidelines") appen. G, § XVII, subd. (c). The Guidelines also ask whether the project will "conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?" Id., subd. (b).*
>
> *Here, although evidence in the record addresses the Guidelines in Appendix G regarding incompatible uses, the EIR lacks substantial evidence to the*

potential traffic hazard impacts to pedestrians and bicyclists concerning South Grade Road. In particular, the EIR lacks substantial evidence as to the yet-to-be-determined sight distance analysis for the traffic control device at the project's driveway, and analysis as to pedestrians who would be parking and walking along South Grade Road when the 240-vehicle space parking lot is full. The Court agrees with petitioners that City of Maywood v. Los Angeles Unified School Dist. is instructive. Id. (2012) 208 Cal.App.4th 362, 392 (concluding the FEIR did not analyze pedestrian hazards associated with the project and the extent to which the presence of an active roadway would impact pedestrian safety). The County does not cite to evidence in the record showing it analyzed and disclosed the traffic hazard impacts concerning South Grade Road.

Additionally, though an EIR is not required to include information that is not "reasonably feasible" for the agency to obtain and provide, Gooden v. County of Los Angeles (2024) 106 Cal.App.5th 1, 17) the County does not provide any supported reason as to why it could not yet determine the project's driveway location to assess the sight distance analysis and appropriate intersection control device. The purpose of an EIR is to inform the public and officials of "the environmental consequences of their decisions before they are made." Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564. Petitioners have shown the County did not proceed in the manner required by CEQA by delaying the analysis and potential impacts of the driveway, multi-way stop control, and sight distance analysis on traffic collisions, including as to pedestrians and bicyclists.

Response to Writ

The Writ directs the County to analyze and disclose the traffic hazard impacts concerning South Grade Road, in particular, whether the project will substantially increase hazards due to a design feature such as sharp curves or dangerous intersections. The County is further directed not to delay the analysis of the project's driveway, the driveway's traffic control device, and the sight distance analysis on traffic collisions, including impacts to pedestrians and bicyclists.

To comply with the Writ, the following analyses have been prepared and are described in this memo:

- Safety Review – Review of accident history in the area.
- Parking Generation to determine whether a parking overflow would potentially result in project users parking along either South Grade Road or nearby residential streets.
- Sight distance analysis to determine whether there is sufficient line of sight along South Grade Road at the two project driveways.
- Traffic Control Device Evaluation.
- Determination of Pedestrian and Bicyclist Hazard Analysis along South Grade Road.
- Assessment of Design Features that Could Increase Traffic Hazards.

Safety Review

CR Associates conducted a safety review of existing conditions along South Grade Road in the vicinity of the proposed project to evaluate whether the project would substantially increase traffic hazards due to a design feature, consistent with the directive of the Writ and the Minute Order. The safety review is organized into two components, presented in sequence below: (1) a five-year crash history review covering the South Grade Road segment in the immediate vicinity of the project site (January

1, 2021 through December 31, 2025), consistent with the standard analytical window recommended in the Federal Highway Administration (FHWA) Highway Safety Improvement Program (HSIP)[1] guidance for corridor and intersection safety analyses; and (2) a separate review of historical incidents referenced in the Court's Minute Order via AR 5544 that fall outside the geographic segment evaluated in the crash history review, or predate the standard analytical period. To support a conservative analysis aligned with the Court's directive, these historical incidents are included even though they fall outside the immediate project vicinity or predate the standard analytical period, in order to confirm that the conditions associated with each prior incident are not introduced or replicated by the proposed project.

Crash History Review (January 2021 – December 2025)

To evaluate whether the project would substantially increase hazards due to a design feature (such as sharp curves or dangerous intersections), CR Associates reviewed crash history along South Grade Road within the vicinity of the project site using data obtained from the Transportation Injury Mapping System (TIMS), maintained by the University of California, Berkeley SafeTREC program and sourced from the California Statewide Integrated Traffic Records System (SWITRS) and the San Diego Association of Governments (SANDAG) Traffic Safety Dashboard. These are included in **Attachment A**.

South Grade Road is a long corridor traversing varied terrain with differing geometric conditions along its length. To ensure the analysis was focused and relevant to the project, the crash data query was limited specifically to the segment of South Grade Road within the immediate vicinity of the project site. The study period covered January 1, 2021, through December 31, 2025, representing five years of recent crash experience, consistent with the standard analytical window recommended in the Federal Highway Administration (FHWA) Highway Safety Improvement Program (HSIP)[2] guidance for corridor and intersection safety analyses.

The query returned a total of three crashes within the study area and study period (TIMS, 2026). One of the reported crashes occurred in between the location of the two planned project driveways at the intersection of South Grade Road with Via Viejas (approximately 700 feet south of the planned location for Driveway #1). The remaining two crashes occurred north of the intersection of South Grade Road with Calle de Compadres, at approximately 1,500 to 1,900 feet north of the planned location for Driveway #1. No fatal crashes were recorded.

A review of the three (3) subject collision records retrieved from the Transportation Injury Mapping System (TIMS), bearing Case IDs 94371540, 94784761, and 94807595, and occurring along South Grade Road within unincorporated San Diego County between August 17, 2024 and July 20, 2025, establishes that each collision was attributable exclusively to operator-specific Vehicle Code violations and not to any deficiency in roadway geometry or design.

In all three (3) instances, the Primary Collision Factor (PCF) as recorded by the investigating law enforcement authority reflects volitional or impaired driver conduct: PCF Category 08 (Improper Turning) in Case ID 94371540; PCF Category 01 (Driving or Bicycling Under the Influence of Alcohol or Drug) in Case ID 94807595; and PCF Category 09 (Automobile Right of Way) in Case ID 94784761. No PCF designation in any of the subject cases references or implicates substandard roadway design elements, including but not limited to inadequate stopping sight distance, deficient horizontal or vertical alignment, non-conforming lane width, or insufficient clear recovery zone.

[1] https://highways.dot.gov/safety/hsip/hsip-noteworthy-practice-series/hsip-project-evaluation

[2] https://highways.dot.gov/safety/hsip/hsip-noteworthy-practice-series/hsip-project-evaluation

Accordingly, the subject collision history, taken in its entirety, does not support a finding or inference that the roadway geometry of South Grade Road constitutes a contributing or proximate cause of the documented injury collisions. The crash data is legally and factually consistent with the conclusion that the subject collisions resulted solely from driver behavior, including improper turning maneuvers, failure to yield the right-of-way, and operation of a motor vehicle while under the influence of alcohol or a controlled substance; these are conditions that are not correctable through geometric roadway improvements and are not attributable to any deficiency in the physical design standards of the subject roadway. The proposed project does not introduce any design feature (including new geometric elements, access configurations, or changes to the cross-section of South Grade Road) that would replicate or exacerbate the driver behavior conditions identified as the primary collision factors in any of the three subject crashes.

Historical Pedestrian Fatality (2016)

As noted above, the Court's Minute Order references a fatal pedestrian collision at the South Grade Road and Calle de Compadres intersection that occurred on June 22, 2016 (SWITRS Case ID 90262214). Although this incident falls outside the standard five-year analytical window applied to the crash history review, it is addressed in this section in response to the Court's directive and to support a conservative analysis of conditions along South Grade Road in the vicinity of the proposed project.

The 2016 incident is documented in SWITRS as a Vehicle/Pedestrian fatal collision occurring approximately 145 feet south of the South Grade Road and Calle de Compadres intersection. The Primary Collision Factor (PCF) is recorded as Violation Category 11, representing a Pedestrian Violation, with fault assigned to the pedestrian party. The driver of the involved vehicle was found not at fault and was proceeding straight southbound at the time of the collision. While the fatality is acknowledged as a serious prior incident within the project corridor, the SWITRS record indicates it was not attributable to a geometric deficiency of the roadway but rather to a pedestrian violation. The project does not introduce conditions that would replicate or exacerbate the circumstances of this incident, as the proposed driveways are located at defined, stop-controlled access points with confirmed adequate stopping sight distance on the major road approaches.

Historical Vehicle Fatality (2012)

In addition to the 2016 pedestrian collision discussed above, the Court's Minute Order references a second fatality within the South Grade Road corridor. This incident has been identified as a single-vehicle collision that occurred on December 6, 2012, at approximately 5:20 p.m., at the intersection of South Grade Road and Via Viejas Oeste, in the vicinity of the proposed project. As with the 2016 collision, this incident falls outside the standard five-year analytical window applied to the crash history review and is addressed here in response to the Court's directive and to support a conservative analysis of conditions along South Grade Road.

The collision involved a single vehicle whose driver, who was the sole occupant, left the roadway and struck a wall and a utility pole. The driver was pronounced deceased at the scene. According to the San Diego Association of Governments (SANDAG) Traffic Safety Dashboard, the primary collision factor for this incident was improper turning (PCF Category 08), a violation of the California Vehicle Code. The record does not attribute the collision to any deficiency in roadway geometry or design, and the incident did not involve a pedestrian or bicyclist.

The proposed project does not introduce or modify any geometric element, access configuration, or cross-section of South Grade Road that would replicate or exacerbate the conditions associated with this incident. The proposed driveways are located at defined, stop-controlled access points with

confirmed adequate stopping sight distance on the major road approaches, further supporting the conclusion that the project will not substantially increase traffic hazards along the corridor.

Historical Pedestrian Collision (2021)

In addition to the 2016 pedestrian fatality and 2012 vehicle fatality discussed above, CR Associates has identified a third historical incident that, based on the crash characteristics described in the Minute Order's reference to AR 5544, is likely one of the three crashes cited therein. This incident is a vehicle/pedestrian collision that occurred on February 10, 2021, at approximately 11:15 AM on South Grade Road at Kenda Way, approximately 325 feet north of that intersection (SWITRS Case ID 91412970). This incident falls within the standard five-year analytical window applied to the crash history review and is addressed here in response to the Court's directive and to support a conservative analysis of conditions along South Grade Road. This location is approximately 0.8 miles north of the proposed Driveway #1 and falls outside the geographic segment of South Grade Road evaluated in the crash history review presented above, which was limited to the immediate vicinity of the project driveways.

The collision involved a pedestrian struck by a vehicle whose driver failed to remain at the scene. The Primary Collision Factor is recorded as Violation Category 08 (Improper Turning), consistent with the PCF recorded for the 2012 collision discussed above. The pedestrian, a 19-year-old female, sustained a suspected minor injury per the SWITRS record, and the collision was non-fatal.

Considered together, the 2016 incident, the 2012 incident, and this 2021 incident account for three historical crashes along South Grade Road: two involving pedestrians (2016, 2021) and two resulting in fatalities (2016, 2012), consistent with the characterization of AR 5544 in the Minute Order. Consistent with the findings for the 2016 and 2012 collisions, this incident resulted from operator conduct, specifically an improper turning maneuver, rather than from any geometric or design deficiency of South Grade Road. The proposed project does not introduce or modify any geometric element, access configuration, or cross-section of South Grade Road that would replicate or exacerbate the conditions associated with this incident. The collision's location approximately 0.8 miles from the proposed project driveways further distinguishes it from conditions at the project site.

Parking Demand Analysis

The Minute Order identified concerns raised by petitioners that the project's parking lot, with a capacity of 240 spaces, would be insufficient to accommodate anticipated park visitation of up to 1,000 visitors per day on weekdays and up to 2,000 visitors during weekend events (AR 2314; AR 2462). Petitioners argued that when the on-site lot reaches capacity, visitors would be forced to park on the shoulder of South Grade Road and walk along the roadway, creating pedestrian safety hazards on a high-speed road with a documented history of fatal accidents (AR 5544).

To respond to this concern, CR Associates prepared a parking demand analysis using parking demand rates published in the *Institute of Transportation Engineers (ITE) Parking Generation Manual, 6th Edition*. The ITE Parking Generation Manual is the nationally accepted standard for conducting parking demand analyses. To provide a conservative analysis, the calculated ITE parking demand was compared against observed parking demand at a local comparable community park, and the higher of the two values was used to evaluate the potential for spillover and to identify recommendations where appropriate.

Table 1 summarizes the average weekday and weekend parking demand calculated for the proposed project using the ITE methodology. As a conservative assumption, the total gross site area of 96.6 acres was applied to the per-acre demand rates.

Table 1 - ITE Parking Demand for the Proposed Project

Day	ITE Weighted Average Demand Rate (vehicles per acre)	Project Size (acres)	Calculated Parking Demand (vehicles)
Weekday	0.77	96.6	74
Saturday	0.60	96.6	58
Sunday (Peak)	2.33	96.6	225

Source: ITE Parking Generation Manual, 6th Edition (Public Park land use).

As shown in Table 1, the highest average parking demand is 225 vehicles on Sundays, which is well within the project's parking supply.

To validate the calculated parking demand, observed parking demand was collected at a comparable existing community park. The project team screened 76 public parks within East San Diego County and selected Hilton Head County Park as the comparable site for the parking demand validation survey. Hilton Head County Park was selected on the basis of several comparability factors, including: (a) active recreational programming featuring multi-use sports field practice; (b) comparable facility scale, with a 10-acre developed footprint and a 56-space parking lot; and (c) the absence of tournament-level events, consistent with the day-use operational character anticipated at the Alpine Community Park. Notably, Hilton Head County Park offers a playground, splash pad area, multi-use sports field, basketball courts, exercise stations, and shaded picnic and barbecue areas. A 2.5 area-based scale factor was applied to account for the difference in active program area between Hilton Head (10 acres) and Alpine (25 acres), proportionally adjusting the observed parking demand to reflect the proposed 240-space lot; this factor is within the range supported by National Recreation and Park Association (NRPA) guidance for transferable trip-rate studies. Hilton Head County Park is located in a denser, more urbanized setting and serves a larger surrounding population than the proposed Alpine Community Park site, conditions that would be expected to generate comparatively greater parking demand. No additional adjustment factor was applied to account for these differences, making the analysis conservative and representative of an upper-bound estimate of demand at the project site. The full findings of the parking demand analysis, including the comparable park screening criteria, are documented in **Attachment B***:* Alpine Community Park Parking Demand Analysis (CR Associates, May 2026).

Hilton Head County Park Parking Demand - Non-Event and Standard Weekday Conditions

On non-event days and standard weekday conditions, observed parking demand at the analog site averaged 17 vehicles in the on-site lot; well within the project's proposed 240-space supply. Under these baseline conditions, the on-site parking supply is more than sufficient to accommodate all park users, and no spillover onto South Grade Road or adjacent streets is anticipated. Most pedestrians accessing the park under these conditions would be expected to park and walk entirely within the project site, with no need to walk along South Grade Road.

Hilton Head County Park Parking Demand - Organized Sports Event Conditions

During standard park usage and organized sports event days, under conditions of single-sport practice and without simultaneous occurrence of sport activities, the observed parking demand at the analog site reached an average of 72 vehicles for baseball practice and 105 vehicles for multi-use field practice, with maximum observed demands of 119 and 131 vehicles, respectively. Both figures remain substantially below the project's proposed on-site supply of 240 spaces. Because the on-site parking supply exceeds projected demand under all single-sport event conditions, and because the on-site

parking areas are located in close proximity to the multi-use fields, park users attending organized sports events are not expected to seek off-site parking along South Grade Road or adjacent streets.

To prevent demand from exceeding supply under concurrent multi-sport conditions, where combined maximum demand could approach approximately 250 vehicles, the parking demand analysis identifies a required project feature governing organized sports programming scheduling. With this scheduling protocol in place, on-site parking supply will remain sufficient to accommodate all event-day demand, and spillover onto South Grade Road is not anticipated. County Parks and Recreation Programming staff shall implement and maintain the following scheduling requirements for all organized sports activities at the park:

- Only one sport or user group shall occupy each park field/court at any given time; overlapping or simultaneous sports activities or practices are prohibited.
- Sports Programming staff will monitor the site between consecutive sessions to confirm no vehicular spillover onto the public right-of-way. If spillover is observed more than two times in any given season, a minimum one-hour buffer shall be implemented between consecutive sessions to allow full vehicle turnover before the next group arrives. For example, if a session ends at 1:00 PM, the next session may not begin until 2:00 PM. This one-hour buffer shall increase to two hours if additional spillover continues to be observed.
- Sports Programming staff shall be responsible for scheduling all organized activities in strict accordance with these requirements.
- Parks Programming staff and the on-site volunteer shall monitor scheduling compliance on an ongoing basis to ensure these requirements are met at all times.
- Vehicular spillover onto the public right-of-way, including South Grade Road, shall be prevented through enforcement of this scheduling protocol.

Because on-site parking is expected to accommodate all park users under both standard and event-day conditions, visitors are not expected to park on the shoulder of South Grade Road and walk along the roadway to access the park. The pedestrian safety concern identified by petitioners, that overflow parkers would be exposed to traffic hazards along South Grade Road, is therefore not substantiated under the conditions analyzed. The project, together with the recommended parking management measures, would not create a condition in which pedestrians are foreseeably required to walk along South Grade Road as a consequence of inadequate parking supply.

Driveway Location and Sight Distance

The proposed project includes two full-access driveways along South Grade Road. Driveway #1 is located at the existing South Grade Road and Calle de Compadres intersection at the northern end of the property, which will operate as a side-street stop-controlled intersection. Driveway #2 is a proposed side-street stop-controlled intersection at the southern end of the property along the northeast-southwest segment of South Grade Road.

Sight distance refers to the unobstructed line of sight available to a driver to perceive conditions ahead and respond accordingly. CR Associates conducted field observations on April 16, 2026 to measure sight distance conditions at the two proposed park access driveways on South Grade Road, referred to herein as Driveway #1 and Driveway #2. Two distinct but complementary forms of sight distance were evaluated, each governed by a separate applicable standard: (1) stopping sight distance on South Grade Road, which measures the view available to drivers *approaching* either driveway from the through road; and (2) corner sight distance at each driveway approach, which measures the view available to a driver *waiting at the driveway* before entering South Grade Road. These evaluations are described in the subsections below.

A design speed of 50 mph was applied to all approaches, reflecting the governing 85th percentile speed of 46 mph observed in the prior travel speed survey conducted as part of the Transportation Impact Study for the project (2020) and rounded up conservatively relative to the posted speed limits of 40 mph near Driveway #1 and 45 mph near Driveway #2. Speed survey data is included with the sight distance analysis included in **Attachment C.**

Stopping Sight Distance on South Grade Road

Stopping sight distance (SSD) is the distance, measured along the travel lane on South Grade Road, that a driver needs to perceive an object or vehicle ahead and bring their own vehicle to a complete stop before reaching it. In the context of a driveway intersection, SSD answers the question: *Does a driver traveling on the main road have enough distance to see a vehicle emerging from the driveway and stop before reaching it?* SSD is measured on the through road and is not affected by the physical characteristics of the driveway itself.

SSD was evaluated in accordance with the American Association of State Highway and Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* (7th Edition, 2018) (hereinafter *AASHTO Green Book* or *AASHTO (2018)*). At a 50-mph design speed, the required SSD is 425 feet, as set forth in AASHTO (2018), Table 3-1, p.3-4 AASHTO (2018), Section 3.2.2.5, p.3-6, expressly provides that separate SSD criteria for trucks are not used in highway design; the passenger car standard governs all vehicle classes on the major road. Accordingly, the 425-foot requirement applies equally to passenger cars, recreational vehicles (RVs), and combination vehicles such as pickup trucks towing horse trailers.

Figure 1 shows a plan view schematic of the sight distance evaluated at the project driveway approaches: stopping sight distance (SSD), measured along South Grade Road, and corner sight distance (CSD), measured from the driveway stop position in each direction along South Grade Road. The figure is intended to illustrate the general concept of how SSD and CSD were evaluated. Existing sight distance conditions are documented separately in Attachment C. It should also be noted that construction of the site would likely require grading of the access roadways and other portions of the Project site. As part of the final site design, the required sight triangles, or clear visibility areas, would be incorporated into the site plan and maintained free of obstructions.

Figure 1 - Sight Distance Diagram for Project Driveway Approaches

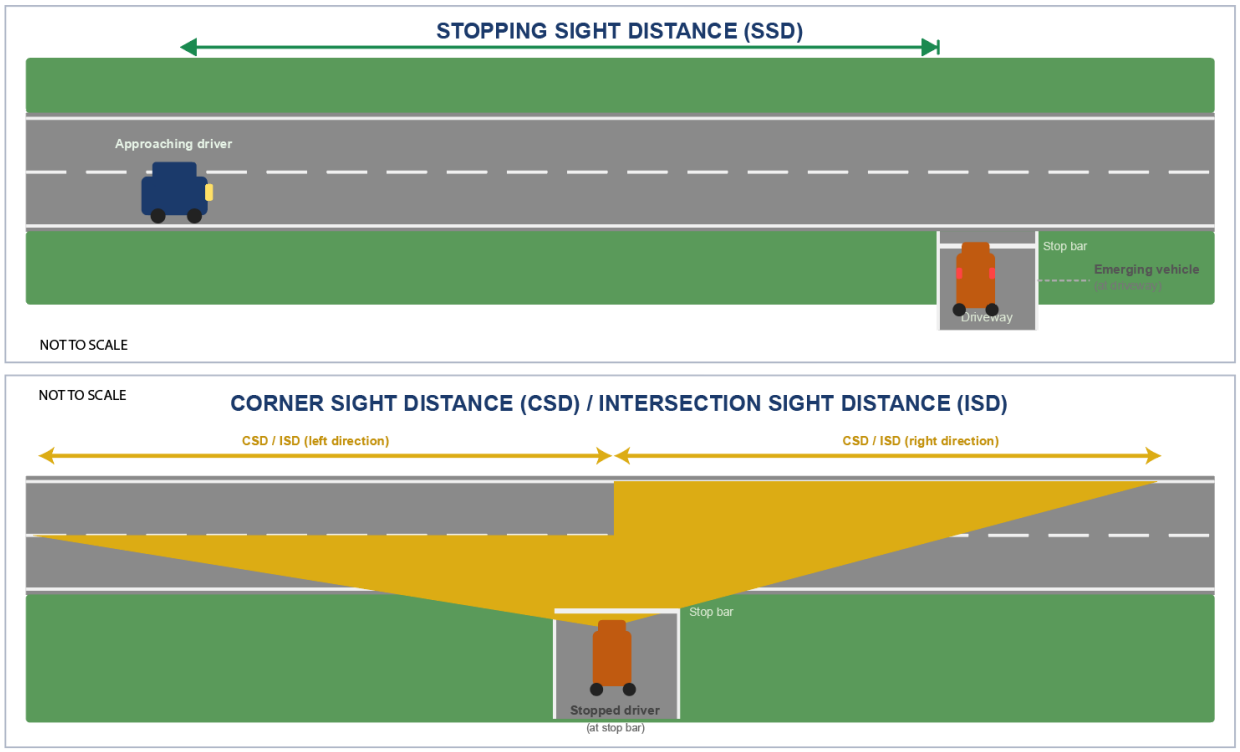


Table 2 shows the observed stopping sight distance evaluation results along South Grade Road at the project driveway approaches.

Table 2 - Stopping Sight Distance Evaluation Results along South Grade Road at the Project Driveway Approaches

Driveway	Approach Direction	Available SSD (ft)	Required SSD (ft)[1]	Compliance with SSD Standard
Driveway #1	NB	*425*	425	✓ Satisfies Standard
Driveway #1	SB	*700+*	425	✓ Satisfies Standard
Driveway #2	NEB	*700+*	425	✓ Satisfies Standard
Driveway #2	SWB	*450*	425	✓ Satisfies Standard

Sources: AASHTO (2018), CR Associates Field Observations on April 16, 2026.

Notes:
1. Required SSD = 425 ft at a 50 mph design speed. Per AASHTO (2018), Table 3-1, p.3-4. Per AASHTO (2018), Section 3.2.2.5, p.3-6, this standard governs all vehicle types on the major road.

As shown in **Table 2**, the available stopping sight distance on South Grade Road satisfies the AASHTO (2018) standard at all four driveway approach directions. This finding applies to all vehicle types, including passenger cars, RVs, and combination vehicles. Full SSD compliance at all four approach directions means that every driver traveling on South Grade Road, regardless of vehicle type, has the sight distance necessary to perceive a vehicle at either driveway approach and bring their vehicle to a complete stop before reaching it. This is the standard AASHTO designates as the applicable measure for through-road operations at driveway intersections.

Corner Sight Distance at Driveway Approaches

Corner sight distance (CSD) is the sight distance available to a driver stopped at the driveway approach, measured in each direction along South Grade Road. It addresses the question: *Does a driver waiting at the driveway have enough visibility along the main road to judge whether it is clear to enter?* CSD is distinct from SSD in an important respect: CSD measures the view from the *driveway*, whereas SSD measures the view from the *through road*. CSD conditions at the driveway do not affect the ability of drivers on South Grade Road to perceive and respond to vehicles at the intersection.

The AASHTO Green Book uses the term "intersection sight distance" (ISD) to describe this same measurement, namely the line of sight available to a driver stopped at the driveway approach, looking in each direction along South Grade Road. CSD and ISD refer to the same fundamental field condition, and the two terms are used interchangeably in this analysis. The distinction between the two applicable standards evaluated herein is not a difference in what is measured, but a difference in the required threshold: the AASHTO combination vehicle ISD threshold is higher than the County passenger car CSD threshold because a Class 8 vehicle (such as a pickup truck towing a horse trailer) accelerates more slowly and occupies the intersection longer during a turning maneuver, and therefore requires a longer observed gap in traffic to complete the movement safely.

CSD was evaluated under two applicable standards, each corresponding to a different class of vehicle anticipated to use the park driveways:

- Standard #1: Passenger Car (County CSD Standard). The County of San Diego Public Road Standards, Table 5, establishes required CSD values for standard passenger car operations at intersections and driveway approaches.
- Standard #2: Combination Vehicle (AASHTO Intersection Sight Distance). AASHTO (2018) establishes intersection sight distance (ISD) criteria for Case B turning movements, which apply to larger and more slowly accelerating vehicles. Per FHWA vehicle classification guidance (FHWA-HRT-13-091, Chapter 2, November 2014), RVs are classified as FHWA Class 5 or 6 single-unit vehicles and horse trailers towed by pickup trucks as FHWA Class 8 combination vehicles. Because both vehicle types are anticipated users of the park, the Class 8 combination vehicle standard was applied as the more conservative of the two. At a 50-mph design speed, the required ISD for a Class 8 combination vehicle is 845 feet for Case B1 (left turn from stop) and 772 feet for Case B2 (right turn from stop), per AASHTO (2018), Tables 9-6 and 9-8, p. 9-44 and 9-46 respectively.

Both evaluations use the same field-measured available sight distance at each driveway approach direction. **Table 3** presents the corner and intersection sight distance observation results.

Table 3 - Corner and Intersection Sight Distance Evaluation Results along South Grade Road at the Project Driveway Approaches

Driveway	Approach Direction	Available Sight Distance (ft)[1]	Required CSD, Passenger Car, County Standard (ft)[2]	Compliance with County CSD Standard	Required ISD, Combination Vehicle, Case B1, Left Turn (ft)[3]	Required ISD, Combination Vehicle, Case B2, Right Turn (ft)[3]	Compliance with AASHTO Combination Vehicle ISD Standard
Driveway #1	NB	*500*	*500*	✓ Satisfies Standard	845	772	Below Standard[4]
Driveway #1	SB	*700+*	*500*	✓ Satisfies Standard	845	772	Below Standard[4]
Driveway #2	NEB	*<500*	*500*	Below Standard[3]	845	772	Below Standard[4]
Driveway #2	SWB	*550+*	*500*	✓ Satisfies Standard	845	772	Below Standard[4]

Sources: AASHTO (2018), CR Associates Field Observations on April 16, 2026.

Notes

1. Available sight distance is the field-measured CSD recorded at each approach during CR Associate's field observations on April 16, 2026. The same value is applied to both the County passenger car CSD evaluation (Standard #1) and the AASHTO combination vehicle ISD evaluation (Standard #2).
2. Required CSD per County of San Diego Public Road Standards, Table 5. Design speed = 50 mph.
3. Northeastbound approach, Driveway #2: the available corner sight distance at this approach is below the County standard. This condition is attributable to pre-existing vegetation and rock outcroppings located within the sight triangle on the project site.
4. Required ISD per AASHTO (2018), Tables 9-6 and 9-8, p. 9-44 and 9-46 respectively.
5. Case B1 = left turn from stop; Case B2 = right turn from stop. Design vehicle = FHWA Class 8 combination vehicle. Design speed = 50 mph.

As shown in **Table 3**, the County of San Diego passenger car CSD standard is satisfied at both approach directions of Driveway #1 (northbound and southbound) and at the southwestbound approach of Driveway #2, three of the four approach directions evaluated. At the northeastbound approach of Driveway #2, the available corner sight distance is below the County standard. This condition is attributable to pre-existing vegetation and rock and boulder outcroppings located within the sight triangle on the project site, and is not a condition created or introduced by the proposed project.

Additionally, as shown in **Table 3,** the available sight distance at each of the four approach directions is below the AASHTO combination vehicle ISD threshold. This condition is attributable to fixed, pre-existing physical features of South Grade Road and the surrounding terrain: a vertical crest curve in the roadway near the northbound approach of Driveway #1, and the vegetation and rock outcroppings at the northeastbound approach of Driveway #2. The proposed project does not create, introduce, or alter either of these conditions.

The combination vehicle ISD finding should be understood in practical terms. The available sight distance at each approach is a fixed characteristic of the roadway and terrain; it does not change based on the type of vehicle waiting at the stop bar. What the ISD threshold reflects for a combination vehicle is that the available sight distance, while sufficient for a passenger car to enter the through-road traffic stream, falls below the distance at which AASHTO's standard allows a more slowly accelerating combination vehicle to confirm a full clear gap before completing the turn. A driver towing a horse trailer or recreational vehicle should exercise additional caution at either driveway and may need to wait for a larger gap than a passenger car driver would require. This is consistent with the level

of care expected of combination vehicle operators on rural roadways with pre-existing geometric constraints, and is not a condition created or worsened by the proposed project.

The combination vehicle ISD finding is appropriately read alongside the stopping sight distance results summarized above. SSD is met at all four approach directions for all vehicle types. A driver traveling along South Grade Road who observes a vehicle with a trailer entering from either park driveway has sufficient sight distance to bring their vehicle to a complete stop before reaching the driveway. The ISD finding therefore does not reflect an absolute safety deficiency; it identifies the extent to which pre-existing roadway geometry constrains the gap-acceptance margin for an emerging combination vehicle, while the through-road stopping sight distance remains fully compliant.

The vegetation and rock outcroppings at the northeastbound approach of Driveway #2 are located within the project site and will be addressed through vegetation clearing and grading of the sight triangle area as part of the final site plan. Sight distance compliance must be demonstrated on project improvement plans and approved by the County of San Diego Department of Public Works prior to the issuance of any grading or construction permit, consistent with the County Site Design Standards and Roadway Design Standards.

As established above, stopping sight distance on South Grade Road meets the applicable AASHTO standard at all four approach directions. Per AASHTO (2018) Section 3.2.2.5, separate SSD criteria for trucks are not applied in highway design; the passenger car standard governs and is considered adequate for all vehicle classes on the major road. Therefore, drivers on South Grade Road, including operators of recreational vehicles and horse trailers, have sufficient sight distance to perceive and stop for a vehicle emerging from either driveway.

Where the full combination vehicle ISD threshold cannot be achieved due to existing geometric constraints of the roadway, SSD compliance on the through road constitutes the applicable standard per AASHTO (2018). The sight distance conditions at Driveway #1 and Driveway #2 reflect pre-existing characteristics of South Grade Road and the adjacent terrain, not conditions introduced by the proposed project. Upon completion of the required vegetation clearing and grading at the northeastbound approach of Driveway #2, all applicable sight distance conditions will be addressed.

This sight distance analysis was conducted under normal daytime conditions during CR Associate's field observations on April 16, 2026, and does not constitute a roadway lighting study. The findings and standards applied herein are based on AASHTO and County criteria calibrated to adequate visibility during daytime hours. Sight distance conditions during dawn, dusk, or nighttime operations (including the effect of reduced ambient light and limited headlight illumination range on the effective available sight distance) were not evaluated as part of this study. The County's programming and operations plan for the park should take dawn and dusk access conditions into consideration, including whether operational measures such as restricted hours, signage, or roadway lighting are warranted to address low-light conditions at either driveway approach.

Traffic Control Device

South Grade Road is a continuous, uninterrupted two-lane roadway serving the Alpine community. Traffic control device selection for both project driveways was re-evaluated based on projected driveway volumes, crash history, available sight distance, and the operational characteristics of South Grade Road.

The 2020 TIS estimated project trip generation at 480 ADT, 20 AM peak hour trips, and 39 PM peak hour trips. The parking demand analysis found that, on non-event days, the analog site averaged 17 vehicles. On event days, maximum parking demand is projected at 131 vehicles for a single-sport

practice (including typical park use). Because vehicles can queue entirely within the on-site parking lot before entering South Grade Road, the site would buffer the through traffic stream from event-driven surges and would not require traffic control on South Grade Road to manage driveway operations.

The 2020 TIS recommended installation of all-way stop control at Driveway 1. That recommendation was based, in part, on a documented pedestrian fatality at the South Grade Road and Calle de Compadres intersection in 2016. As discussed in the crash history section of this memorandum, the SWITRS record for that incident assigns fault to the pedestrian party under PCF Violation Category 11 as a pedestrian violation. The collision was not attributable to a geometric deficiency or to the absence of all-way stop control at the intersection.

In light of the updated sight distance analysis and the detailed review of crash history along the project frontage, the prior driveway traffic control recommendation was re-evaluated using the all-way stop control warrants set forth in the 2026 California Manual on Uniform Traffic Control Devices, Sections 2B.12 through 2B.17. The evaluation was informed by the most recently available five years of crash data from 2021 through 2025 and current turning movement volumes. The evaluation considered five warrant categories, as summarized below.

Warrant A, Crash Experience, is not met. The updated crash record identifies three non-fatal crashes during the 2021 to 2025 study period, consistent with the standard analytical window recommended in the Federal Highway Administration (FHWA) Highway Safety Improvement Program (HSIP)[3] guidance for corridor and intersection safety analyses. None involved pedestrians, and none were identified as susceptible to correction through installation of all-way stop control. This falls well short of the five-crash threshold required under CA MUTCD Warrant A.

Warrant B, Sight Distance, is not met. Corner sight distance at the existing Calle de Compadres approach meets the County's 500-foot standard. For the proposed Driveway 1 approach, adequate corner sight distance is contingent on implementation of the brush management and vegetation clearing measures recommended in the companion sight distance memorandum, Alpine Community Park: Driveway Sight Distance Evaluation, prepared by CR Associates in May 2026. With those measures in place, sight distance will meet the applicable standard and Warrant B will not be triggered.

Warrant C, Transition to Signal Control, is not applicable. No traffic signal or roundabout installation is planned at this location.

Warrant D, 8-Hour Volume, is not met. Turning movement count data collected in June 2020 show peak hour volumes of 147 vehicles on South Grade Road during the AM peak hour and 248 vehicles during the PM peak hour. Calle de Compadres recorded 2 vehicles during the AM peak hour and 1 vehicle during the PM peak hour. Because the 85th percentile approach speed on South Grade Road exceeds 40 mph, the 70 percent speed adjustment to the Warrant D volume thresholds is applicable. With this adjustment, the major street threshold is 210 units per hour and the minor street threshold is 140 units per hour. While the PM peak hour volume on South Grade Road exceeds the adjusted major street threshold, the minor street volumes fall decisively below the adjusted threshold in both peak periods. Therefore, Warrant D is not met.

Warrant E, Other Factors, is not met. Turning movement count data collected in June 2020 recorded left-turn volumes from Calle de Compadres of 1 vehicle during the AM peak hour and 1 vehicle during the PM peak hour, confirming that left-turn demand from the minor street is effectively zero. Pedestrian crossing volumes observed during the same count period were 7 during the AM peak hour and 12

[3] https://highways.dot.gov/safety/hsip/hsip-noteworthy-practice-series/hsip-project-evaluation

during the PM peak hour; low absolute volumes that do not support installation of all-way stop control under the other factors criterion., Additionally, South Grade Road and Calle de Compadres do not share similar design or operating characteristics. These conditions do not support installation of all-way stop control under the other factors criterion.

Based on the CA MUTCD warrant evaluation, an all-way stop or traffic signal at either driveway is not warranted. The relatively low side-street and driveway volumes compared to South Grade Road would create substantially differing approach volumes, and all-way stop control under these conditions would impose unnecessary delay on through traffic. This conclusion is consistent with the California MUTCD 2026, which states that all-way stop control should be based on an engineering study and cautions that "all-way stop controls at intersections with substantially differing approach volumes can reduce the effectiveness of these devices for all roadway users" (California MUTCD 2026, Part 2, Chapter 2B, Section 2B.12, All-Way Stop Control, p. 11). Installing all-way stop control at an unwarranted location may also introduce operational and safety concerns, including rear-end collision potential from unexpected deceleration on a high-speed approach, queue spillback into the through traffic stream, and reduced driver compliance over time if the control device is perceived as unnecessary. Accordingly, all-way stop control is no longer considered appropriate, and the prior all-way stop recommendation from the 2020 TIS at Driveway 1 is superseded.

Based on the availability of adequate stopping sight distance and corner sight distance, side-street stop control is recommended at both Driveway 1 and Driveway 2. This treatment would require exiting park vehicles to stop and yield before entering South Grade Road while allowing through traffic on South Grade Road to remain unimpeded.

Supplemental MUTCD Signing

The County should install the following signs along South Grade Road in advance of both driveways:

- Side Road warning (W4-3) in both directions, placed per MUTCD Table 2C-4 for the applicable approach speed, to alert drivers to the intersecting park driveways ahead.
- Recreational Area Direction sign (RA1-1) with the park name and directional arrow, installed per MUTCD Part 2D from both the east and west approaches, advising drivers they are approaching the Alpine Community Park entrance.

Pedestrian and Bicyclist Safety Evaluation

Pedestrian safety at the proposed project driveways was evaluated based on the sight distance findings documented above and the right-of-way provisions of the California Vehicle Code (CVC). Under CVC Section 21950(a), the driver of a vehicle is required to yield the right-of-way to a pedestrian crossing the roadway within any marked or unmarked crosswalk at an intersection. Pedestrians crossing South Grade Road at either project driveway are protected by this statutory right-of-way, and drivers exiting either driveway are required to yield to such pedestrians before entering the through travel lane.

As established in the Stopping Sight Distance evaluation above, the available SSD on South Grade Road satisfies the AASHTO 50 mph standard at all four driveway approach directions. A driver traveling on South Grade Road at the 85th percentile operating speed of 46 mph, under normal daytime conditions, therefore has sufficient sight distance to perceive a pedestrian at either driveway location and bring the vehicle to a complete stop before reaching the pedestrian. Pedestrians, in turn, have a clear view of oncoming traffic along South Grade Road from the driveway position. This is supported by the corner sight distance findings above for three of the four driveway approach directions, and will

be supported at the fourth approach (Driveway #2, northeastbound) upon completion of the vegetation clearing and grading measures identified as a condition of project approval.

The AASHTO-compliant stopping sight distance, together with the statutory pedestrian right-of-way protection under CVC Section 21950 and the low pedestrian volumes anticipated at the driveway locations, supports a finding that the project will not substantially increase hazards to pedestrians along South Grade Road.

Public outreach conducted during the planning process for the proposed project indicated that residents currently access the project area via preserve trails on County of San Diego and Back County Land Trust (BCLT) property. This existing pedestrian access pattern is consistent with a trail-oriented mode of arrival rather than direct pedestrian crossings of South Grade Road at the proposed driveway locations, and supports the finding that pedestrian crossing volumes at the driveways are expected to remain low.

Bicyclist safety at the proposed project driveways was evaluated based on the sight distance findings documented above. The available stopping sight distance on South Grade Road satisfies the AASHTO standard at all four driveway approach directions, which means a driver traveling on South Grade Road has sufficient distance to perceive a bicyclist near either driveway and bring the vehicle to a complete stop before reaching the bicyclist. On this basis, the proposed driveway locations are considered safe for bicyclists traveling along South Grade Road.

The project will construct its South Grade Road frontage improvements consistent with County of San Diego standards, including the provision of improvements applicable to the roadway frontage as required. This is consistent with the County General Plan, which designates Class II bicycle lanes along both sides of South Grade Road. The project's frontage improvements do not preclude the County from implementing the broader bicycle network envisioned in the County Active Transportation Plan along this corridor in the future.

South Grade Road in the vicinity of the project site does not include a dedicated bicycle lane on the project frontage. Under California Vehicle Code Section 21202, bicyclists operating on a roadway without a bicycle lane may legally occupy the full travel lane. Consequently, bicyclists traveling along South Grade Road in the project vicinity may be present within the southbound or northbound travel lane rather than at the roadway edge. Drivers exiting either park driveway should therefore anticipate the potential presence of bicyclists within the travel lane, not exclusively at the roadway shoulder in current conditions. These conditions are not proposed to be changed as part of the project.

The confirmed adequacy of stopping sight distance at all four driveway approach directions further supports bicyclist safety in this context. A driver on South Grade Road approaching either driveway has sufficient sight distance to perceive and stop for a bicyclist occupying the travel lane, consistent with the SSD findings documented in Attachment C.
Park visitors arriving by bicycle are anticipated to consist primarily of teens and adults, as younger children are generally chauffeured by parents or guardians, a travel pattern accounted for in the companion Parking Generation Study. As concluded in this memorandum, the project's construction of frontage improvements to County standards combined with confirmed adequate sight distance at both proposed driveways provides a safe operating environment for bicyclists traveling along South Grade Road, with drivers exiting either driveway having sufficient sight distance to identify and yield to an approaching bicyclist.

From a bicyclist safety perspective, the project's construction of frontage improvements to County standards, combined with the confirmation of adequate sight distance at both proposed project

driveways with implementation of the recommendations identified in the companion sight distance memorandum (*Alpine Community Park: Driveway Sight Distance Evaluation*, CR Associates, May 2026), provides a safe operating environment for bicyclists traveling along South Grade Road. Drivers exiting either driveway will have sufficient sight distance to identify and yield to approaching bicyclists, consistent with the requirements evaluated and documented in the sight distance analysis.

Beyond the sight distance and parking analyses, several physical design features of the proposed project collectively support a safe operating environment for pedestrians and bicyclists. Park access is limited to two defined, stop-controlled driveways along South Grade Road, concentrating vehicle entry and exit at locations evaluated for sight distance adequacy and channeling pedestrian and bicycle crossings to predictable, manageable points. The project will construct frontage improvements along its South Grade Road frontage consistent with County of San Diego standards, providing a paved, defined edge condition along the roadway that benefits both pedestrians and bicyclists in the project vicinity. The project is also designed in conformance with ADA accessibility requirements, ensuring accessible pathways and connections within the site. Taken together, these features support a finding that the project provides a safe environment for pedestrians and bicyclists consistent with applicable standards.

In addition to the measures discussed above, CRA considered three supplemental traffic control and pedestrian crossing treatments applicable to the project driveways and South Grade Road frontage. These treatments include a traffic signal at Driveway #1, a Pedestrian Hybrid Beacon (PHB), and a Rectangular Rapid-Flashing Beacon (RRFB) with high-visibility crosswalk. Each treatment is subject to its own applicable CAMUTCD warrant criteria, which evaluate factors such as vehicular and pedestrian volumes, crossing distance, and crash experience. These treatments are identified solely in the interest of full disclosure and for the County's future consideration, consistent with the ongoing post-occupancy monitoring and engineering judgment appropriately exercised by the agency with jurisdiction over the right-of-way. These treatments, along with the applicable warrant criteria and disclosure basis for each, are documented in **Attachment D**.

Design Features that Substantially Increase Hazards

The project does not propose any changes to the existing geometric design of South Grade Road. The two proposed driveways introduce new intersection legs at locations where, as documented in the companion sight distance memorandum (*Alpine Community Park: Driveway Sight Distance Evaluation*, CR Associates, May 2026), stopping sight distance meets AASHTO requirements at all approaches and corner sight distance meets or can be brought into compliance with County of San Diego Public Road Standards through implementation of the recommended project design measures. The project therefore does not introduce a design feature that would create or substantially increase traffic hazards along South Grade Road, and the crash history within the project vicinity does not indicate a pattern of geometry-related collisions that would be exacerbated by the project.

Supporting documentation is provided in the attachments to this memorandum as follows:

- **Attachment A** (South Grade Road Crash Summary, January 2021–December 2025, TIMS/ SWITRS) documents the crash history data underlying the safety review in this Memorandum;
- **Attachment B** (Alpine Community Park – Parking Demand Analysis) documents a parking study prepared for the project;
- **Attachment C** (Alpine Community Park — Driveway Sight Distance Evaluation) presents the SSD, CSD, and combination vehicle ISD field analysis; and
- **Attachment D** (Additional Safety Treatments) describes additional safety treatments considered during the analysis.

References

California Environmental Quality Act (CEQA) Guidelines, 14 Cal. Code Regs. §§ 15000 et seq.

City of Maywood v. Los Angeles Unified School Dist. (2012) 208 Cal.App.4th 362.

Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553.

County of San Diego. 2023. Final Environmental Impact Report for the Alpine Community Park Project (State Clearinghouse No. 2021030196). October.

Gooden v. County of Los Angeles (2024) 106 Cal.App.5th 1.

Minute Order, Case No. 37-2024-00000536-CU-WM-CTL, Superior Court of California, County of San Diego, June 9, 2025 (ROA 68).

Peremptory Writ of Mandate, Case No. 37-2024-00000536-CU-WM-CTL, Superior Court of California, County of San Diego, January 23, 2026.

U.S. Department of Transportation, Federal Highway Administration. Manual on Uniform Traffic Control Devices (MUTCD), 11th Edition. 2023.

Caltrans. 2020. Highway Design Manual. Chapter 200 – Sight Distance.

Attachment A - South Grade Road Crash Summary, January 2021 – December 2025 (TIMS/SWITRS)

Find address or place

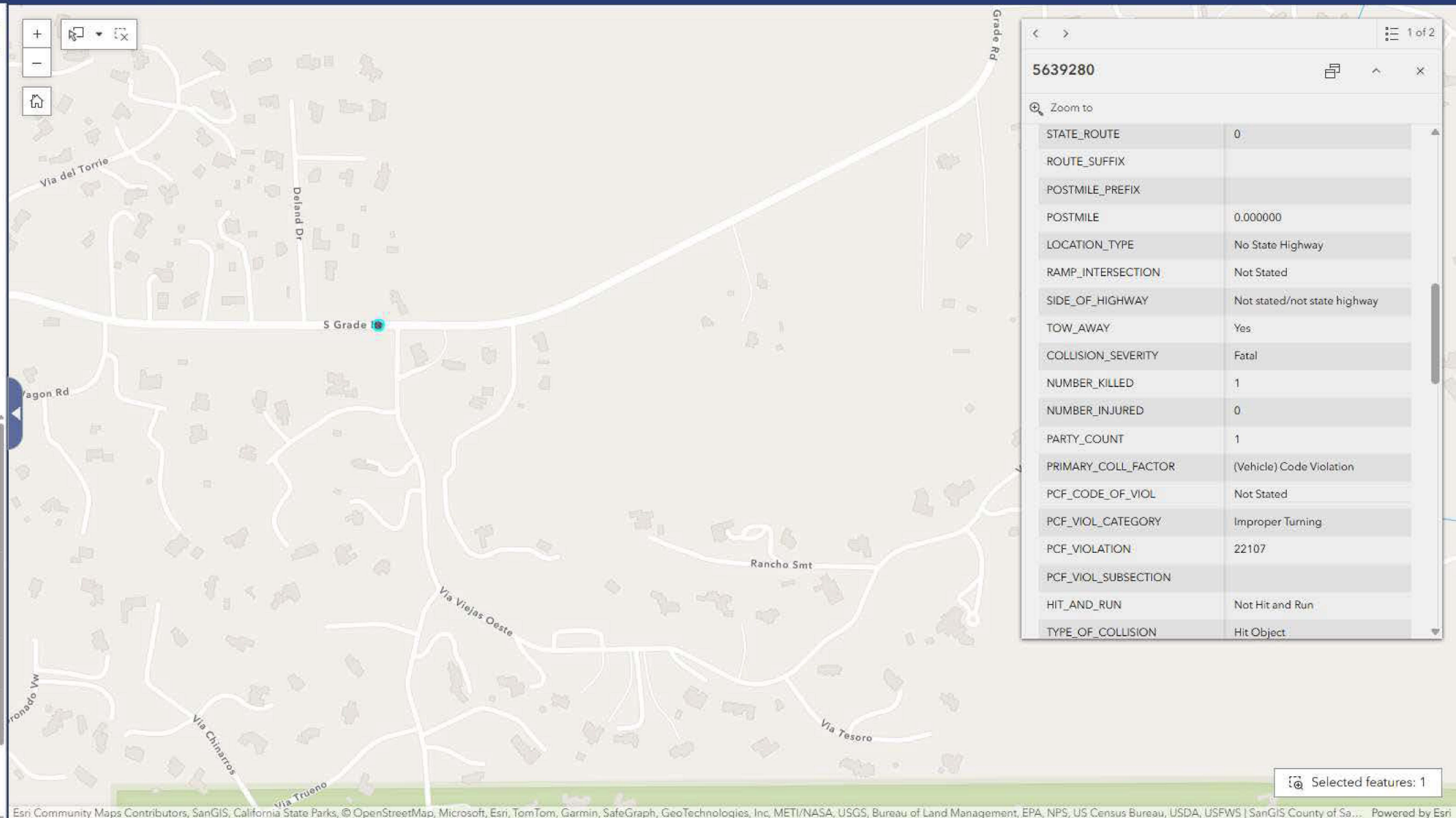
Collision year is any of
1 Selected

Collision severity is any of
1 Selected

Jurisdiction is any of
0 Selected

- Collisions (2012-2024)
- Bikeways
- Safety Focus Network
- Systemic Safety Network
- Jurisdictions

Cities



1 of 2

5639280

Zoom to

STATE_ROUTE	0
ROUTE_SUFFIX	
POSTMILE_PREFIX	
POSTMILE	0.000000
LOCATION_TYPE	No State Highway
RAMP_INTERSECTION	Not Stated
SIDE_OF_HIGHWAY	Not stated/not state highway
TOW_AWAY	Yes
COLLISION_SEVERITY	Fatal
NUMBER_KILLED	1
NUMBER_INJURED	0
PARTY_COUNT	1
PRIMARY_COLL_FACTOR	(Vehicle) Code Violation
PCF_CODE_OF_VIOL	Not Stated
PCF_VIOL_CATEGORY	Improper Turning
PCF_VIOLATION	22107
PCF_VIOL_SUBSECTION	
HIT_AND_RUN	Not Hit and Run
TYPE_OF_COLLISION	Hit Object

Selected features: 1

Esri Community Maps Contributors, SanGIS, California State Parks, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS | SanGIS County of Sa… Powered by Esri

Crash Diagram

Primary Street:

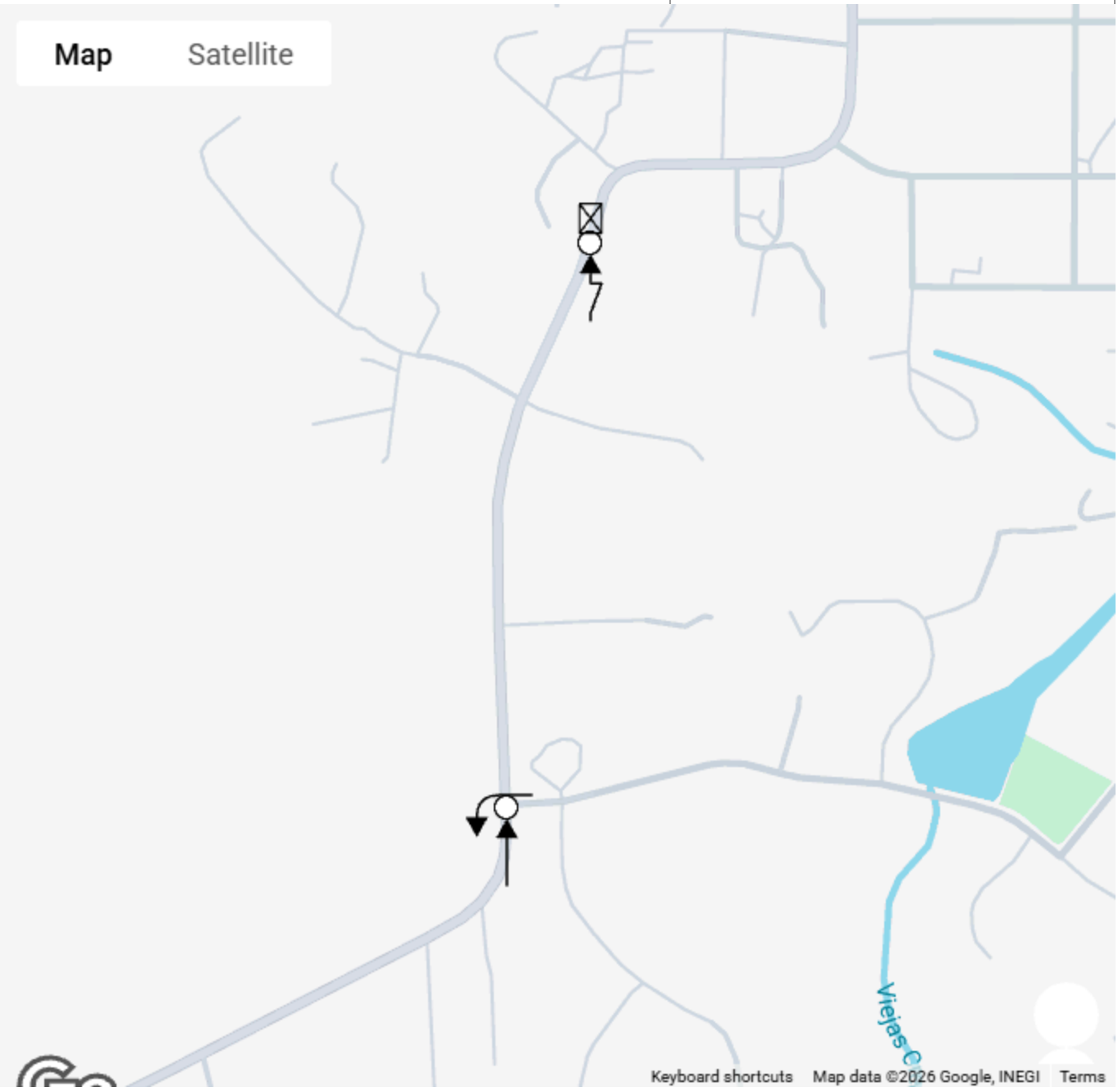
Secondary Street:

Time Period:

Agency Name:

Mapping Summary:	
Fatal Crash	0
Injury Crash	2
Mapped	2
Not Drawn	1
Total	3

- Straight
- Left Turn
- Right Turn
- U-Turn
- Overturned
- Ran Off Road
- Stopped
- Parked
- Pedestrian
- Bicycle
- Object
- Fatal Crash
- Injury Crash



Date Created: 04/19/2026

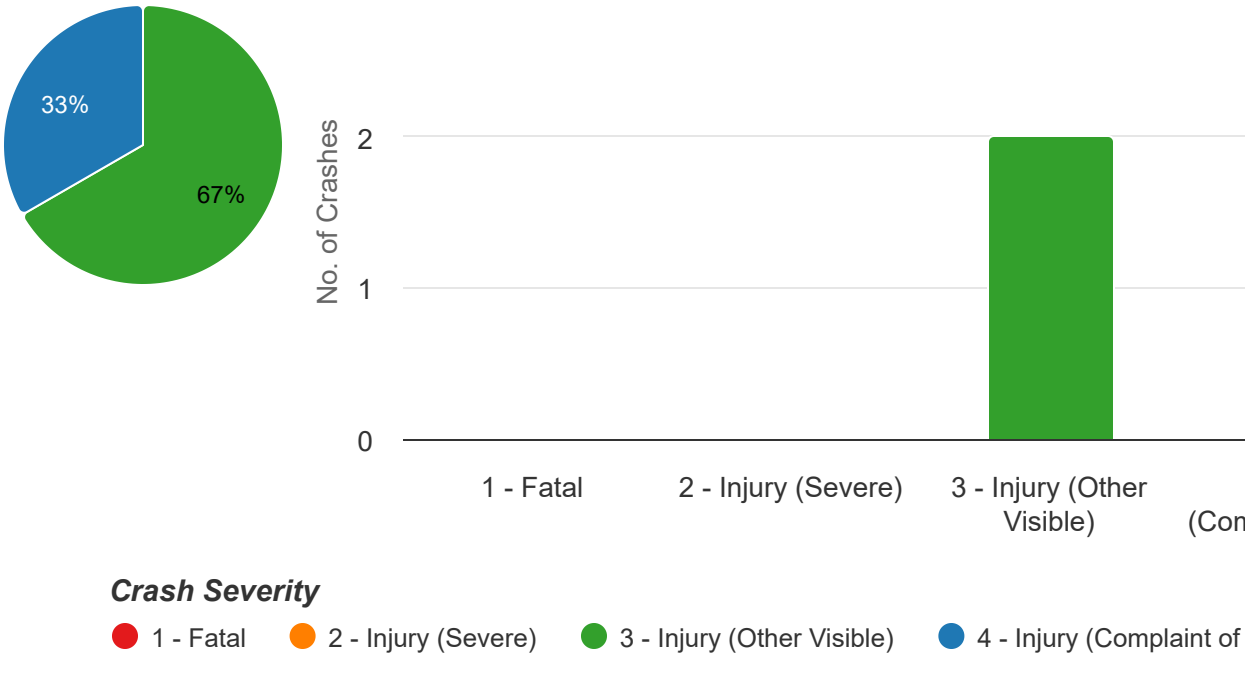
Created by TIMS (https://tims.berkeley.edu) © UC Regents, 2014-2026

Crash Summary by All | Selected Crashes

Crash Summary | Victim Summary | Ped Crash Summary

Crash Summary

By Crash Severity



Show Zero

Crash Severity	Count	%
1 - Fatal	0	0.00%
2 - Injury (Severe)	0	0.00%
3 - Injury (Other Visible)	2	66.67%
4 - Injury (Complaint of Pain)	1	33.33%

By Crash Type

BerkeleySafeTREC

SWITRS Crash Details for CASE ID - 91412970

Crash Information

County	San Diego
City	Unincorporated
Date & Time (M/D/Y)	02/10/2021 11:15
Location (Intersection)	South Grade Rd & Kenda Way
Dist. & Dir. from Intersection	325.00 ft North
State Highway	No
Geocoded Location	32.8316422, -116.7534256 Location

Type of Crash	G - Vehicle/Pedestrian
Motor Vehicle Involved With	B - Pedestrian
Crash Severity	3 - Injury (Other Visible)
PCF Violation Category	08 - Improper Turning
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	Yes	**Bicycle Crash**	No
Motorcycle Crash	No	**Truck Crash**	No

Map View



Street View



Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	- - Not Stated	Yes	South	M - Other Unsafe Turning
2	2 - Pedestrian	N - Pedestrian	No	South	- - Not Stated

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
2	3 - Pedestrian	F - Female	19	6 - Suspected Minor Injury

BerkeleySafeTREC

Crash Details for Case ID - 94371540

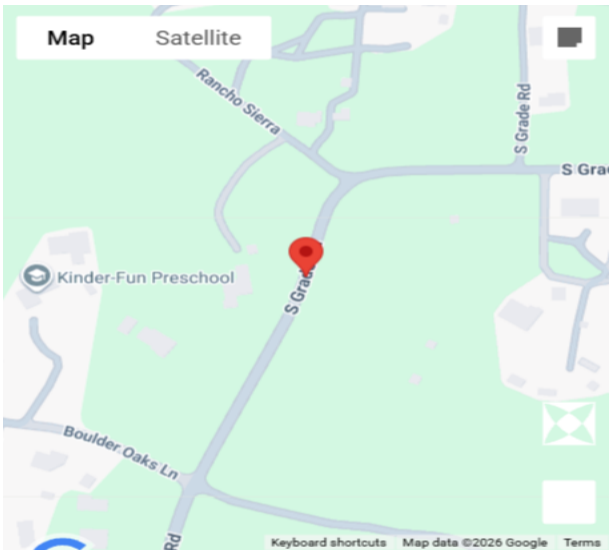
Crash Information

County	San Diego
City	Unincorporated
Date & Time (M/D/Y)	08/17/2024 22:30
Location (Intersection)	South Grade Rd & Rancho Sierra
Dist. & Dir. from Intersection	300.00 ft South
State Highway	No
Geocoded Location	32.8260269, -116.7572479

Type of Crash	E - Hit Object
Motor Vehicle Involved With	I - Fixed Object
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	08 - Improper Turning
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	**Bicycle Crash**	No
Motorcycle Crash	No	**Truck Crash**	No

Map View



Street View



Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	C - Ran Off Road

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	69	7 - Possible Injury

BerkeleySafeTREC

Crash Details for Case ID - 94784761

Crash Information

County	San Diego
City	Unincorporated
Date & Time (M/D/Y)	07/20/2025 16:55
Location (Intersection)	South Grade Rd & Via Viejas
Dist. & Dir. from Intersection	At Intersection
State Highway	No
Geocoded Location	32.8198318, -116.7583466

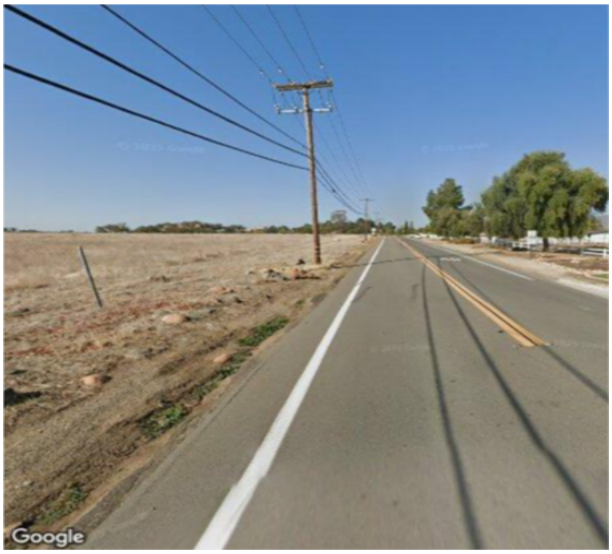
Type of Crash	D - Broadside
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	3 - Injury (Other Visible)
PCF Violation Category	09 - Automobile Right of Way
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	**Bicycle Crash**	No
Motorcycle Crash	No	**Truck Crash**	No

Map View



Street View



Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	West	E - Making Left Turn
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	B - Proceeding Straight

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	18	6 - Suspected Minor Injury

BerkeleySafeTREC

Crash Details for Case ID - 94807595

Crash Information

County	San Diego
City	Unincorporated
Date & Time (M/D/Y)	07/03/2025 22:25
Location (Intersection)	South Grade Rd & Rancho Sierra
Dist. & Dir. from Intersection	40.00 ft South
State Highway	No
Geocoded Location	32.8266907, -116.756958

Type of Crash	E - Hit Object
Motor Vehicle Involved With	I - Fixed Object
Crash Severity	3 - Injury (Other Visible)
PCF Violation Category	01 - Driving or Bicycling Under the Influence of Alcohol or Drug
Weather	A - Clear
Alcohol Involved	Yes

Pedestrian Crash	No	**Bicycle Crash**	No
Motorcycle Crash	No	**Truck Crash**	No

Map View



Street View



Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	South	M - Other Unsafe Turning

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	34	6 - Suspected Minor Injury

Attachment B - Alpine Community Park: Parking Demand Analysis

TO:	Yara Fisher, HELIX Environmental Planning, Inc.
FROM:	Phuong Nguyen, TE; CR Associates Jorge Muradas, EIT; CR Associates
DATE:	July 29, 2026
RE:	Alpine Community Park – Parking Demand Analysis

This memorandum presents the methodology and findings of a parking demand study prepared for the Alpine Community Park project (hereinafter referred to as the "project"). The study was conducted to evaluate anticipated parking conditions associated with organized sports activities at the project site and to assess whether the proposed parking supply would be sufficient to accommodate projected demand without resulting in spillovers onto adjacent streets or neighboring residential areas.

Project Background

The County of San Diego (County) Department of Parks and Recreation (DPR) proposes to construct the Alpine Community Park project within the community of Alpine, California. The project encompasses approximately 96.6 acres of undeveloped land, of which approximately 25 acres would be developed as an active community park, and the remaining 70 acres would be preserved as permanent open space.

The project site is located adjacent to the Back County Land Trust's (BCLT) Wright's Field Preserve, north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard. The active park development area would incorporate modifications to existing trails and the construction of new recreational amenities, while the remaining acreage would be conserved as undisturbed open space.

CR Associates (CRA) previously prepared a Transportation Impact Study (TIS) for the proposed project (Alpine Community Park Transportation Impact Study, July 2020). The TIS evaluated two roadway segments and five intersections along South Grade Road under Existing and Near-Term Year 2023 Base conditions. Key findings from the TIS are summarized as follows:

- Project trip generation was estimated at 480 average daily trips (ADT), including 20 AM peak hour trips and 39 PM peak hour trips, based on the SANDAG Brief Guide to Vehicular Traffic Generation Rates for the San Diego Region (April 2002) at a rate of 20 trips per acre[1] for a 24-acre regional park.
    - While Alpine Community Park is intended to be a community park, not local park, the SANDAG trip generation rates do not have a standalone "community park" category. The Regional Park rate was selected as the more appropriate rate given the project's rural, unincorporated context and comparatively smaller surrounding population relative to a typical urban city park, while also consistent with the rate applied in the previously approved 2020 TIS. This rate is considered a conservative estimate of actual demand, which is further supported by the parking demand analysis presented in this memorandum.
- Under all studied scenarios, all analyzed roadway segments and intersections were found to operate at Level of Service (LOS) C or better, and no significant traffic impacts were identified.

[1] Weekday non-event trip generation rate.

- Parking requirements of 240 spaces were confirmed per County of San Diego Ordinance No. 10251.
- While project Driveway #1 (located at the intersection of South Grade Road at Calle de Compadres) does not meet CAMUTCD peak hour volume warrants for an all-way stop-controlled intersection, conversion to all-way stop control was recommended due to documented pedestrian collisions in the vicinity of the intersection.
- A stopping sight distance at the intersection of South Grade Road at Via Viejas is not met on the southbound approach.
    - Recommendation for the installation of "STOP AHEAD" warning signs on the south leg of the intersection.

In response to the Writ of Mandate issued on January 23, 2026 (Case No. 37-2024-00000536-CU-WM-CTL), CRA conducted a parking demand analysis to evaluate the anticipated parking conditions at the proposed project. The analysis was conducted to address the following objectives:

1. Quantify the observed average and maximum parking demand associated with organized sports activities at a comparable park facility. The proposed project is intended to accommodate organized sports practices, during which organizations or leagues may reserve fields for scheduled use; however, the site is not intended to host tournaments or other formal competitive events.
2. Evaluate whether projected parking demand could exceed the available on-site parking supply and result in spillover parking onto adjacent streets or nearby properties.
3. Identify appropriate parking management strategies, as warranted, to ensure that park-generated parking demand can be accommodated on-site and that spillover into the surrounding residential neighborhood is avoided.
4. Evaluate whether the available on-site parking supply and recommended management measures would contain park-related parking demand within the project site and prevent park users from parking within the surrounding residential neighborhood or along roadway shoulders, thereby reducing the potential for conflicts between park users and vehicular traffic in the vicinity of South Grade Road.

Analog Facility Selection

To address the study objectives, a structured, criteria-based screening of 76 public parks within and around the East San Diego County region was conducted to identify the facility most representative of the proposed Alpine Community Park program for purposes of parking demand observation. The candidate inventory was compiled from County of San Diego Parks and Recreation records, municipal parks departments (Cities of Santee, El Cajon, La Mesa, and Lemon Grove), and supporting capital improvement and planning documents.

The screening applied five sequential filters. A park eliminated at any screen was not advanced to subsequent screens. The screens are summarized below; the complete screening log documenting the disposition of all 76 candidate parks is provided in **Attachment A**.

- **Screen 0 — Geographic Eligibility:** Three parks were excluded as outside the East San Diego County study area — Sweetwater Summit Regional Park (Bonita/South Bay), Sycamore Canyon/Goodan Ranch County Preserve (Poway/North Inland), and Wilderness Gardens County Preserve (Pala/North County) — leaving a candidate universe of 73 East County public parks.

- **Screen 1 — Park Type:** Eighteen parks were eliminated for incompatible trip generation patterns: 12 programmed Sports Complexes, which generate scheduled league-based

demand concentrated around game and practice times rather than the mixed-use day-use pattern of a community park; and 6 Regional/Camping Parks, which generate multi-day overnight stays with stayover dwell times incompatible with day-use trip rates.

- **Screen 2 — Catchment Setting and Population Density:** Twenty-seven parks were eliminated whose catchment contexts — urbanized, far-rural, or established mixed-suburb settings — do not transfer to Alpine's rural/semi-rural East County setting. For purposes of this screening, catchment context was assessed based on the regional setting of each candidate park relative to Alpine, considering the surrounding community plan designations, land use character, and density patterns within San Diego County. Parks serving higher-density urban catchments exhibit greater walk and transit modal share and different per-household visitation rates than those anticipated at Alpine. Operating agency was deliberately not used as a screen criterion because catchment context, not jurisdictional ownership, is the determinant of park trip-generation transferability.

- **Screen 3 — Amenity Mix:** Twenty-five parks with predominantly passive, pocket-neighborhood, preserve-trailhead, or indoor-recreation programs were eliminated. Advancement required a destination-grade family park program including at minimum a playground, picnic areas, restrooms, and active sports facilities — consistent with the proposed Alpine Community Park improvements.

- **Screen 4 — Fine Demographic Alignment:** No additional parks were eliminated. All parks that satisfied Screens 2 and 3 also met the fine demographic alignment criteria (median household income of approximately $85,000 or greater, family-dominant household composition, high homeownership), confirming that the coarse catchment screen at Screen 2 effectively captured the relevant demographic filter.

- **Screen 5 — Scale and Survey Configuration:** Two parks — Collier County Park (Ramona) and Steele Canyon County Park (Spring Valley/Jamul) — were retained through Screen 4 but not selected as the primary comparable park. Collier County Park presents multiple access points requiring coordinated multi-station counts; its older facility vintage and lower current amenity intensity would yield a low-end attraction estimate inappropriate for forecasting peak design-year conditions. Steele Canyon County Park was retained through Screen 4, but not selected as the primary comparable park. This park's catchment straddles urbanized Spring Valley and rural Jamul, producing a mixed demographic signal that complicates rate transferability. Both parks are retained as secondary sensitivity references as discussed below.

Hilton Head County Park was selected as the primary analog facility on the basis of full alignment across all five screens. The park is a 10-acre County of San Diego Community/Neighborhood Park located in Rancho San Diego/Eastern El Cajon, a planned low-density suburban community with a family-dominant, high-homeownership, single-family-dominant household profile and population density directly comparable to Alpine's East County setting. Its amenity program — children's playground, multi-use sports field, basketball court, exercise stations, shaded picnic and BBQ areas, covered pavilions, drinking fountains, and restrooms — most closely parallels the proposed Alpine improvements among the parks that advanced through screening. Hilton Head has a single primary vehicular access from Hilton Head Road enabling a methodologically clean observation with a single station, and its current design reflects County community park standards comparable to the proposed Alpine improvements. A 2.5 area-based scale factor was applied to account for the difference in active program area between Hilton Head (10 acres) and Alpine (25 acres), proportionally adjusting the observed parking demand to reflect the proposed 240-space lot; this factor is within the range supported by National Recreation and Park Association (NRPA) guidance for transferable trip-rate

studies. Hilton Head's denser urban setting and larger surrounding population relative to Alpine's rural, unincorporated context results in comparatively greater baseline parking demand. No adjustment was made for differences in population density, retaining the unadjusted demand rates from the denser Hilton Head setting as a conservative upper-bound estimate for the proposed project.

In addition to the foregoing screening process, two additional East San Diego County parks — Cactus County Park and Valley Center Community Park — were considered but determined to be unsuitable analogs due to significant differences in facility size, parking capacity, recreational programming, and geographic and demographic context relative to both the proposed project and the selected analog site.

Sensitivity References

Although Hilton Head County Park is the primary analog facility, Collier County Park and Steele Canyon County Park are documented as secondary references for sensitivity comparison of the community-park parking demand rate. Where the Hilton Head observed rate falls within the range bracketed by the two secondary references after appropriate adjustment for demographic and amenity differences, the central forecast is considered robust. Additionally, because no East County park combines the full amenity-rich community-park program with equestrian access in a single facility, the equestrian-trip component is addressed through a supplementary sensitivity reference utilizing Oakoasis County Preserve (Lakeside) and Dos Picos County Park (Ramona) as data sources for the discrete equestrian-trip contribution, scaled to the proposed Alpine equestrian footprint.

ITE Reference Rate Comparison

As a supplemental reference, trip generation rates for Land Use Code (LUC) 411 (Public Park) from the Institute of Transportation Engineers (ITE) Trip Generation Manual (12th Edition) were reviewed. The ITE LUC 411 average weekday rate of 0.78 vehicle trips per acre yields an estimated 20 daily vehicle trips for Alpine Community Park's 25-acre active program area. The Saturday rate of 1.96 vehicle trips per acre yields approximately 49 daily vehicle trips. Because the ITE LUC 411 database encompasses a wide range of park types and sizes — including predominantly passive and trail-oriented facilities substantially larger than the proposed project, with an average study-site size of 612 acres — the resulting rates understate the parking demand that would be expected at a smaller, actively programmed sports park during organized practice conditions. As noted in the ITE data source, caution should be used when applying the acreage-based rate, as the percentage of park area used most intensively varies considerably across the study sites. The parks eliminated at earlier screens — particularly the passive, preserve-trailhead, and trail-corridor facilities eliminated at Screens 2 and 3 — more closely resemble the large passive facilities that anchor the lower end of the ITE LUC 411 rate distribution, confirming their inapplicability as analogs for an actively programmed community park.
The observed peak parking demand at Hilton Head County Park during organized practice days — averaging 72 vehicles for baseball and 105 vehicles for multi-use field practices — substantially exceeds the implied demand from ITE's generalized public park rates. This confirms that the Hilton Head analog captures peak active programming demand more accurately and conservatively than the ITE composite rate would suggest, and further reinforces the appropriateness of its selection as the primary analog facility.

Parking Demand Study

Parking demand was evaluated using Nearmap, a high-resolution aerial imagery platform that provides geo-referenced, time-stamped overhead imagery at recurring intervals throughout the year. Nearmap allows for systematic vehicle counts within defined parking areas and adjacent on-street segments and provides a non-intrusive, repeatable basis for evaluating parking utilization over time. Nearmap

imagery is typically collected near midday to minimize shadowing and optimize image clarity. Accordingly, the observed vehicle counts are assumed to be generally representative of peak daytime parking conditions, particularly for weekend observations when park visitation and associated parking demand are typically greatest.

A total of 14 survey dates spanning from February 2022 through January 2026 were reviewed. For each survey date, the aerial imagery was examined to identify the activity occurring at the site at the time of image capture. Survey observations were categorized into the following activity types:

- Baseball practice days
- Multi-use field practice days[2]
- Non-event days with no organized sports activity

Hilton Head County Park is served by a 56-space on-site parking lot. When on-site parking supply is fully utilized, overflow parking occurs along adjacent on-street segments along Hilton Head Road. Therefore, total parking demand at the analog site was defined as the combined utilization of the on-site parking lot and adjacent on-street parking supply.

Because the on-site parking lot and adjacent on-street parking are shared by organized sports participants, general park users, and residents of nearby multi-family residential uses, multiple survey observations were necessary to distinguish sports-related parking demand from baseline parking activity. To isolate the parking demand attributable to organized sports practices, the following assumptions and analytical procedures were applied:

- Vehicles observed in the same on-street locations across multiple non-event survey dates were assumed to represent residential spillover from adjacent properties.
- The average on-street occupancy observed on non-event days, equal to 16 vehicles, was established as the residential spillover baseline.
- For sports activity days, this 16-vehicle baseline was subtracted from total observed on-street occupancy to estimate the incremental on-street parking demand attributable to organized sports practices.

Parking demand observed at Hilton Head County Park during sports activity days reflects the types of active programming that may occur at the proposed project, including organized sports activities and concurrent general recreational use by non-sports visitors. Hilton Head County Park is also located in a denser and more urbanized setting, which likely results in a higher regular park usage rate than would be expected at the proposed project. Therefore, applying the Hilton Head regular park usage rate to the proposed project provides a conservative assumption for estimating total parking demand during active programming conditions, while excluding recurring background parking not associated with park activities to avoid overstating park-generated demand.

Table 1 summarizes the observed average and maximum parking demand by activity type. Supporting calculations are provided in **Attachment B**.

[2] Note: The organized field-sport activity observed at Hilton Head County Park, which included soccer practice, is considered representative of the parking demand anticipated during scheduled multi-use field use at Alpine Community Park. Multi-use fields accommodate a similar range of organized team sports, and the associated parking demand is expected to be comparable regardless of the specific sport being played.

Table 1: Observed Parking Demand by Activity Type – Hilton Head County Park

Activity Type	Observations (n)	Park Lot (vehicles)	Multi-Use Field Practice (vehicles)	Total Parking Demand (vehicles)
Baseball Game	5	Avg: 41 / Max: 50	Avg: 31 / Max: 69	**Avg: 72 / Max: 119**
Multi-Use Field Practice	2	Avg: 54 / Max: 59	Avg: 51 / Max: 72	**Avg: 105 / Max: 131**

Source: CR Associates (2026)

Notes:
1. Game On-Street Demand = Observed On-Street Parking minus Residential Spillover Baseline (16 vehicles).
2. See **Attachment B** for detailed calculations.

As presented in **Table 1**, the average total parking demand on baseball practice days was 72 vehicles, with a maximum observed demand of 119 vehicles. For multi-use field practice days, the average total demand was 105 vehicles, with a maximum of 131 vehicles. In both cases, total parking demand reflects the combined utilization of the on-site park lot and the adjacent on-street supply, net of the 16-vehicle residential spillover baseline.

Conclusion

The parking demand analysis indicates that parking demand associated with a single organized sports practice would remain within the proposed project's on-site parking supply of 240 spaces. Specifically, the average total parking demand observed at the analog site was 72 vehicles for baseball practices and 105 vehicles for multi-use field practices, while the maximum observed demands were 119 vehicles and 131 vehicles, respectively. Each of these demand levels is below the proposed on-site parking supply. On this basis, parking demand generated by a single organized sports practice at any given time is not expected to exceed available on-site parking at the project site.

Potential exceedance of parking supply would occur only under conditions in which multiple organized sports practices overlap. For example, if baseball and multi-use field practices were to occur concurrently, the combined parking demand could be as follows:

- Combined average parking demand: approximately 177 vehicles
- Combined maximum parking demand: approximately 250 vehicles

Under the maximum concurrent condition, total parking demand could exceed the proposed 240-space parking supply, which could result in spillover parking onto adjacent streets, roadway shoulders, or into the surrounding residential neighborhood.

To prevent demand from exceeding supply under concurrent multi-sport conditions, where combined maximum demand could approach approximately 250 vehicles, The following scheduling requirements shall apply to all organized sports activities at the park. With this scheduling protocol in place, on-site parking supply will remain sufficient to accommodate all event-day demand, and spillover onto South Grade Road is not anticipated. County Parks and Recreation Programming staff shall implement and maintain these requirements:

- Only one sport or user group shall occupy each park field/court at any given time; overlapping or simultaneous sports activities or practices are prohibited.

- Sports Programming staff will monitor the site between consecutive sessions to confirm no vehicular spillover onto the public right-of-way. If spillover is observed more than two times in any given season, a minimum one-hour buffer shall be implemented between consecutive sessions to allow full vehicle turnover before the next group arrives. For example, if a session ends at 1:00 PM, the next session may not begin until 2:00 PM. This one-hour buffer shall increase to two hours if additional spillover continues to be observed.
- Sports Programming staff shall be responsible for scheduling all organized activities in strict accordance with these requirements.
- Parks Programming staff and the on-site volunteer shall monitor scheduling compliance on an ongoing basis to ensure these requirements are met at all times.
- Vehicular spillover onto the public right-of-way, including South Grade Road, shall be prevented through enforcement of this scheduling protocol.

Implementation of these measures would reduce the potential for overlapping parking demand and help ensure that park-generated parking remains fully accommodated on-site.

It should also be recognized that actual parking demand at the proposed project site may be lower than the demand observed at Hilton Head County Park. As discussed previously, Hilton Head County Park is located in a denser and more urbanized setting and serves a larger surrounding population than the proposed project site. Accordingly, the parking demand rates applied in this analysis are considered conservative and likely represent an upper-bound estimate of parking demand that could occur at the project site.

Following project opening, County staff and park rangers will monitor on-site and nearby on-street parking conditions for a minimum of one year of operation. If field observations demonstrate that actual parking demand associated with organized sports practices is consistently and materially lower than the levels estimated herein, modification of the parking management program may be considered. Any such modification, including potential relaxation of the single-sport restriction, should occur only following review of observed parking data and in coordination with the County Traffic Engineer

Attachment A - Comparable Park Screening Log

The table below documents the disposition of all 76 parks evaluated in the structured screening process. Rows are sorted with the selected comparable park first (green-highlighted), runner-up parks retained for sensitivity reference second (yellow-highlighted), then remaining parks grouped by the screen at which they were eliminated. Geographic exclusions at Screen 0 are highlighted in gray. The Score column (0–5) indicates how far through the screening process the park advanced.

Park / Facility	Community / Area	Primary Category	Setting	Median HHI	Screen	Score	Rationale / Disposition
Hilton Head County Park	Rancho San Diego / El Cajon	Community / Neighborhood Park	Suburban (planned)	~$100k+	SELECTED	5	Selected as primary comparable park.
Collier County Park	Ramona	Community / Neighborhood Park	Rural / semi-rural	~$90-105k	Screen 5	4	Runner-up; multiple access points; older vintage.
Steele Canyon County Park	Spring Valley / Jamul	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 5	4	Runner-up; mixed catchment; multiple entries.
Barnett Ranch County Preserve	Ramona	Open-Space Preserve	Rural / semi-rural	~$90-105k	Screen 3	2	Eliminated: insufficient amenity mix (passive/preserve).
Big Rock Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix (missing restrooms, active sports).
Boulder Oaks County Preserve	Lakeside / Alpine area	Open-Space Preserve	Suburban / rural edge	~$85-95k	Screen 3	2	Eliminated: passive/preserve program.
Deputy Ken Collier Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Forester Creek Trail	Santee	Trail Corridor	Suburban	~$95-110k	Screen 3	2	Eliminated: trail corridor, no active sports.
Lakeside Linkage County Preserve	Lakeside	Open-Space Preserve	Suburban / rural edge	~$85-95k	Screen 3	2	Eliminated: passive/preserve program.
Louis A. Stelzer County Park	Lakeside	Day-Use / Picnic Park	Suburban / rural edge	~$85-95k	Screen 3	2	Eliminated: no playground or active sports.
Luelf Pond County Preserve	Ramona	Open-Space Preserve	Rural / semi-rural	~$90-105k	Screen 3	2	Eliminated: passive/preserve program.
Marine Memorial Trails	Santee	Trail Corridor	Suburban	~$95-110k	Screen 3	2	Eliminated: trail corridor.
Mast Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: missing playground and restrooms.
Mast Park West Trail	Santee	Trail Corridor	Suburban	~$95-110k	Screen 3	2	Eliminated: trail corridor.

Park / Facility	Community / Area	Primary Category	Setting	Median HHI	Screen	Score	Rationale / Disposition
Mission Creek Trail	Santee	Trail Corridor	Suburban	~$95-110k	Screen 3	2	Eliminated: trail corridor.
Mt. Gower County Preserve	Ramona	Open-Space Preserve	Rural / semi-rural	~$90-105k	Screen 3	2	Eliminated: passive/preserve program.
Oakoasis County Preserve	Lakeside	Open-Space Preserve	Suburban / rural edge	~$85-95k	Screen 3	2	Eliminated: passive/preserve; retained as equestrian sensitivity reference.
Ramona Grasslands / Santa Maria Creek	Ramona	Open-Space Preserve	Rural / semi-rural	~$90-105k	Screen 3	2	Eliminated: passive/preserve program.
Shadow Hill Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Simon County Preserve	Ramona	Open-Space Preserve	Rural / semi-rural	~$90-105k	Screen 3	2	Eliminated: passive/preserve program.
Sky Ranch Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Town Center Community Park East	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Town Center Community Park West	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Walker Preserve Trail	Santee	Open-Space Preserve	Suburban	~$95-110k	Screen 3	2	Eliminated: trail/preserve.
West Hills Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: missing restrooms.
Weston Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: insufficient amenity mix.
Weston Trail	Santee	Trail Corridor	Suburban	~$95-110k	Screen 3	2	Eliminated: trail corridor.
Woodglen Vista Park	Santee	Community / Neighborhood Park	Suburban	~$95-110k	Screen 3	2	Eliminated: missing picnic and restrooms.
Aztec Park	La Mesa	Community / Neighborhood Park	Established suburb	~$80-90k	Screen 2	1	Eliminated: established mixed suburb, lower HHI, mixed tenure.

Park / Facility	Community / Area	Primary Category	Setting	Median HHI	Screen	Score	Rationale / Disposition
Berry Street Park	Lemon Grove	Community / Neighborhood Park	Urbanized	~$65-75k	Screen 2	1	Eliminated: urbanized catchment, lower HHI.
Bill Beck Park	El Cajon	Community / Neighborhood Park	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Bostonia Park / Bostonia Recreation Center	El Cajon	Civic / Recreation Facility	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Briercrest Park	La Mesa	Day-Use / Picnic Park	Established suburb	~$80-90k	Screen 2	1	Eliminated: established suburb.
Collier Park	La Mesa	Day-Use / Picnic Park	Established suburb	~$80-90k	Screen 2	1	Eliminated: established suburb.
Dictionary Hill Open Space Preserve	Spring Valley	Open-Space Preserve	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
El Capitan County Preserve	Lakeside / El Cajon Mtn	Open-Space Preserve	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Estrella County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Eucalyptus County Park	La Mesa / Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Fletcher Hills Center & Pool	El Cajon	Community / Neighborhood Park	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Goodland Acres County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Highwood Park	La Mesa	Community / Neighborhood Park	Established suburb	~$80-90k	Screen 2	1	Eliminated: established suburb.
Hillside Park	El Cajon	Day-Use / Picnic Park	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Ildica Street County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
In-Ko-Pah County Park	Jacumba / East County	Open-Space Preserve	Far rural / desert	~$45-55k	Screen 2	1	Eliminated: far-rural/desert, insufficient density.
Judson Park	El Cajon	Day-Use / Picnic Park	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.

Park / Facility	Community / Area	Primary Category	Setting	Median HHI	Screen	Score	Rationale / Disposition
Kennedy Recreation Center / JFK Park	El Cajon	Civic / Recreation Facility	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Lamar County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Lemon Grove Park	Lemon Grove	Civic / Recreation Facility	Urbanized	~$65-75k	Screen 2	1	Eliminated: urbanized catchment.
MacArthur Park	La Mesa	Civic / Recreation Facility	Established suburb	~$80-90k	Screen 2	1	Eliminated: established suburb.
Monterey Heights Park	Lemon Grove	Community / Neighborhood Park	Urbanized	~$65-75k	Screen 2	1	Eliminated: urbanized catchment.
Renette Park	El Cajon	Civic / Recreation Facility	Urbanized	~$60-70k	Screen 2	1	Eliminated: urbanized catchment.
Santa Ysabel County Preserves	Santa Ysabel / Julian	Open-Space Preserve	Far rural	~$70-85k	Screen 2	1	Eliminated: far-rural, insufficient density.
Spring Valley County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Sweetwater Place County Park	Spring Valley	Community / Neighborhood Park	Suburban / urbanized	~$70-80k	Screen 2	1	Eliminated: suburban/urbanized catchment.
Volcan Mountain Wilderness Preserve	Julian	Open-Space Preserve	Far rural	~$70-85k	Screen 2	1	Eliminated: far-rural, insufficient density.
Agua Caliente County Park	East County desert	Regional / Camping Park	Mixed East County	~$70-90k	Screen 1	0	Eliminated: overnight destination park, incompatible trip pattern.
Cajon Valley Middle School Park	El Cajon	Sports Complex	Urbanized	~$60-70k	Screen 1	0	Eliminated: programmed sports complex, event-driven trip pattern.
Dos Picos County Park	Ramona	Regional / Camping Park	Rural / semi-rural	~$90-105k	Screen 1	0	Eliminated: overnight destination park; retained as equestrian sensitivity reference.
El Monte County Park	Lakeside	Sports Complex	Suburban / rural edge	~$85-95k	Screen 1	0	Eliminated: programmed sports complex.
Flinn Springs County Park	El Cajon / Lakeside	Sports Complex	Urbanized	~$60-70k	Screen 1	0	Eliminated: programmed sports complex.

Park / Facility	Community / Area	Primary Category	Setting	Median HHI	Screen	Score	Rationale / Disposition
Karl Tuttle Park	El Cajon	Sports Complex	Urbanized	~$60-70k	Screen 1	0	Eliminated: programmed sports complex.
La Mesita Park / Junior Seau Sports Complex	La Mesa	Sports Complex	Established suburb	~$80-90k	Screen 1	0	Eliminated: programmed sports complex.
Lake Morena County Park	Campo	Regional / Camping Park	Far rural	~$60-75k	Screen 1	0	Eliminated: overnight destination park.
Lakeside Baseball Park	Lakeside	Sports Complex	Suburban / rural edge	~$85-95k	Screen 1	0	Eliminated: programmed sports complex.
Lindo Lake County Park	Lakeside	Sports Complex	Suburban / rural edge	~$85-95k	Screen 1	0	Eliminated: programmed sports complex, event-driven trip pattern.
Pine Valley County Park	Pine Valley	Sports Complex	Far rural	~$75-85k	Screen 1	0	Eliminated: programmed sports complex.
Potrero County Park	Potrero	Regional / Camping Park	Far rural	~$60-75k	Screen 1	0	Eliminated: overnight destination park.
Sportsplex USA Santee	Santee	Sports Complex	Suburban	~$95-110k	Screen 1	0	Eliminated: programmed sports complex.
Sunset Park	La Mesa	Sports Complex	Established suburb	~$80-90k	Screen 1	0	Eliminated: programmed sports complex.
Sweetwater Lane County Park	Spring Valley	Sports Complex	Suburban / urbanized	~$70-80k	Screen 1	0	Eliminated: programmed sports complex.
Vallecito County Park	East County desert	Regional / Camping Park	Mixed East County	~$70-90k	Screen 1	0	Eliminated: overnight destination park.
Wells Park	El Cajon	Sports Complex	Urbanized	~$60-70k	Screen 1	0	Eliminated: programmed sports complex.
William Heise County Park	Julian	Regional / Camping Park	Far rural	~$70-85k	Screen 1	0	Eliminated: overnight destination park.
Sweetwater Summit Regional Park	Bonita / South Bay	Regional / Camping Park	Suburban / urbanized	~$70-80k	Screen 0	0	Eliminated: outside East County study area (South Bay).
Sycamore Canyon / Goodan Ranch Preserve	Santee / Poway edge	Open-Space Preserve	Suburban	~$95-110k	Screen 0	0	Eliminated: outside East County study area (North Inland/Poway).
Wilderness Gardens County Preserve	Pala / North County edge	Open-Space Preserve	Mixed East County	~$70-90k	Screen 0	0	Eliminated: outside East County study area (North County/Pala).

Source: CR Associates (2026). Screening log based on review of County of San Diego Parks and Recreation records, municipal parks departments, and supporting planning documents.

Notes: Green highlight = selected primary analog. Yellow highlight = runner-up/sensitivity reference. Gray highlight = excluded at Screen 0 (geographic eligibility).
HHI = Median Household Income

Attachment B - Count Observation Data & ITE Parking Generation

HILTON HEAD COUNTY PARK – PARKING SURVEY SUMMARY					
Survey Date	Day of Week	Activity Observed	Park Lot (vehicles)	Adjacent Street (vehicles)	Total Observed (vehicles)
1/16/2026	Friday	Baseball Game	49	45	94
9/23/2025	Tuesday	None	11	25	36
5/14/2025	Wednesday	None	37	20	57
4/24/2025	Thursday	None	14	14	28
1/19/2025	Sunday	None	15	12	27
10/26/2024	Saturday	Soccer Game	50	46	96
5/12/2024	Sunday	None	15	8	23
1/15/2024	Monday	Baseball Game	50	34	84
9/14/2023	Thursday	Soccer Game	59	88	147
5/7/2023	Sunday	Baseball Game	50	85	135
1/13/82023	Friday	None	9	12	21
8/28/2022	Sunday	None	16	23	39
4/23/2022	Saturday	Baseball Game	19	43	62
2/2/2022	Sunday	Baseball Game	37	29	66

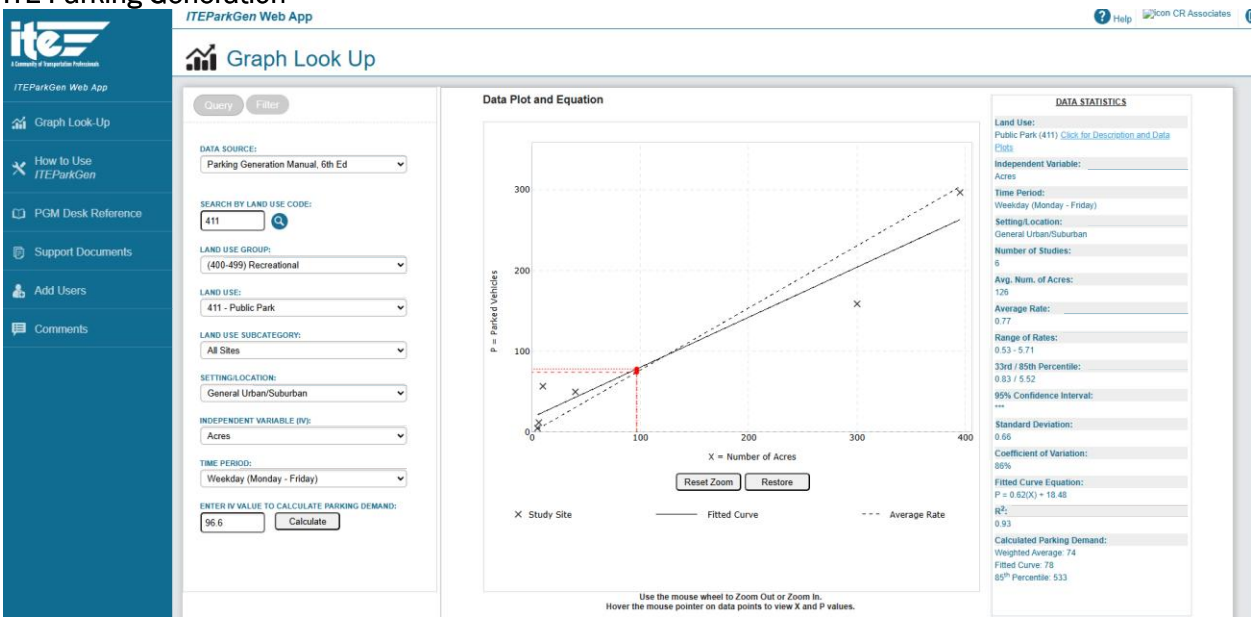
NO-ACTIVITY DAYS – RESIDENTIAL SPILLOVER ESTIMATE (ON-STREET)			
Metric	Park Lot (vehicles)	Adjacent Street (vehicles)	Residential Spillover Baseline (vehicles)
Observations (n)	7	7	**16**
Average (vehicles)	17	16	
Maximum (vehicles)	37	25	
Minimum (vehicles)	9	8	

Note:
1. Interpretation: On days with no organized events, park lot occupancy reflects background/passive use. The adjacent on-street occupancy is attributed to residential spillover (cell I2), establishing a baseline residential parking demand.

PARKING DEMAND BY ACTIVITY TYPE					
Activity Type	Observations (n)	Average Total Observed Vehicles	Residential Spillover Credit	Average Parking Demand (Vehicles)	Max Total Observed Vehicles
Baseball Game	5	88	-16	72	119
Multi-Use Field Practice	2	122	-16	106	131
No Activity	7	17	0	17	37

Note:
1. Game On-Street Demand = Observed Adjacent Street Parking − Residential Spillover Baseline.

ITE Parking Generation



ITEParkGen Web App

Help | Icon CR Associates

Graph Look Up

Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 411

LAND USE GROUP: (400-499) Recreational

LAND USE: 411 - Public Park

LAND USE SUBCATEGORY: All Sites

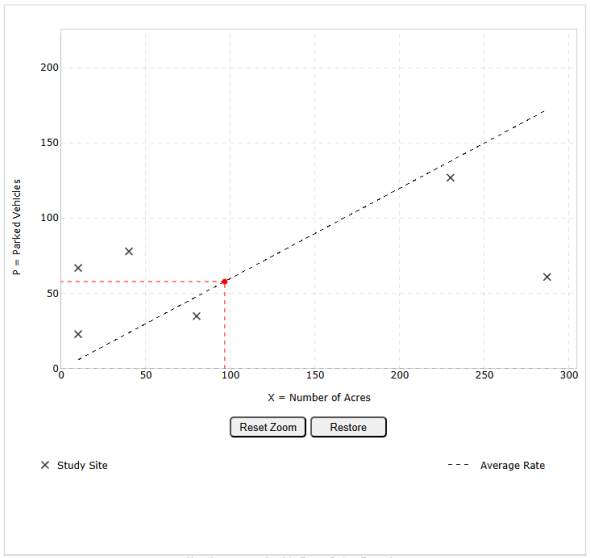
SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Acres

TIME PERIOD: Saturday

ENTER IV VALUE TO CALCULATE PARKING DEMAND: 96.6 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use: Public Park (411) Click for Description and Data Plots

Independent Variable: Acres

Time Period: Saturday

Setting/Location: General Urban/Suburban

Number of Studies: 6

Avg. Num. of Acres: 110

Average Rate: 0.60

Range of Rates: 0.21 - 6.71

33rd / 85th Percentile: 0.47 / 6.49

95% Confidence Interval: ***

Standard Deviation: 0.98

Coefficient of Variation: 163%

Fitted Curve Equation: ***

R^2: ***

Calculated Parking Demand:
Weighted Average: 58
Fitted Curve: Not Available
85th Percentile: 627

ITEParkGen Web App

Help | Icon CR Associates | Sig

Graph Look Up

Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 411

LAND USE GROUP: (400-499) Recreational

LAND USE: 411 - Public Park

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Acres

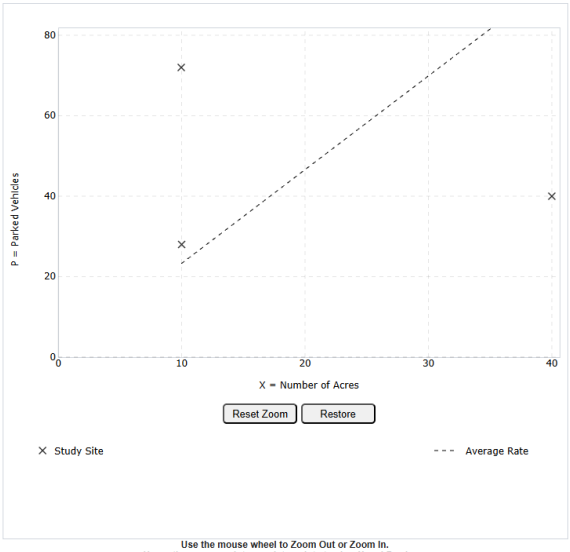
TIME PERIOD: Sunday

ENTER IV VALUE TO CALCULATE PARKING DEMAND: 96.6 Calculate

Data Range: 9.98 - 40.00

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use: Public Park (411) Click for Description and Data Plots

Independent Variable: Acres

Time Period: Sunday

Setting/Location: General Urban/Suburban

Number of Studies: 3

Avg. Num. of Acres: 20

Average Rate: 2.33

Range of Rates: 1.00 - 7.21

33rd / 85th Percentile: 1.58 / 7.21

95% Confidence Interval: ***

Standard Deviation: 2.79

Coefficient of Variation: 120%

Fitted Curve Equation: ***

R^2: ***

Calculated Parking Demand:
Weighted Average: 225
Fitted Curve: Not Available
85th Percentile: 696

Hilton Head County Park – Study Area



Attachment C - Alpine Community Park: Driveway Sight Distance Evaluation

TO: Yara Fisher, HELIX Environmental Planning, Inc.

FROM: Phuong Nguyen, TE; CR Associates
Jorge Muradas, EIT; CR Associates

DATE: July 29, 2026

RE: Alpine Community Park – Driveway Sight Distance Evaluation – Technical Memorandum

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This memorandum documents field observations of stopping sight distance (SSD) and corner sight distance (CSD) conducted on April 16, 2026, at the two (2) proposed project driveways along South Grade Road for the Alpine Community Park project (the "project"). This analysis is prepared as a supplemental technical deliverable in response to the Writ of Mandate issued on January 23, 2026, for CASE NO: 37-2024-00000536-CU-WM-CTL (Writ), and as further detailed in the Minute Order issued on June 9, 2025, in the same proceeding (Minute Order), which identified a deficiency in the prior Environmental Impact Report (EIR) regarding the deferred driveway sight distance analysis.

Project Background

The County of San Diego Department of Parks and Recreation proposes the Alpine Community Park project on a 96.6-acre undeveloped site in Alpine, with about 25 acres developed as an active community park and the remaining roughly 70 acres preserved as permanent open space. The site is adjacent to the Back Country Land Trust's (BCLT) Wright's Field Preserve, north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard. Access to the park is proposed from two full-access driveways on South Grade Road: one at the existing all-way stop-controlled intersection with Calle de Compadres and a second at a new side-street stop-controlled intersection near the southern end of the property. Site plan is provided in **Figure 1**.

South Grade Road is a two-lane undivided Light Collector with posted speeds of 40 mph near the northern driveway and 45 mph near the southern driveway. CRA previously prepared a Transportation Impact Study for the project in July 2020, which included a speed study conducted by Elite Traffic Dynamics along South Grade Road. Using that speed study, CRA then performed field observations at both proposed driveway locations to evaluate stopping sight distance against AASHTO standards, assess corner sight distance relative to County standards, identify physical or visual obstructions, and recommend measures where substandard sight conditions were identified.

Methodology

The following methodology was applied to evaluate stopping sight distance (SSD) and corner sight distance (CSD) at the two proposed project driveways. SSD criteria are based on AASHTO's A Policy on Geometric Design of Highways and Streets (2018), and CSD criteria are based on the County of San Diego Public Road Standards (March 2012) – Table 5 – Standard Corner Sight Distance at Intersections. Both are evaluated using a design speed derived from the 85th percentile speed observed along South Grade Road, consistent with standard engineering practice. For each driveway approach, the observer was positioned on the minor road at a setback of 10 feet from the edge of the major road pavement, with an eye height of 3.5 feet above the roadway surface. Corner sight distance was measured along the direction of travel on the major road to an object height of 4.25 feet, identifying the most restrictive sight-limiting feature within the sight triangle. Where the available sight

distance did not meet the corner sight distance standard, the nature and location of the obstruction were documented and photographic evidence was collected.

Design Speed

The speed study collected 24-hour speed data in both directions, yielding 85th percentile speeds of 44 mph northbound and 46 mph southbound from a combined sample of 950 vehicles. The higher southbound value of 46 mph governs and was rounded up to 50 mph per standard engineering practice. Data collected as part of the speed survey is provided as **Attachment A**.

Figure 1 - Site Plan



SITE ELEMENT KEY

1. MULTI-USE TRAIL
2. ADMIN/RESTROOM
3. RESTROOM
4. SHADE PAVILION
5. SHADE SHELTER
6. SHADE SAIL
7. ADA PARKING
8. ALL-WHEEL PARK GATEWAY
9. COMMUNITY GARDEN
10. GARDEN STORAGE
11. NATURE PLAY AREA
12. 2-5 PLAY AREA
13. VOLUNTEER PAD
14. PICKLEBALL COURTS
15. BASKETBALL COURT
16. GAME TABLE PLAZA
17. PICNIC AREA
18. CORRAL
19. EQUESTRIAN STAGING
20. DROP-OFF/PICK-UP
21. BIKE PARK
22. ALL-WHEEL PARK
23. BASEBALL FIELD
24. MULTI-USE TURF AREA
25. SECONDARY PARK ENTRANCE
26. PRIMARY PARK ENTRANCE
27. PARKING
28. DOG PARK
29. EXISTING TRAIL
30. EXISTING TREES
31. BERMED LANDSCAPE SCREEN
32. PARK MONUMENT SIGN
33. NATIVE PLANTS
34. FITNESS STATIONS
35. ENGINEERED WOOD FIBER
36. TRASH ENCLOSURE
37. RETENTION BASIN
38. EXISTING LANDSCAPE/TERRAIN
39. EXISTING FENCE

PARKING SUMMARY

240 SPACES (including standard, ADA, trailers)

DPR DIRECTOR SIGNATURE/APPROVAL DATE

NORTH

Stopping Sight Distance Criteria

Required SSD values were determined per AASHTO (2018) Exhibits 3-1 and 3-2, using the 50-mph design speed established in Section 3.1. SSD is measured along the road from a driver's eye height of 3.5 feet to an object height of 2.0 feet on the roadway surface, representing the distance required to perceive a hazard and brake to a complete stop. Grade adjustments were applied where applicable; for uphill approaches, the unadjusted level-grade requirement was conservatively retained. Required SSD values by approach are summarized in Table 1 below.

Table 1 - AASHTO – Stopping Sight Distance Standard

Location	Approach	Grade (%)	Required SSD (ft)	AASHTO Reference
Driveway #1 (S. Grade Rd at Calle de Compadres)	NB	+5.3%	425	Exhibit 3-1 (level grade, conservative)
Driveway #1 (S. Grade Rd at Calle de Compadres)	SB	−3.9%	446	Exhibit 3-2 (grade-adjusted, downgrade)
Driveway #2 (S. Grade Rd, south driveway)	NEB	+2.7%	425	Exhibit 3-1 (level grade)
Driveway #2 (S. Grade Rd, south driveway)	SWB	Level	425	Exhibit 3-1 (level grade)

Note:
1. Design speed = 50 mph for all approaches. Grade-adjusted SSD applied on the SB downgrade per Exhibit 3-2; level-grade SSD conservatively retained on all uphill approaches.
2. NB = Northbound; SB = Southbound; NEB = Northeastbound; SWB = Southwestbound

Corner Sight Distance

CSD represents the sight distance available to a driver on the minor road (driveway) when deciding whether to enter the major road traffic stream. It is measured from a setback position 10 feet from the edge of the major road pavement, using a height of eye of 3.5 feet on the minor road and an object height of 4.25 feet on the major road, consistent with County of San Diego guidelines. Required CSD values by approach are summarized in Table 2 below.

Table 2 - County of San Diego Corner Sight Distance Standard

Location	Approach	Setback (ft)	Required CSD (ft)	Standard
Driveway #1 (S. Grade Rd at Calle de Compadres)	NB	10	500	County of San Diego (50 mph)
Driveway #1 (S. Grade Rd at Calle de Compadres)	SB	10	500	County of San Diego (50 mph)
Driveway #2 (S. Grade Rd, south driveway)	NEB	10	500	County of San Diego (50 mph)
Driveway #2 (S. Grade Rd, south driveway)	SWB	10	500	County of San Diego (50 mph)

Note:
1. NB = Northbound; SB = Southbound; NEB = Northeastbound; SWB = Southwestbound

Field Observations

Field observations were conducted on April 16, 2026, at the two (2) proposed project driveway locations along South Grade Road. At each driveway, available SSD was measured in the field for each approach direction by identifying the most restrictive sight-limiting feature along the roadway, such as vertical crest curves, horizontal curvature, roadside vegetation, terrain, or existing structures, and measuring the distance from that feature to the anticipated stop bar location at the driveway. SSD

measurements were taken from a height of eye of 3.5 feet above the roadway surface to an object height of 2.0 feet, consistent with AASHTO criteria for passenger vehicle sight distance evaluation. Roadway grade conditions were observed in the field at each approach and factored into the required SSD determination as described in Section 3.2. Available SSD was stress tested at distances greater than the minimum required values, up to approximately 700 feet, to characterize the extent of available sight lines beyond the minimum standard.

CSD observations were conducted from a setback of 10 feet from the edge of the major road pavement at each proposed driveway, with measurements taken from a height of eye of 3.5 feet on the minor road to an object height of 4.25 feet on the major road, consistent with County of San Diego Public Road Standards (*March* 2012). At locations where the CSD standard was not met, the nature and extent of sight obstructions were documented in the field and photographic evidence was collected. Observed obstructions include overgrown brush and vegetation, differential in elevation between the roadway surface and the project site, existing wooden utility poles and signage, and rock and boulder outcroppings, as documented in the Findings section and supporting field observation photographs.

Findings

This section presents the results of the stopping sight distance and corner sight distance field observations at the two proposed project driveways along South Grade Road. The results of the SSD and CSD field observations are summarized in **Table 3** below.

Field observation photographs documenting sight conditions at each approach are provided in **Attachments B** through **E** of this memorandum.

Attachment F includes CSD triangle exhibits for the two proposed project driveways.

Table 3 - Sight Distance Summary – Alpine Community Park Driveways

Location	Approach	Grade (%)	SSD (ft)		CSD (ft)		SSD Met?	CSD Met?
			Required	Available	Required	Available		
Driveway #1 (S. Grade Rd at Calle de Compadres)	NB	+5.3%[1]	425’	425’	500’	500’[2]	Yes	Yes[2]
Driveway #1 (S. Grade Rd at Calle de Compadres)	SB	−3.9%	446’[3]	700’+	500’	700’+	Yes	Yes
Driveway #2 (S. Grade Rd, south driveway)	NEB	+2.7%[1]	425’	700’+	500’	<500[4]	Yes	No[4]
Driveway #2 (S. Grade Rd, south driveway)	SWB	Level	425’	450’+	500’	550’+	Yes	Yes

Sources: CR Associates Field Observations on April 16, 2026.

Notes:

1. Positive grade present; approach evaluated conservatively using level-grade SSD requirement of 425 feet per AASHTO (2018) Exhibit 3-1.
2. CSD met at 500 feet; partial visibility obstructions (overgrown vegetation, utility poles, sign pole) observed from both major and minor street approaches. Stress test at 520 feet yielded similar results.
3. Grade-adjusted required SSD at 50 mph design speed for a 3.9% downgrade, per AASHTO (2018) Exhibit 3-2. Available SSD stress tested at 700 feet and met. Grade of 4.2% observed at CSD setback location; not directly incorporated into CSD calculation consistent with County of San Diego methodology, but stress tested at 700’ and met.
4. CSD not met for NEB approach at Driveway #2 due to overgrown vegetation and rock/boulder outcroppings obstructing sightlines.

As shown in **Table 3**, available SSD meets or exceeds AASHTO-required values at all four approach directions at both proposed driveways, and the CSD is met for three out of the four approaches. A detailed discussion of findings for each approach follows.

Driveway #1 – South Grade Road at Calle de Compadres

Stopping Sight Distance (NB Approach) – The northbound approach is situated on a 5.3% positive grade and was evaluated conservatively using the level-grade SSD requirement of 425 feet. Available SSD was measured at 425 feet, meeting the requirement at the minimum threshold. The limited margin is attributable to a vertical crest curve near the proposed driveway location, which creates a geometric constraint on vertical sight lines; stress testing confirmed 425 feet as the effective maximum available SSD on this approach. Sensitivity checks at 3% and 6% grade adjustments (405 feet and 388 feet required, respectively) confirm compliance under either assumption.

Corner Sight Distance (NB Approach) – The northbound approach meets the 500-foot County standard; however, partial obstructions including overgrown vegetation, a utility pole, and a sign pole were observed within the sight triangle from both the major and minor street approaches. A stress test at 520 feet yielded similar conditions. Field observation photographs are included in **Attachment B**.

Stopping Sight Distance (SB Approach) – The southbound approach is situated on a 3.9% downgrade, yielding a grade-adjusted required SSD of 446 feet per AASHTO (2018) Exhibit 3-2. Available SSD substantially exceeds this value, confirmed at 700 feet and beyond during stress testing. Field observation photographs are included in **Attachment C**.

Corner Sight Distance (SB Approach) – The southbound approach meets the 500-foot County standard. A downgrade of 4.2% was observed along South Grade Road at the CSD setback location. Available CSD was confirmed at 700 feet during stress testing, providing a substantial margin above the 500-foot standard. No significant obstructions were identified. Field observation photographs are included in **Attachment C**.

Driveway #2 – South Grade Road, South Driveway

Stopping Sight Distance (NEB) – The northeast bound approach is situated on a 2.7% positive grade and was evaluated conservatively using the level-grade SSD requirement of 425 feet. Available SSD substantially exceeds the minimum requirement, confirmed at 700 feet and beyond during stress testing. Field observation photographs are included in **Attachment D**.

Corner Sight Distance (NEB) – The northeast bound approach does not meet the County of San Diego 500-foot CSD standard. Overgrown vegetation and rock and boulder outcroppings within the sight triangle physically limit the available sight line from the minor street setback position, constituting a confirmed deficiency attributable to existing site conditions and is not a condition created or introduced by the proposed project. Field observation photographs are included in **Attachment D**.

Stopping Sight Distance (SWB) – The southwest bound approach is on a level grade. Available SSD was confirmed at 425 feet, with a stress test at 450 feet also confirming compliance. Field observation photographs are included in **Attachment E**.

Corner Sight Distance (SWB) – The southwest bound approach meets the 500-foot County standard, with a stress test at 550 feet confirming continued compliance. No significant obstructions were identified. Field observation photographs are included in **Attachment E**.

Sight Distance Evaluation for Larger Vehicles

This section evaluates sight distance conditions at the proposed project driveways with respect to larger vehicle types anticipated to use the facility, specifically recreational vehicles (RVs) and horse trailers.

Vehicle Classification

Per the Federal Highway Administration's vehicle classification guidance (FHWA-HRT-13-091, Chapter 2, November 2014), the vehicle types considered in this supplemental evaluation fall within the following FHWA classification categories:

- **Recreational Vehicles (RVs/Motorhomes):** Self-propelled recreational vehicles, including motorhomes and campers, are classified as FHWA Class 5 (Two-Axle, Six-Tire, Single-Unit Trucks) or Class 6 (Three-Axle Single-Unit Trucks), depending on configuration. These vehicles are analogous to the Single-Unit Truck (SU) or Recreational Vehicle (RV) design vehicle classes defined in AASHTO (2018).
- **Horse Trailers:** A pickup truck towing a horse trailer constitutes a two-unit combination vehicle, classified under FHWA Class 8 (Four or Fewer Axle Single-Trailer Combination Truck). This vehicle type is analogous to the Combination Vehicle (WB-12) design vehicle class defined in AASHTO (2018).

Because both vehicle types are anticipated users of the park driveways, and because horse trailers (FHWA Class 8, AASHTO combination vehicle) represent the more demanding design vehicle with respect to intersection sight distance time gap requirements, the combination-truck vehicle standard is applied as the conservative governing design vehicle for the ISD evaluation presented below.

Intersection Sight Distance — Combination Vehicle

Intersection sight distance (ISD) represents the sight distance required for a driver on the minor road to safely enter or cross the major road traffic stream. ISD was evaluated per AASHTO (2018) for two stop-controlled cases applicable to exiting park vehicles: Case B1 (left turn from stop), requiring the driver at the minor street approach to identify and enter an acceptable gap in traffic from both directions; and Case B2 (right turn from stop), requiring the driver at the minor street approach to identify an acceptable gap from the left. Required ISD values are computed using the following formula:

$$ISD = 1.47 \times V \times t_g,$$

Where: V is the major road design speed (50 mph)

t_g is the design time gap

Time gap values for a combination-truck vehicle were obtained from AASHTO (2018), where t_g is 11.5 seconds for Case B1 and 10.5 seconds for Case B2. Applying the formula, the required ISD for Case B1 is 845 feet, and for Case B2 is 772 feet. No minor road grade adjustment was applied, as the proposed driveways are yet to be constructed and a flat grade at the stop bar is assumed. Available ISD at each approach is taken as the available CSD observed during field observations, consistent with the measurement methodology applied in the passenger car analysis."

Table 4 shows the intersection sight distance and stopping sight distance summary results for larger vehicles at the proposed project driveways.

Table 4 - Intersection Sight Distance and Stopping Sight Distance Summary — Combination Vehicle — Alpine Community Park Driveways

Location	Approach	Available ISD/CSD (ft)	ISD Case B1 Met? (Req. 845 ft)	ISD Case B2 Met? (Req. 772 ft)	SSD Met? (Req. varies[1])
Driveway #1 (S. Grade Rd at Calle de Compadres)	NB	500’	No	No	Yes
Driveway #1 (S. Grade Rd at Calle de Compadres)	SB	700’+	No	No	Yes
Driveway #2 (S. Grade Rd, south driveway)	NEB	<500’[4]	No	No	Yes
Driveway #2 (S. Grade Rd, south driveway)	SWB	550’+	No	No	Yes

Sources: CR Associates Field Observations (April 16, 2026); AASHTO (2018)

Notes:

1. SSD required values per AASHTO (2018) Exhibits 3-1 and 3-2 at 50 mph design speed: 425 ft for NB, NEB, and SWB approaches (level/uphill grade); 446 ft for SB approach (3.9% downgrade, grade-adjusted). Per AASHTO (2018) Section 3.2.2.5, the passenger car SSD standard governs design for all vehicle types. ISD = 1.47 × V × t_g per AASHTO (2018) Exhibit 9-54; combination vehicle t_g = 11.5 sec (Case B1, required 845 ft) and 10.5 sec (Case B2, required 772 ft) at V = 50 mph. Available ISD taken as available CSD from field observations; no minor road grade adjustment applied (driveways yet to be constructed, flat grade assumed).
2. NB = Northbound; SB = Southbound; NEB = Northeastbound; SWB = Southwestbound.
3. Grade-adjusted SSD at 50 mph for a 3.9% downgrade per AASHTO (2018) Exhibit 3-2.
4. CSD not met for NEB approach at Driveway #2 due to overgrown vegetation and rock/boulder outcroppings; available CSD is less than 500 feet.

As shown in **Table 4**, the available ISD does not meet the required combination-truck vehicle standard at any approach under either Case B1 or Case B2. Required ISD values of 845 feet (Case B1) and 772 feet (Case B2) exceed the available sight distance at all four driveway approaches. The basis for this finding, the applicable safety standard under these conditions, and the significance of the deficiency are discussed in the paragraphs below.

Per AASHTO (2018) Section 3.2.2.5, separate stopping sight distances for trucks and passenger cars are not generally used in highway design. The longer braking distances required by trucks are largely offset by the higher eye position of the truck driver, which provides a comparatively greater available sight line. Consequently, the passenger car SSD standard governs design at all approaches and is considered adequate for major road vehicles of all types, including trucks. As documented in the Findings section and summarized in **Table 3**, available SSD meets or exceeds AASHTO requirements at all four approach directions at both proposed driveways. Major road drivers including truck operators traveling along South Grade Road, have sufficient sight distance to perceive and brake to a stop for a vehicle emerging from either driveway, regardless of the emerging vehicle type.

The ISD evaluation demonstrates that available sight distance at the proposed project driveways is insufficient to satisfy the AASHTO combination-truck vehicle standard under either Case B1 (left turn from stop) or Case B2 (right turn from stop). This deficiency is attributable to existing geometric and physical constraints along South Grade Road; specifically, the vertical crest curve near the NB approach of Driveway #1 and the overgrown vegetation and rock and boulder outcroppings at the NEB approach of Driveway #2.

Notwithstanding the ISD deficiency, available SSD is met at all four approaches for major road traffic in both directions. SSD compliance establishes that drivers traveling along South Grade Road have sufficient sight distance to perceive and brake to a stop for a vehicle emerging from either driveway

under any combination of design vehicle conditions. This provides a meaningful and quantifiable safety margin even where full ISD cannot be achieved.

It is acknowledged that SSD compliance represents the lower end of the sight distance safety spectrum. ISD is the preferred standard because it provides the emerging driver with the time needed to complete an entry maneuver without requiring the major road driver to brake. Where ISD cannot be met due to existing geometric constraints that are not correctable within the project footprint, SSD compliance on the major road establishes that the corridor retains a baseline level of safety for major road traffic. The corrective measures identified in this memorandum (vegetation clearing at both driveways and removal or grading of the rock and boulder outcroppings at the NEB approach of Driveway #2) will improve available CSD and partially reduce the ISD deficiency where physically achievable, further strengthening the safety posture of both driveway locations.

ISD deficiencies at existing rural driveways are not uncommon where roadway geometry such as vertical crest curves, cut slopes, or natural terrain features constrain available sight lines beyond what project-level improvements can correct. The AASHTO (2018) combination-truck ISD standard is a design objective applied during facility planning and does not, in and of itself, characterize a location as unsafe where SSD on the major road is confirmed. When existing geometric constraints preclude full ISD compliance, SSD confirmation at the major road approach is the applicable safety benchmark, and its satisfaction at all four approaches demonstrates that South Grade Road retains a functional safety margin at both driveway locations. Operators of combination vehicles are expected to exercise appropriate gap judgment and, where necessary, wait for a larger gap in traffic than a passenger car driver would require a behavioral expectation consistent with standard rural driving practice.

Conclusions and Recommendations

SSD meets or exceeds AASHTO requirements at all four approach directions at both driveways. The following recommendations address CSD conditions where obstructions were identified.

At Driveway #1, CSD is met on all approaches; however, partial obstructions including overgrown vegetation were observed within the sight triangle on the northbound approach, resulting in a degraded quality of the available line of sight. Brush management and vegetation clearing within the sight triangle are recommended to improve the quality of the available sight line beyond the minimum CSD 500-foot threshold to provide additional margin above the County standard, thereby enhancing safety for vehicles exiting the driveway.

An existing CSD deficiency at Driveway #2 northeast bound approach is attributed to overgrown vegetation and rock/boulder outcroppings within the sight triangle that limit the available sight line below the County's 500-foot threshold at this location. Corrective measures, including vegetation clearing and removal or grading of the rock/boulder outcroppings shall be adequately addressed through the site plan review and improvement plan approval process pursuant to the County of San Diego Site Design Standards and Roadway Design Standards, which require that sight distance requirements be satisfied and shown on project plans prior to approval by the County of San Diego Department of Public Works. Compliance with these standards shall be verified and approved before final design approval and issuance of a grading or construction permit.

The sight distance triangles for both proposed driveways, including the constrained NEB approach at Driveway #2, are depicted in **Attachment F** and illustrate the general sight lines evaluated for this analysis. These exhibits shall serve as a reference during the site plan review and improvement plan approval process, at which time the precise dimensions of the required clear zone, along with any associated height restrictions, will be established and confirmed.

Additionally, a driver towing a horse trailer or recreational vehicle should exercise additional caution at either driveway and may need to wait for a larger gap than a passenger car driver would require. This is consistent with the level of care expected of combination vehicle operators on rural roadways with pre-existing geometric constraints, and is not a condition created or worsened by the proposed project.

Attachment A - Speed Survey Data

S GRADE RD - VIA VIEJAS TO CALLE DE COMPADRES

ETD20-0619-01

NORTHBOUND

Wednesday, July 8, 2020

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

Time	1 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41- 45	46 - 50	51 - 55	56 - 60	61 - 65	66 +	TOTAL	%VEHICLES
12:00:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.08%
12:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
12:30:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.08%
12:45:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.08%
1:00:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.08%
1:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2:15:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.08%
2:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2:45:00 AM	0	0	0	0	0	0	0	1	1	0	0	0	0	2	0.15%
3:00:00 AM	0	0	0	0	2	0	0	0	1	0	0	0	0	3	0.23%
3:15:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.08%
3:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
3:45:00 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0.15%
4:00:00 AM	0	0	0	0	0	0	2	1	0	0	0	0	0	3	0.23%
4:15:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.08%
4:30:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.08%
4:45:00 AM	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0.15%
5:00:00 AM	0	0	0	0	1	1	0	1	0	0	0	0	0	3	0.23%
5:15:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0.15%
5:30:00 AM	0	0	0	1	2	0	0	0	1	0	0	0	0	4	0.31%
5:45:00 AM	0	0	0	0	3	2	0	2	1	0	0	0	0	8	0.62%
6:00:00 AM	0	0	0	2	2	0	3	3	0	0	0	0	0	10	0.77%
6:15:00 AM	0	0	0	0	1	1	0	4	4	0	0	0	0	10	0.77%
6:30:00 AM	0	0	0	2	4	2	3	0	1	0	0	0	0	12	0.92%
6:45:00 AM	0	0	0	0	2	2	0	2	3	0	0	0	0	9	0.69%
7:00:00 AM	0	0	0	1	3	2	1	2	1	1	0	0	0	11	0.85%
7:15:00 AM	0	1	0	1	3	5	3	3	3	0	0	0	0	19	1.46%
7:30:00 AM	0	0	0	0	7	1	3	3	3	0	0	0	0	17	1.31%
7:45:00 AM	0	0	0	0	2	4	4	7	1	0	0	0	0	18	1.39%
8:00:00 AM	0	0	0	2	7	4	7	4	1	0	0	0	0	25	1.93%
8:15:00 AM	0	0	0	3	8	3	6	2	2	0	0	0	0	24	1.85%
8:30:00 AM	0	0	1	2	5	4	6	3	1	1	0	0	0	23	1.77%
8:45:00 AM	0	0	0	1	5	4	9	7	2	0	0	0	0	28	2.16%
9:00:00 AM	0	0	0	2	4	3	4	6	3	0	0	0	0	22	1.69%
9:15:00 AM	0	0	0	0	9	6	8	5	0	0	0	0	0	28	2.16%
9:30:00 AM	0	0	1	0	6	4	7	4	0	0	0	0	0	22	1.69%
9:45:00 AM	0	0	1	0	7	4	4	4	1	1	0	0	0	22	1.69%
10:00:00 AM	0	0	0	0	1	4	3	4	3	0	0	0	0	15	1.16%
10:15:00 AM	0	0	0	0	2	3	4	1	2	0	0	0	0	12	0.92%
10:30:00 AM	0	0	0	1	9	6	8	3	0	0	0	0	0	27	2.08%
10:45:00 AM	0	0	1	1	5	7	7	5	3	0	0	0	0	29	2.23%
11:00:00 AM	0	0	0	2	6	6	4	6	2	0	0	0	0	26	2.00%
11:15:00 AM	0	0	0	1	3	4	7	2	2	1	0	0	0	20	1.54%
11:30:00 AM	0	0	0	2	2	3	9	6	0	1	0	0	0	23	1.77%
11:45:00 AM	0	0	0	0	2	3	3	4	2	0	0	0	0	14	1.08%
AM TOTAL	0	1	4	25	115	89	118	99	46	5	0	1	0	503	38.75%
PERCENTAGE	0.0%	0.2%	0.8%	5.0%	22.9%	17.7%	23.5%	19.7%	9.1%	1.0%	0.0%	0.2%	0.0%		
CUMULATIVE	0	1	5	30	145	234	352	451	497	502	502	503	503		
PERCENTAGE	0.0%	0.2%	1.0%	6.0%	28.8%	46.5%	70.0%	89.7%	98.8%	99.8%	99.8%	100.0%	100.0%		

15th Percentile	28	Mean Speed Average	36
50th Percentile	36	10 MPH Pace Speed	34-43
85th Percentile	44	Number in Pace	233
95th Percentile	47	Percent in Pace	46%

S GRADE RD - VIA VIEJAS TO CALLE DE COMPADRES

ETD20-0619-01

NORTHBOUND

Wednesday, July 8, 2020

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

Time	1 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41- 45	46 - 50	51 - 55	56 - 60	61 - 65	66 +	TOTAL	%VEHICLES
12:00:00 PM	0	0	0	1	6	6	6	6	0	0	0	0	0	25	1.93%
12:15:00 PM	0	0	1	1	8	2	3	2	1	0	0	0	0	18	1.39%
12:30:00 PM	0	0	0	0	2	6	8	4	0	0	0	0	0	20	1.54%
12:45:00 PM	0	0	0	5	4	1	1	6	0	0	0	0	0	17	1.31%
1:00:00 PM	0	0	0	0	3	3	8	8	0	1	0	0	0	23	1.77%
1:15:00 PM	0	0	0	1	5	3	4	5	2	1	0	0	0	21	1.62%
1:30:00 PM	0	0	1	2	8	5	8	4	3	0	1	0	0	32	2.47%
1:45:00 PM	0	0	0	1	3	3	4	10	2	0	0	0	0	23	1.77%
2:00:00 PM	0	0	0	1	3	5	5	3	0	0	0	0	0	17	1.31%
2:15:00 PM	0	0	0	1	3	3	3	1	1	0	0	0	0	12	0.92%
2:30:00 PM	0	0	0	1	0	5	3	2	1	1	0	0	0	13	1.00%
2:45:00 PM	0	0	1	0	5	6	4	6	2	1	0	0	0	25	1.93%
3:00:00 PM	0	0	0	2	7	8	6	3	4	0	0	0	0	30	2.31%
3:15:00 PM	0	0	0	3	7	3	4	5	4	0	0	0	0	26	2.00%
3:30:00 PM	0	0	0	0	3	2	3	9	0	0	0	0	0	17	1.31%
3:45:00 PM	0	0	0	1	3	7	4	5	0	1	0	0	1	22	1.69%
4:00:00 PM	0	0	1	1	4	4	1	7	1	1	0	0	0	20	1.54%
4:15:00 PM	0	0	0	1	1	6	4	7	3	0	0	0	0	22	1.69%
4:30:00 PM	0	0	0	0	4	3	3	7	1	1	1	0	0	20	1.54%
4:45:00 PM	0	0	0	1	7	9	6	10	4	2	0	0	0	39	3.00%
5:00:00 PM	0	0	0	3	5	1	8	3	4	0	0	0	0	24	1.85%
5:15:00 PM	0	0	0	0	4	4	5	12	4	1	0	0	0	30	2.31%
5:30:00 PM	0	0	0	2	7	7	4	8	2	1	1	0	0	32	2.47%
5:45:00 PM	0	0	0	0	1	5	4	3	4	1	0	0	0	18	1.39%
6:00:00 PM	0	0	0	0	3	9	7	8	5	0	0	0	0	32	2.47%
6:15:00 PM	0	0	1	1	3	3	5	5	5	0	0	0	0	23	1.77%
6:30:00 PM	0	0	0	0	0	4	3	7	5	0	0	0	0	19	1.46%
6:45:00 PM	0	0	0	1	5	3	1	2	2	0	0	0	0	14	1.08%
7:00:00 PM	0	0	0	2	5	4	3	6	1	0	0	0	0	21	1.62%
7:15:00 PM	0	0	0	1	2	1	6	10	2	1	0	0	0	23	1.77%
7:30:00 PM	0	0	0	1	6	2	6	4	2	0	0	0	0	21	1.62%
7:45:00 PM	0	0	0	0	3	1	2	2	4	0	0	0	0	12	0.92%
8:00:00 PM	0	0	0	1	3	2	1	2	4	1	0	1	0	15	1.16%
8:15:00 PM	0	0	0	1	3	1	5	2	0	0	0	0	1	13	1.00%
8:30:00 PM	0	0	0	0	0	0	4	4	2	0	0	0	0	10	0.77%
8:45:00 PM	0	0	0	0	0	1	1	1	1	0	1	0	0	5	0.39%
9:00:00 PM	0	0	0	0	1	0	0	0	1	1	0	0	0	3	0.23%
9:15:00 PM	0	0	0	0	1	1	2	0	0	0	0	0	0	4	0.31%
9:30:00 PM	0	0	0	0	1	1	0	2	0	0	1	0	0	5	0.39%
9:45:00 PM	0	0	0	0	1	0	1	2	0	0	0	0	0	4	0.31%
10:00:00 PM	0	0	0	0	0	1	0	0	1	0	1	0	0	3	0.23%
10:15:00 PM	0	0	0	0	3	0	1	0	1	0	0	0	0	5	0.39%
10:30:00 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0.15%
10:45:00 PM	0	0	0	0	0	1	3	1	1	0	1	0	0	7	0.54%
11:00:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0.15%
11:15:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0.15%
11:30:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0.15%
11:45:00 PM	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0.15%
PM TOTAL	0	0	5	36	144	146	163	195	81	15	7	1	2	795	61.25%
PERCENTAGE	0.0%	0.0%	0.6%	4.5%	18.1%	18.4%	20.5%	24.5%	10.2%	1.9%	0.9%	0.1%	0.3%		
CUMULATIVE	0	0	5	41	185	331	494	689	770	785	792	793	795		
PERCENTAGE	0.0%	0.0%	0.6%	5.2%	23.3%	41.6%	62.1%	86.7%	96.9%	98.7%	99.6%	99.7%	100.0%		

15th Percentile	29	Mean Speed Average	37
50th Percentile	38	10 MPH Pace Speed	36-45
85th Percentile	45	Number in Pace	374
95th Percentile	48	Percent in Pace	47%

DAY TOTAL	0	1	9	61	259	235	281	294	127	20	7	2	2	1,298	100.00%
PERCENTAGE	0.0%	0.1%	0.7%	4.7%	20.0%	18.1%	21.6%	22.7%	9.8%	1.5%	0.5%	0.2%	0.2%	1,298	100.00%
	0.0%	0.1%	0.8%	5.5%	25.4%	43.5%	65.2%	87.8%	97.6%	99.2%	99.7%	99.8%	100.0%		

S GRADE RD - VIA VIEJAS TO CALLE DE COMPADRES
SOUTHBOUND

ETD20-0619-01

Wednesday, July 8, 2020

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

Time	1 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41- 45	46 - 50	51 - 55	56 - 60	61 - 65	66 +	TOTAL	%VEHICLES
12:00:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07%
12:15:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.07%
12:30:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.07%
12:45:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.07%
1:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1:15:00 AM	0	0	0	0	0	0	1	0	1	1	0	0	0	3	0.22%
1:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
1:45:00 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0.15%
2:00:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.07%
2:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
2:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
3:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
3:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
3:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
3:45:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0.15%
4:00:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.07%
4:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
4:30:00 AM	0	0	0	0	0	0	0	0	1	0	1	0	0	2	0.15%
4:45:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.07%
5:00:00 AM	0	0	0	0	0	0	0	1	1	0	0	0	0	2	0.15%
5:15:00 AM	0	0	0	0	0	2	1	0	0	0	0	0	0	3	0.22%
5:30:00 AM	0	0	0	0	0	1	0	4	1	0	0	0	0	6	0.44%
5:45:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.07%
6:00:00 AM	0	0	0	0	1	2	3	4	2	0	0	0	0	12	0.89%
6:15:00 AM	0	0	0	0	0	1	1	3	2	0	0	0	0	7	0.52%
6:30:00 AM	0	0	0	0	1	0	2	4	1	0	1	0	0	9	0.66%
6:45:00 AM	0	0	0	0	1	3	1	2	1	0	0	0	0	8	0.59%
7:00:00 AM	0	0	0	0	0	1	9	8	1	1	0	0	0	20	1.48%
7:15:00 AM	0	0	0	0	0	4	5	7	1	0	0	0	0	17	1.25%
7:30:00 AM	0	0	1	1	2	2	1	5	3	2	0	0	0	17	1.25%
7:45:00 AM	0	0	0	0	1	3	2	7	2	0	0	0	0	15	1.11%
8:00:00 AM	0	0	0	0	2	2	4	2	5	1	0	0	0	16	1.18%
8:15:00 AM	0	0	0	0	1	2	3	5	2	0	0	0	0	13	0.96%
8:30:00 AM	0	0	0	0	0	2	6	10	1	0	0	0	0	19	1.40%
8:45:00 AM	0	0	0	0	1	8	6	3	3	1	0	0	0	22	1.62%
9:00:00 AM	0	0	0	0	1	6	6	10	2	0	0	0	0	25	1.85%
9:15:00 AM	1	0	0	1	0	7	5	11	0	0	0	0	0	25	1.85%
9:30:00 AM	0	0	0	1	1	4	4	3	2	2	0	0	0	17	1.25%
9:45:00 AM	0	0	0	1	2	2	8	8	0	0	0	0	0	21	1.55%
10:00:00 AM	0	0	0	0	1	3	2	5	3	1	0	0	0	15	1.11%
10:15:00 AM	0	0	0	0	1	2	7	6	5	1	1	0	0	23	1.70%
10:30:00 AM	0	0	0	0	0	7	5	4	1	0	0	0	0	17	1.25%
10:45:00 AM	0	0	0	0	2	3	10	3	4	1	0	0	0	23	1.70%
11:00:00 AM	0	0	0	1	2	3	12	3	3	0	0	0	0	24	1.77%
11:15:00 AM	0	0	0	1	4	4	6	5	3	0	0	0	0	23	1.70%
11:30:00 AM	0	0	0	0	0	1	4	6	7	0	0	0	0	18	1.33%
11:45:00 AM	0	0	0	1	2	0	2	3	4	1	0	0	0	13	0.96%
AM TOTAL	1	0	1	7	26	77	117	137	63	15	3	0	0	447	32.99%
PERCENTAGE	0.2%	0.0%	0.2%	1.6%	5.8%	17.2%	26.2%	30.6%	14.1%	3.4%	0.7%	0.0%	0.0%		
CUMULATIVE	1	1	2	9	35	112	229	366	429	444	447	447	447		
PERCENTAGE	0.2%	0.2%	0.4%	2.0%	7.8%	25.1%	51.2%	81.9%	96.0%	99.3%	100.0%	100.0%	100.0%		

15th Percentile	33	Mean Speed Average	40
50th Percentile	40	10 MPH Pace Speed	36-45
85th Percentile	46	Number in Pace	276
95th Percentile	49	Percent in Pace	62%

S GRADE RD - VIA VIEJAS TO CALLE DE COMPADRES
SOUTHBOUND

ETD20-0619-01

Wednesday, July 8, 2020

PREPARED BY: ELITE TRAFFIC DYNAMICS, LLC

Time	1 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41- 45	46 - 50	51 - 55	56 - 60	61 - 65	66 +	TOTAL	%VEHICLES
12:00:00 PM	0	0	0	0	0	2	9	5	3	0	0	0	0	19	1.40%
12:15:00 PM	0	0	0	0	1	3	7	7	3	1	0	0	0	22	1.62%
12:30:00 PM	0	0	0	0	0	7	9	4	4	2	0	0	0	26	1.92%
12:45:00 PM	0	0	0	0	0	10	3	7	6	0	0	0	0	26	1.92%
1:00:00 PM	0	0	0	0	2	3	5	3	7	0	1	0	0	21	1.55%
1:15:00 PM	0	0	0	1	0	1	11	7	5	2	0	0	1	28	2.07%
1:30:00 PM	0	0	0	0	0	6	3	9	2	2	1	0	0	23	1.70%
1:45:00 PM	0	0	0	0	1	5	5	3	3	1	0	0	0	18	1.33%
2:00:00 PM	0	0	0	0	0	3	10	10	3	0	0	0	0	26	1.92%
2:15:00 PM	0	0	0	0	2	5	7	10	1	0	0	0	0	25	1.85%
2:30:00 PM	0	0	1	0	1	3	7	5	2	1	0	0	0	20	1.48%
2:45:00 PM	0	0	0	1	0	6	11	6	4	2	0	0	0	30	2.21%
3:00:00 PM	0	0	0	0	0	6	9	14	4	2	0	0	0	35	2.58%
3:15:00 PM	0	0	0	0	3	9	8	7	5	1	0	0	0	33	2.44%
3:30:00 PM	0	0	0	1	3	7	10	9	5	0	0	0	0	35	2.58%
3:45:00 PM	0	0	0	0	1	4	3	7	2	1	0	0	0	18	1.33%
4:00:00 PM	0	0	0	0	2	4	3	8	2	0	0	0	0	19	1.40%
4:15:00 PM	0	0	0	0	1	7	6	12	3	0	0	0	0	29	2.14%
4:30:00 PM	0	0	0	1	1	0	10	8	4	1	0	0	0	25	1.85%
4:45:00 PM	0	0	0	1	3	4	9	6	1	1	0	0	0	25	1.85%
5:00:00 PM	0	0	0	3	0	2	12	7	1	1	0	0	0	26	1.92%
5:15:00 PM	0	0	0	0	0	9	9	4	3	0	1	0	0	26	1.92%
5:30:00 PM	0	0	0	0	2	8	12	8	3	2	0	0	0	35	2.58%
5:45:00 PM	0	0	0	0	1	13	8	5	4	1	0	0	0	32	2.36%
6:00:00 PM	0	0	0	0	0	7	3	6	3	0	0	0	0	19	1.40%
6:15:00 PM	0	0	0	0	1	3	5	9	2	0	0	0	0	20	1.48%
6:30:00 PM	0	0	0	0	3	2	5	8	2	1	1	0	0	22	1.62%
6:45:00 PM	0	0	0	0	0	1	6	4	4	3	1	0	0	19	1.40%
7:00:00 PM	0	0	0	0	0	4	2	5	2	0	0	0	0	13	0.96%
7:15:00 PM	0	0	0	0	1	9	12	1	3	0	0	0	0	26	1.92%
7:30:00 PM	0	0	0	0	2	6	6	5	4	1	0	0	0	24	1.77%
7:45:00 PM	0	0	0	0	1	4	9	3	3	1	0	0	0	21	1.55%
8:00:00 PM	0	0	0	0	1	3	7	2	1	1	0	0	0	15	1.11%
8:15:00 PM	0	0	0	0	3	6	2	6	0	1	0	0	0	18	1.33%
8:30:00 PM	0	0	0	0	2	3	2	1	1	2	0	0	0	11	0.81%
8:45:00 PM	0	0	0	0	2	3	2	5	2	1	0	0	0	15	1.11%
9:00:00 PM	0	0	0	0	0	4	5	1	2	0	0	0	0	12	0.89%
9:15:00 PM	0	0	0	1	1	1	2	3	0	0	0	0	0	8	0.59%
9:30:00 PM	0	0	0	0	1	0	1	0	1	0	0	0	0	3	0.22%
9:45:00 PM	0	0	0	0	0	3	2	1	2	0	0	0	0	8	0.59%
10:00:00 PM	0	0	0	0	0	0	4	3	1	1	1	0	0	10	0.74%
10:15:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.07%
10:30:00 PM	0	0	0	0	0	0	2	1	2	1	0	0	0	6	0.44%
10:45:00 PM	0	0	0	0	0	1	0	3	0	0	0	0	0	4	0.30%
11:00:00 PM	0	0	0	0	0	1	3	1	0	0	0	0	0	5	0.37%
11:15:00 PM	0	0	1	0	0	0	1	0	1	1	0	1	0	5	0.37%
11:30:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.07%
11:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
PM TOTAL	0	0	2	9	42	188	267	240	117	35	6	1	1	908	67.01%
PERCENTAGE	0.0%	0.0%	0.2%	1.0%	4.6%	20.7%	29.4%	26.4%	12.9%	3.9%	0.7%	0.1%	0.1%		
CUMULATIVE	0	0	2	11	53	241	508	748	865	900	906	907	908		
PERCENTAGE	0.0%	0.0%	0.2%	1.2%	5.8%	26.5%	55.9%	82.4%	95.3%	99.1%	99.8%	99.9%	100.0%		

15th Percentile	34	Mean Speed Average	40
50th Percentile	40	10 MPH Pace Speed	36-45
85th Percentile	46	Number in Pace	563
95th Percentile	49	Percent in Pace	62%

DAY TOTAL	1	0	3	16	68	265	384	377	180	50	9	1	1	1,355	100.00%
PERCENTAGE	0.1%	0.0%	0.2%	1.2%	5.0%	19.6%	28.3%	27.8%	13.3%	3.7%	0.7%	0.1%	0.1%	1,355	100.00%
	0.1%	0.1%	0.3%	1.5%	6.5%	26.1%	54.4%	82.2%	95.5%	99.2%	99.9%	99.9%	100.0%		

Attachment B - Stopping & Corner Sight Distance Field Observations – Driveway #1 – NB Approach



SSD at 425’



CSD at 500’ from Major Roadway



CSD at 500’ from Minor Roadway

Attachment C - Stopping & Corner Sight Distance Field Observations – Driveway #1 – SB Approach



SSD at 446’



CSD at 500’ from Major Roadway



CSD at 500’ from Minor Roadway



CSD at 700’ from Major Roadway



CSD at 700’ from Minor Roadway

Attachment D - Stopping & Corner Sight Distance Field Observations – Driveway #2 – NEB Approach



SSD at 425’



CSD at 500’ from Major Roadway



CSD at 500’ from Minor Roadway

Attachment E - Stopping & Corner Sight Distance Field Observations – Driveway #2 – SWB Approach



SSD at 425’



CSD at 500’ from Major Roadway



CSD at 500’ from Minor Roadway

Attachment F - CSD Triangle Exhibits



CSD Triangles for Driveway #1



CSD Triangles for Driveway #2

Attachment D - Additional Safety Treatments

TO: Yara Fisher, HELIX Environmental Planning, Inc.

FROM: Phuong Nguyen, TE; CR Associates

Jorge Muradas, EIT; CR Associates

DATE: July 29, 2026

RE: Additional Safety Treatments for the access driveways of the Alpine Community Park Project in the County of San Diego

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This memorandum documents the consistency of the Alpine Community Park's project frontage improvements at the two driveway access points along South Grade Road with the County of San Diego General Plan and Alpine Community Plan Mobility Element classification, and it clarifies that corridor-scale improvements beyond the project frontage remain the responsibility of the County of San Diego Department of Public Works. This memorandum further documents additional traffic control and pedestrian crossing treatments that CR Associates considered during the analysis, identified for the County's information and future consideration, but are not recommended at this time. These topics are addressed in the subsections that follow.

General Plan Consistency

South Grade Road is identified in the County of San Diego General Plan Mobility Element and the Alpine Community Plan Mobility Element as a public road serving the semi-rural community of Alpine. The applicable Mobility Element classification establishes the ultimate roadway design as a two-lane facility with intermittent left-turn lanes at appropriate locations along the corridor. The two-lane configuration with intermittent left-turn pockets is consistent with the rural and semi-rural community character of Alpine and with the operational and design objectives set forth in the County of San Diego Public Road Standards for roadways serving this community.

The project's frontage improvements along South Grade Road have been designed in a manner consistent with the applicable Mobility Element classification described above. The project's two driveway access points have been located, designed, and reviewed for sight distance, traffic control device selection, and pedestrian and bicyclist accommodation in accordance with the applicable County of San Diego, AASHTO, and California Manual on Uniform Traffic Control Devices (CA MUTCD) standards, as documented in the preceding sections of this memorandum.

It is acknowledged that the project is not constructing South Grade Road to its ultimate Mobility Element classification. Roadway widening to add intermittent left-turn pockets at locations beyond the project's frontage, corridor-wide pavement reconstruction, alignment correction, drainage improvements, and similar corridor-scale capital improvements remain the responsibility of the County of San Diego Department of Public Works (DPW) and are subject to the County's capital improvement programming, environmental review, and funding processes. The project, as a single-parcel

development, is responsible only for the frontage improvements applicable to the project's portion of the South Grade Road right-of-way, in accordance with the County of San Diego Public Road Standards and the conditions of project approval. The project's frontage improvements do not preclude the County from implementing additional corridor-scale improvements at or in the vicinity of the project site at any time in the future, and the project's driveway design has been coordinated to remain compatible with such future corridor improvements should they be undertaken.

Additional Safety Treatments Considered

In the course of preparing this analysis, CR Associates considered additional traffic control and pedestrian crossing treatments that could provide further enhancement to operating and crossing conditions in the immediate vicinity of the project's driveways and along the broader South Grade Road corridor. These treatments are identified and described below for the County's information, awareness, and future consideration. Nothing in this memorandum, and no omission of any treatment from the current project scope, shall be construed as an engineering determination that such treatments are or will be unnecessary in perpetuity, or as a representation by the engineer of record regarding the post-occupancy operating conditions that may exist at this location following project construction. The engineer of record's analysis is limited to the conditions and data evaluated as set forth in this memorandum and the accompanying attachments. Future field conditions, vehicular and pedestrian volumes, driver behavior, and crash experience may differ from those evaluated, and any subsequent determination regarding the installation of an additional traffic control or pedestrian crossing treatment along South Grade Road is reserved to the County and other agencies with jurisdiction.

1. Traffic Signal with Advance Warning Signage. A conventional traffic signal at the South Grade Road / Calle de Compadres / Driveway #1 intersection, accompanied by advance warning signage on the South Grade Road approaches, could enhance vehicular operational control and pedestrian crossing protection at this location if and when actual traffic volumes, pedestrian volumes, and crash experience warrant such control. Traffic signal warrants under the CA MUTCD (Sections 4C.01 through 4C.09) are determined on the basis of field-observed operating conditions, including eight-hour and four-hour vehicular volumes, peak-hour delay, pedestrian volumes, school crossings, coordinated signal systems, and crash experience. These conditions are inherently post-occupancy in nature and cannot be definitively measured or warranted prior to project construction and the establishment of stable operating conditions at the project site. For this reason, a traffic signal is not recommended for installation as part of the present project scope.

2. Pedestrian Hybrid Beacon (PHB). A Pedestrian Hybrid Beacon (formerly known as a HAWK beacon), installed at a designated pedestrian crossing of South Grade Road in the vicinity of the project, could enhance pedestrian crossing safety by providing a positive driver indication (steady red signal phase) of an active pedestrian crossing demand on a high-speed roadway. PHB installation is governed by CA MUTCD Section 4F.02, which establishes a warrant matrix based on the major-street posted or 85th percentile operating speed, the major-street vehicular volume, the pedestrian crossing volume, and the length of the crossing. The applicability of a PHB at this location is therefore a function of field-observed, post-occupancy pedestrian crossing volume at any designated crossing of South Grade

Road in the project vicinity, which cannot be definitively forecast prior to project construction and occupancy. For this reason, a PHB is not recommended for installation as part of the present project scope.

3. Rectangular Rapid-Flashing Beacon (RRFB) with High-Visibility Crosswalk and Advance Warning Signage. A Rectangular Rapid-Flashing Beacon installed in conjunction with a high-visibility (continental or ladder-style) crosswalk treatment and W11-2 pedestrian advance warning signage on the South Grade Road approaches could enhance pedestrian crossing conditions at a designated mid-block or driveway crossing location. RRFBs are recognized by the Federal Highway Administration (FHWA) under Interim Approval 21 (IA-21) and are addressed under CA MUTCD Section 4L.03 as a permissible pedestrian crossing treatment for uncontrolled crossing locations on roadways with elevated operating speeds. Like the PHB, the appropriateness of an RRFB at this location is a function of post-occupancy field conditions, including observed pedestrian crossing demand, driver yielding compliance, and the proximity of existing or planned designated crossing locations along the corridor. These conditions cannot be definitively forecast prior to project construction and the establishment of stable operating conditions at the project site. For this reason, an RRFB with high-visibility crosswalk and advance warning signage is not recommended for installation as part of the present project scope.

The treatments identified in this subsection are not necessary, and are not required, in order for the project to satisfy the applicable CEQA, AASHTO, County of San Diego, and CA MUTCD standards as documented in the preceding sections of this memorandum, and the non-inclusion of any such treatment in the present project scope does not constitute, and shall not be construed as, an engineering finding that the project will substantially increase hazards to vehicular traffic, pedestrians, or bicyclists along South Grade Road. The treatments are identified solely in the interest of full disclosure and for the County's future consideration, in recognition of the fact that traffic safety treatments along a public roadway are, by their nature, appropriately the subject of ongoing post-occupancy monitoring and engineering judgment by the agency with jurisdiction over the right-of-way. The engineer of record makes no representation as to the appropriateness of any specific treatment at this location under field conditions that have not been measured or observed at the time of this analysis, and reserves to the County and other agencies with jurisdiction the determination of whether, when, and how any such treatment is to be designed, funded, installed, operated, and maintained.

Appendix J

Fire & Emergency Operational Assessment

PROPOSED

ALPINE COUNTY PARK

FIRE & EMERGENCY OPERATIONAL ASSESSMENT



Prepared for the County of San Diego by:

ROHDE & ASSOCIATES

EMERGENCY MANAGEMENT

June 25, 2021

ALPINE COUNTY PARK
FIRE & EMERGENCY OPERATIONAL ASSESSMENT

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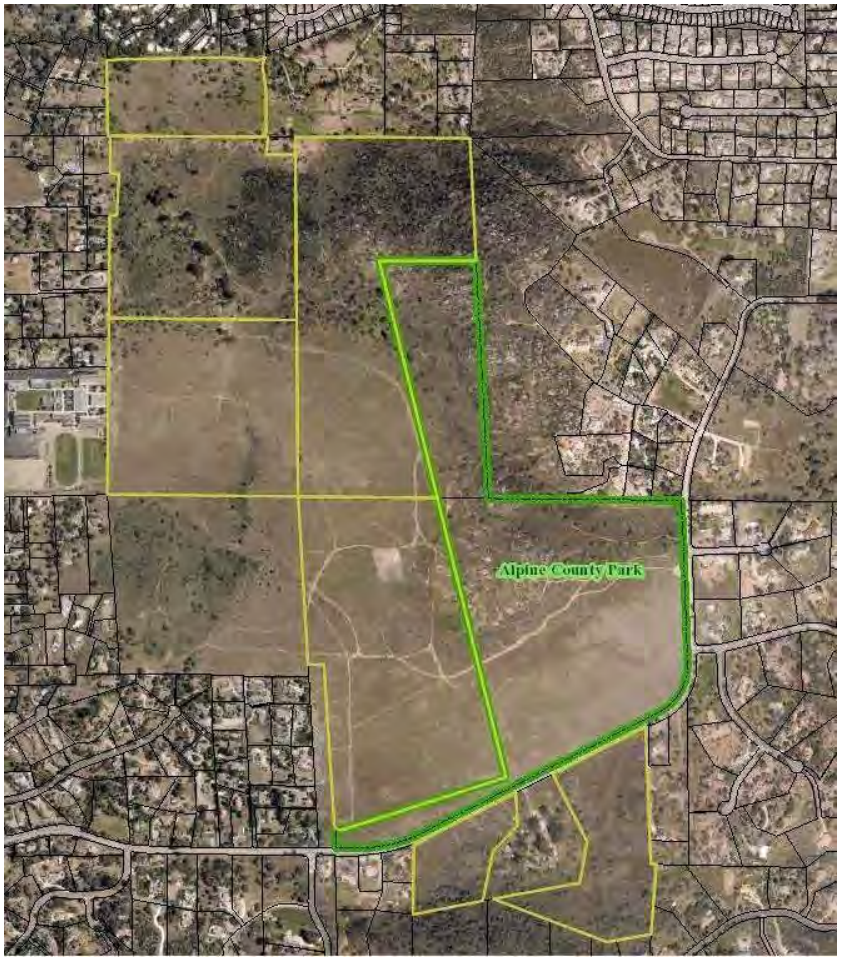
The Project

The area designated for the Alpine County Park project, will be owned and operated by the San Diego County Department of Parks and Recreation (DPR, and is located within the unincorporated Community of Alpine, CA. The proposed improvement project is intended to provide a wide variety of public recreational use for residents and visitors in the Alpine area. The park is proposed to include significant developed facilities including three soccer fields, a baseball diamond, a basketball court, a pickleball court, a skateboard park, a bike trail, a dog parks, equestrian staging with a corral, a table game area, a community garden, and a temporary residence pad for park personnel and a small staff office. The developed park area would be confined to approximately 25 acres. The remaining 70 acres of DPR land will remain undeveloped as a natural preserve. Estimated public usage is 300-500 visitors per day at facility build-out. This usage increases to approximately 1,000 per day on weekends, and up to 2,000 per day during special events 5 or 6 times per year. There are six parcels totaling 245 acres adjacent to Park lands owned by the Back-Country Land Trust (BCLT) in ecological preserve status.

Relationship of County DPR lands (green) to BCLT lands (yellow)



The County Park lands and BCLT preserve lands are contiguous and form a common wildfire compartment. They are subject to impacts from a single wildfire event and pose a wildfire risk to impact the adjacent Wildland-Urban Interface in the Community of Alpine. Because of this, both facilities are assessed as a common parcel in this report. Collectively, these proprieties are referred to in this report as the "site". However, the County and BCLT shall maintain separate jurisdiction over these parcels.

Primary access to both County Park and preserve lands is via South Grade Road. From Interstate 8, the facility may be accessed via the Tavern Road exit, heading south on Tavern Road 1.75 miles, then left at the intersection of South Grade Road. The park is about 1.5 miles east of Tavern Road at 2500 South Grade Road.

Analysis Approach

Rohde and Associates (R&A) has assigned three staff members to this report who have over 100 years of collective fire service experience in Southern California. Additionally, a fourth member is a nationally recognized wildfire behavior analyst. This team has developed this Fire and Emergency Services Operational Assessment for the Alpine County Park project. References consulted during this review have included:

- San Diego County CEQA and planning documents relative to the project
- San Diego County Planning and Development Services website
- County of San Diego High/Very High Fire Severity Zone data
- San Diego County fuels and topographic mapping
- Potential Fire behavior data produced by BehavePlus, FlamMap, and LANDFIRE applications
- San Diego County Wildland-Urban Interface Fire Emergency Response Plans
- Google Earth Pro for geographical information
- Interview with San Diego County Fire Authority and San Diego County Department of Parks and Recreation staff, and stakeholders from the Alpine Fire Protection District, the Back-Country Land Trust, and County Parks consultants, ICF Environmental.

Site Characteristics

The site for the proposed Alpine County Park is primarily flat grasslands with coastal sage in its northern-most segment. Adjacent BCLT preserve lands are more sloping and contoured. While some areas are dominated by grass, most are mainly covered with a mix of sage scrub and chapparal with some oak woodlands. The combined 315 acres of the preserve and park lands include a range of elevation from 1900 to 2150 feet. Roughly 60% of the combined site is dominated by herbaceous fuels and light shrubs, including most of the southern end of the site. The remaining 40% of the site, especially its northeast quadrant is dominated by shrub fuels interspersed with oak.

Slopes are most significant on the northern end of the properties. Generally, the County parklands share an eastern frontage with South Grade Road. While some BCLT lands also front South Grade Road, most of the area is interior to many private properties where access is more limited.



Alpine County Park entry site off South Grade Road showing level slope and surrounding grasslands

Of the County DPR's 98 roughly acres, approximately 25 acres of relatively level topography would receive intensive recreational development. The remaining 70 acres of DPR land will remain open space for passive recreation and hiking trails. BCLT will continue independent management of its 245.62 acres. Of this acreage, 30 acres on the south side of South Grade Road are known as the "Findel Ranch" property, and 200 acres on the north side are known as the "grassland preserve", and an additional site known as the "Priest" property, is on 15.62 acres at the northwest end of the property. Collectively the BCLT owned properties are described as the "Wright's Field Ecological Preserve" The prior property ownership names are commonly used for local reference, however all these properties are managed as a single reserve. All preserve land dedications managed by BCLT have deed restrictions on development other than for parkland use.

The predominant flora of the County Park lands is native and annual grasses, buckwheat, and small coastal sage shrub. These biological characteristics continue south and west into BCLT lands. To the north, BCLT preserve lands are characterized by heavier chaparral and coastal sage plant communities, and some stands of native Engelman Oak. Some non-native Eucalyptus and non-native Russian Olive trees also exist as isolated specimens in this area.

Looking north from the park entry site, grasslands transition to coastal sage



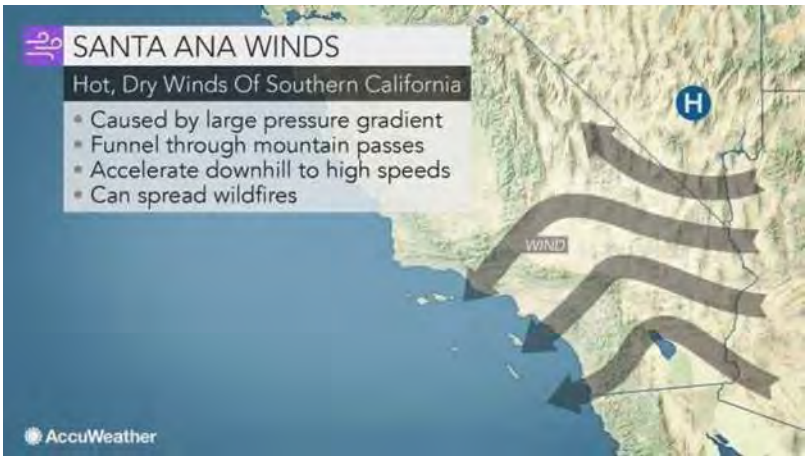
Area Wildfire Risks

The Community of Alpine is located at the foothills of the Peninsular Range of mountains which run through Southern California into Baja Mexico in a northwest to southeast trajectory. This topography allows Alpine to experience strong easterly Santa Ana winds. These winds most commonly reach their peak between September and March; however, Santa Ana winds have been experienced in every month of the year.

Santa Ana wind conditions occur when cooler and drier air masses form a high pressure in the Great Basin region of the Pacific Southwest. This causes a pressure gradient to occur with low pressure air masses along the Southern California coastline. This causes the high-pressure air mass to move southwest, across the Anza Borrego (Colorado) Desert from the four-corners region and over the Peninsular Ranges into the low-pressure air mass along the coast. With this phenomenon, winds are compressed and funneled through narrow drainages formed by the mountain ranges. If the pressure gradient is large, this compression combines with gravity to cause the wind to accelerate downhill to potential hurricane speeds (over 74 mph). It also causes the wind to warm and dry significantly. These winds wick moisture from the native flora causing fuel moistures to lower to a critical condition. This fire hazard condition is often referred to as “Red Flag” levels.

Fire agencies and the National Weather Service collaborate to issue “Red Flag Warnings” for periods of extreme and elevated wildfire risk, and the term is a well known phrase with the public. DPR/BCLT should integrate signage and other interpretive stations at key site entrance points indicating Red Flag conditions when they are announced by fire agencies.

Typical Santa Ana wind patterns in Southern California



The nearby Laguna and Viejas Mountains, the Sweetwater River drainage, and other significant topography of the Peninsular Range influence both winds and wildfire events. When these slopes are in alignment with Santa Ana winds, historically large and destructive wildfires have occurred. The Community of Alpine is situated to arguably pose one of the worst Wildland-Urban Interface conditions in the County of San Diego and is in a known location of repetitious major wildfire occurrence. Such locations of repeat occurrence are known as “historical wildfire corridors”. Some of San Diego County’s most infamous fires have passed near and through the Community of Alpine, including the Cedar Fire (2003), the Viejas Fire (2001), and the Laguna Fire (1970).

A relatively recent wildfire affected the proposed Alpine County Park site directly. The “West Fire” ignited on the eastbound I-8 exit of West Willows on July 6, 2018. Fanned by light to moderate Santa Ana winds, it quickly spread west, burning 504 acres, destroying 18 residences, and damaging 8 others before it was controlled. Fire line to contain this fire was physically placed in the location of the proposed park’s northern boundary.

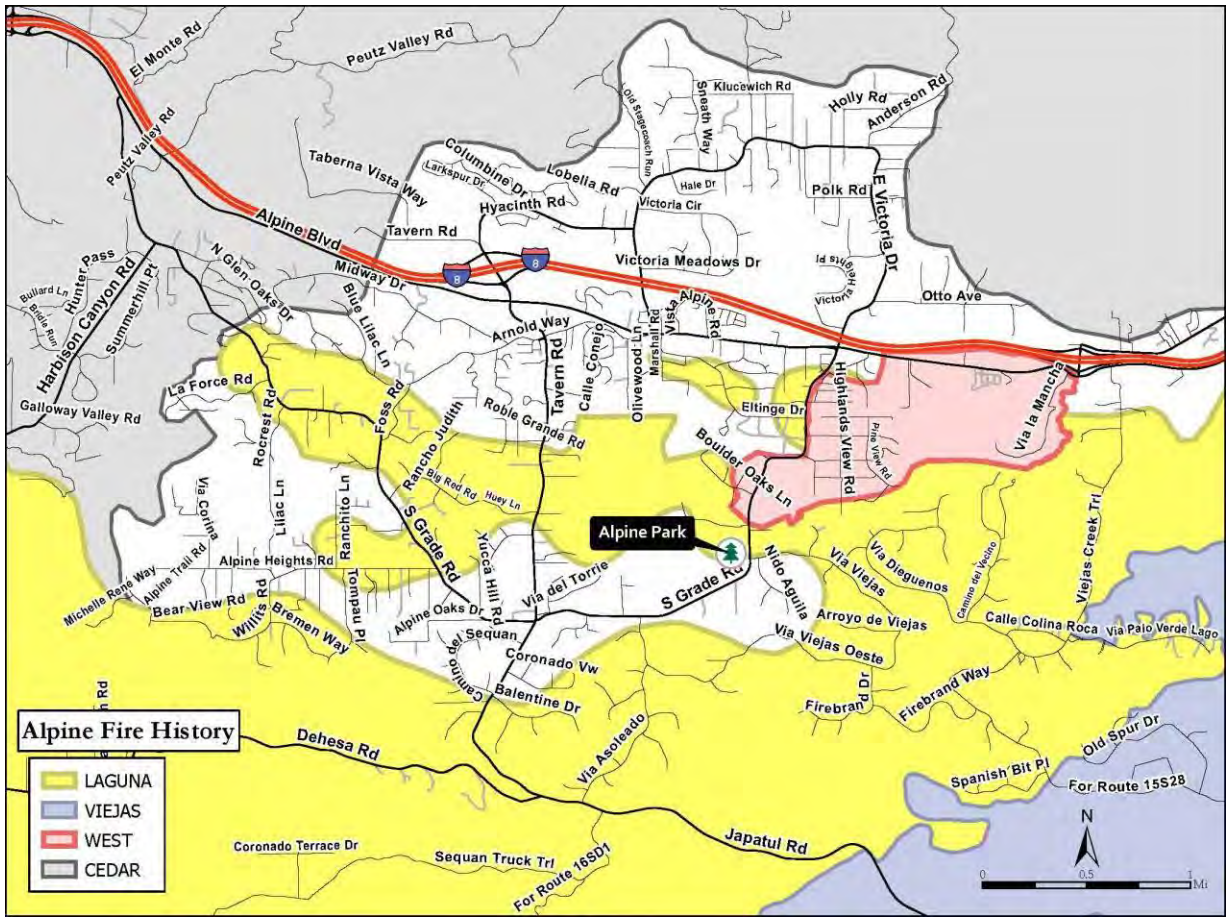


West Fire spread path in an Alpine drainage, looking northeast from South Grade Rd.

One of the most infamous fires to burn through Alpine was the Laguna Fire, started by high winds downing powerlines on September 26, 1970. Pushed by strong Santa Ana winds, it ran through the drainages leading from the Laguna Mountains, through the community of Alpine, extending west to the community of Bonita. It burned much of the proposed park area, scorched 175,425 acres, caused 8 deaths, and destroyed 382 structures.

The October 2003 Cedar Fire burned a similar pattern through the mountain drainages to the northeast of Alpine. Strong Santa Ana winds fanned the blaze with alarming rates of spread of 6-9 mph, burning up to 3600 acres/hour. This fire consumed 270,246 acres, caused 15 deaths and 113 injuries. The fire destroyed or damaged 2820 structures, costing over $1.33 billion.

The Viejas Fire started just east of Alpine on Jan. 3,2001. 65 mph Santa Ana winds caused it to blacken 10,353 acres, damaging or destroying 15 residences, 65 outbuildings and 15 trailers.



History of large wildfires in the vicinity of Alpine County Park

In addition to the Santa Ana wind threat, the predominant weather pattern for the Alpine area between March and September is onshore diurnal winds, often from a west trajectory averaging near 20 mph. Under these typical conditions Alpine can experience high daily temperatures and low relative humidity. During dry periods, this condition presents a near daily wildfire risk, even in the absence of Santa Ana winds.

Expected Wildfire Behavior

Potential for extreme fire behavior has been calculated for the Alpine County Park and adjacent BCLT ecological preserve lands. Extreme wildfire behavior is expressed in rapid rates of spread, spotting distance ahead of the main fire, flame lengths which correlate to high BTU output, and related factors. Results from fire behavior calculations are expressed in the charts below for both off-shore Sana Ana wind conditions and on-shore mid-summer daytime wind conditions.

Results are calculated below using average worst case fire behavior based upon 50 years of local weather records and past wildfire history. Fuel moisture during the displayed periods are seasonally at peak dryness.

Condition	Avg. wind speeds	Peak wind speeds	Avg. temp. (deg.F)	Avg, RH%	Avg Rate of Spread	Peak Rate of Spread	Spotting distance	Flame Lengths (feet)
Offshore winds	20-30 MPH	35-50 MPH	95+	<15%	5 MPH	8 MPH	1 mi.	Grass: 10-12’ Brush: 40-60’
Onshore winds	5-8 MPH	10-15MPH	85+	15-25%	1 MPH	3 MPH	1/4 mi.	Grass: 6-10’ Brush: 30-40’

CAL FIRE and the County of San Diego have identified the Community of Alpine as a Very High Fire Hazard Severity Zone under the California Government Code, section 51178. In response to this designation, both the San Diego County Fire Authority/California Department of Forestry and Fire Protection and the Alpine Fire Protection District maintain robust fire prevention regulations in the site area.

Site Development Risk Factors

Site-specific wildfire and ignition risks associated with the plan site include the following:

1. Proximity to South Grade Road, a known location of increased human related fire ignition factors
2. Adjacency of the site to significant human activity including homes and ranches
3. Robust public usage of the site for both dispersed and organized recreation

4. Location of the park site with respect to historical major wildfire corridors.
5. Heavy fuel concentrations on some DPR/BCLT lands
6. Current off-road parking and occasional vehicle trespass
7. Potential increase in demands on local public safety resources as a result of developed park use

In explanation of these factors and their risk, the following observations are offered:

Risk 1: Proximity to South Grade Road

The location of South Grade Road on the southeastern extremity of the County Park lands poses elevated ignition risks from vehicle passage due to motor vehicle exhaust, discard of hot materials from vehicles, vehicle accidents, off-road parking, dragging of tow chains, or related hazards. These hazards should be mitigated by continued agreement with County Roads to maintain 15-30 feet of vegetation clearance adjacent to the roadbed. DPR/BCLT should consider establishment of a 50-foot clearance in total, counting County Roads clearance, on the edge of this road to prevent establishment of wildfire from the roadway. This 50-foot clearance will also mitigate extension of wildfire from a historical wildfire corridor located on the east face of the site. This corridor has brought wildfire from the West Willows Road area, west onto the park site in the past. This clearance would enhance the ability of firefighters to utilize South Grade Road as a barrier to fire spread. County Park features, such as parking lot placement, may be counted as part of the recommended fuel modification zone.

Risk 2: Adjacency of neighboring homes and ranches

The proximity of homes and ranches to County DPR and BCLT lands poses a significant human risk for both wildfire ignition extending from these properties into the site, and Wildland-Urban Interface risk to these structures from wildfires traveling from or through DPR/BCLT lands. While these properties are already subject to rigorous fire prevention efforts by local fire agencies, additional mitigation should be provided by both County DPR and BCLT to provide enhanced protection to their individual properties through fuel modification and maintenance, (see Fuel Modification, page16).

Risk 3: Robust public recreational usage

Public use of both County DPR and BCLT lands is already extensive, even before site development. Hiking and equestrian usage of the site via existing trails and dirt roads is common, although no overnight use is permitted. Development of the County Parks site will add hard surface parking, equestrian staging, informational signage, trail development, sanitation facilities, and oversite services which will all assist fire prevention efforts. It is recommended that electric utility service for these facilities be placed underground. While It is likely that human introduced through park use will present fire prevention issues, this issue is mitigated in that historical unregulated public use of these lands will now be regulated and managed by the Parks agency, including the introduction of new and enhanced fire prevention measures.

Along with prudent site development, planned regulation of the site by DPR will include forbidding open fires, smoking and overnight use, along with increased patrol by park and volunteer staff. These steps will assist in mitigating the development's fire prevention concerns on County controlled lands. It is recommend that BCLT institute parrallel and coordinated fire prevention measures on their lands as well. Development of the intensive use sports fields, associated parking, public facilities, and support buildings will include landscaping to isolate these facilities from the surrounding wildland as a requirement of the fire and building code, reducing wildfire exposure and ignition risks. Additional fuel modification may be required to further isolate these uses for public safety and ignition resistance, as described in the fuel modification section of this report. Both County Parks and BCLT staff should consider increased patrols, signage, and public outreach during periods of elevated fire danger and consider closure of ecological preserve areas during periods of extreme fire danger, such as Red Flag conditions. Red Flag Warnings should be posted at prominent site locations when such conditions are present.

Risk 4: Park location with respect to major wildfire corridors

Historic wildfire corridors affect the site from both a Santa Ana wind-driven, and an onshore wind-driven conditions. The Santa Ana wind-driven fire corridor, also addressed in Risk #1, channels fire from the West Willows Road area to the eastern boundary of the site along South Grade Road. Past wildfires have traversed this corridor, and fire line has been established in the past within the Wright's Field site for containment. Fuel modification suggested in Risk #1 above, and the placement of developed park features will aid in containing wildfire movement within this corridor. A second route for significant wildfire movement exists on the north edge of the BCLT property, especially off the Eltinge Drive area where an ignition could allow fire to become established during Santa Ana winds in heavy fuel and pose immediate exposure to both BCLT lands and many homes downwind. Such a fire could move through BCLT lands towards the southwest. Finally, if fire were to become established in the southwest corner of the property behind homes and move with onshore winds under dry conditions, it will likely move into both BCLT and County Park lands. Currently no obstacle exists to fire movement in this area. As mitigation to these risks, fuel modification will be recommended (see Fuel Modification, page 16).

Risk #5: Heavy fuel concentrations

Where grass dominates lands within the site, fire behavior may be expected to include rapid burning but lower intensity thermal outputs. Here, fuel loading ranges to 5 tons per acre, and flame fronts may be significant enough to ignite unprotected homes. However,

firefighting can generally be more successful here. Where heavier fuels exist such as in coastal sage or mixed chaparral plant communities, burning conditions will be much more intense, as will be the difficulty of fire suppression. Heavier fuels may also present extreme burning characteristics during critical fire weather including high thermal outputs, rapid rates of spread, and spotting.

Heavy fuel concentrations are located within the site under both ownerships, however heavy fuel is primarily concentrated on BCLT lands. These heavy fuels include old-age, continuous chaparral and sage scrub fuels with fuel loading from 20 to 40 tons per acre and oak woodlands. Heavy fuel loading is capable of extreme fire behavior under either Santa Ana wind or onshore wind-driven wildfire conditions. These critical fuel beds are located near homes on both the north and west aspects of the site. Mitigation for this risk will require boundary area fuel modification to prevent fire from either entering the preserve from adjacent property or moving through preserve lands to affect private properties. Additional fuel modification to remove non-native trees, and to remove deadfall from native species such as pest infested oak groves is also recommended in these areas (see Fuel Modification, page 16)

Risk #6 Off-road vehicle access

Although vehicles access is currently blocked by light fencing, trespass does occasionally occur. Parking occurs haphazardly on either an unimproved dirt lot or on the shoulder of South Grade Road. Park development is expected to strengthen vehicle control barriers and offer improved and fire-safe parking.

Risk #7 Increasing demands on public safety resources

New demand on public safety resources in the Community of Alpine resulting from development of new park facilities was not expected to place unmitigable demands on local fire or law enforcement services. A full review of existing fire services response capability and impacts was conducted and is included in this report. The project will also include establishment of onsite staff that will provide new security for park facilities upon build-out.

Facility Fire-Safe Design

Through appropriate facility development design and County of San Diego fire and building code compliance, the project expects to mitigate wildfire risks for developed facilities within the site. The installation of manicured, irrigated landscaping such as lawns and other fire resistive plantings will offer a fire safe area where the two dog parks, three soccer fields and a baseball diamond are proposed. Additionally, the paved parking lot, basketball and pickleball courts, equestrian area and other cleared assets will serve as not only a buffer to protect the park from wildfire spread, but also provide a Temporary Safe Refuge Area (TSRA) for humans and animals for safe haven during wildfire. Current

fire safety development standards applicable to the site may be reviewed at the County of San Diego website: https://publicservices.sandiegocounty.gov.

All landscaped vegetation on park premises should be accomplished within the guidelines of the San Diego County Department of Planning and Land Use (DPLU) and be consistent with the County's fire resistive approved landscape plant palette. Generally, these plants have the following characteristics:

- Grow close to the ground.
- Have a low sap or resin content
- Grow without accumulating dead branches, needles, or leaves
- Be easily maintained and pruned
- Be drought-tolerant
- Be subject to sufficient irrigation to maintain a "green" state
- Do not present intense thermal outputs during combustion.

A temporary safe refuge/shelter-in-place concept should be integrated into park development. It is likely that park facilities such as its parking lot(s) and equestrian staging will serve as the nearest emergency safe refuge for park users recreating in its open space, and may also serve the emergency needs of nearby park neighbors during a regional wildfire. For this reason, parking and equestrian areas should provide broad expanses of non-combustible surfaces that are absent of combustible ground cover (including in planters) with at least two hundred feet of clearance from native vegetation whenever possible. Trees within these facilities should be maintained in a trimmed state, free of dead plant material and lower limbs removed. Fuel modification of adjacent native fuels may be used in coordination with development of these developed areas when necessary to achieve minimum recommended fuel clearance widths.

Vehicle access onto South Grade Road should be carefully evaluated since this route serves as a regional route for evacuation traffic and carries significant traffic daily. Care should be undertaken to promote best uninterrupted traffic flow while providing safe access and egress to park facilities. Use of median turn lanes and traffic visual constraints should be included in development of access design as blind corners currently exist on South Grade Road. Access lanes will need to be large enough to accommodate large fire apparatus and horse trailer entry.



Alpine County Park Development Plan

Since equestrians will likely use County facilities as temporary safe refuge during wildfire passage, equestrian facility design should be both substantial and fire resistive so as to promote secure and safe housing of large animals, and to prevent accidental release due to animal panic during wildfire. Large animals should continue to be targeted for ultimate evacuation during regional wildfire to the Lakeside Rodeo grounds as the longer-term option. This development will create large animal temporary safe refuge that is currently unavailable within the immediate Alpine community. The current nearest recognized large animal refuge is 15 miles west in Lakeside.

Fuel Modification

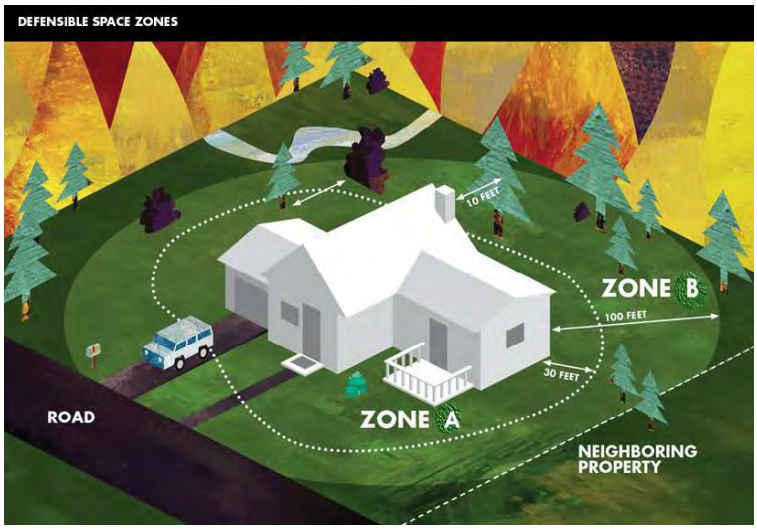
The principal means for mitigation of several wildfire risks associated with the DPR/BCLT site is fuel modification concentrated on specific locations, which offer highest protection value for the expense and effort. This management should be accomplished on a scale needed to mitigate identified fire behavior potential while limiting environmental impacts from the treatment itself.

Goals of fuel modification should be to reduce wildfire intensity sufficiently to offer reasonable protection to adjacent developed and habitable (by either human or animal) structural assets, to limit landowner liability from wildfire damage to adjoining properties, to provide protection for DPR/BCLT site development, and to ensure safe public refuge at key sites. Fuel modification works best when applied directly adjacent to targeted structures/sites or along improvements such as roads, trails, parking lots, or equestrian sites to establish fire compartments or safe refuge areas.

Treatment Prescription

Two forms of fuel modification are typically practiced for fire prevention purposes. The first is typically referred to as “Zone A” and focuses on replacement landscaping in the immediately adjacent yard of a structure. The goal is 100% fire exclusion from the property. This is required for structural development in the California Fire and Building Code in wildland areas. Immediately outside of Zone A is a contiguous “Zone B”, which is an area of fuel thinning to reduce fire intensity as it approaches developed property. The goal of fuel modification described in this report is to achieve Zone A compliance around County Park facilities per fire and building code requirements. For Zone B compliance, maintain reduction of fuels adjacent to Zone A where identified. These areas include: along property lines where practical, around key public facilities such as parking areas, equestrian staging, and similar locations. Fuel modification in Zone B should be designed to achieve fire prevention goals while maintaining viable habitat and preserving ecological values.

Fuel Modification zones around a structure



The objective to landscape replacement in Zone A will be to eliminate potential for wildfire occurrence through establishment of fire resistive landscape around principle park facilities and structures at minimum distances required by code. This has been designed through proposed landscape around sports fields and buildings and is subject to County Fire Marshal review and approval during the permitting process.

The objective of fuels treatment in Zone B is to achieve at least a 75% reduction in fireline intensity from a wildfire moving from native fuels into a constructed fuel modification zone, through accomplishment of the following criteria:

a. The minimum width of a fuel modification zone should be 100 feet in shrubs and 50 feet in grass.
b. The width of a fuel modification zone should be extended to 150 feet for slopes below structures when slopes exceed 45%
c. Shrub fuels within the zone should be reduced by a minimum of 50%
d. Grass/herb fuels within the zone should be reduced by a minimum 80% and what grass is retained should be no more than 4 inches in height
e. Shrub species continuity should be non-contiguous within the modified zone and include clump separations of up to 10 feet.
f. Remaining shrubs in fuel modification zones should be trimmed of dead material
g. All cut materials smaller than 1 inch diameter should be cut, chipped, and scattered for erosion control. Larger materials should be removed from the zone.
h. All gatherings of dead materials, rubbish, and rat nests should be removed.
i. All trees should be a minimum 6 inch diameter at breast height (DBH) and limbed up at least 8 feet
j. Tree canopies remaining must not be contiguous and have at least 10-15 feet of separation between adjacent tree canopies

k. Sensitive plant species should be preserved when possible along with a small buffer of native fuels. A buffer of 15 feet should be retained on each side of water courses.
l. Soils should not be left completely exposed for erosion control concerns. Cut native material less than 1-inch in diameter may be re-deposited and scattered onto soil surfaces to a depth not to exceed 12 inches.
m. Fuel modification may be placed along perimeter fencing or internal roads to serve to compartmentalize fire, when necessary.
n. Reduction of fuels beneath key species such as Engelman Oaks may be accomplished to enhance oak habitat and oak water uptake, and to reduce fire threats to individual species. In this case, remove all dead and down materials below the oak canopy for 5 feet beyond the crown "drip line". Remove any dead tree material that is structurally unsound and remove any ground shrub fuels below the tree canopy.
o. Fuel modification zones should be maintained annually after initial construction (value is lost after 5 years of no maintenance).

It is further recommended that a qualified biologist conduct a nesting bird survey for sensitive bird species when removing shrub fuels during the period March 1 through Sept. 1, annually. If nesting birds are found, secure the site and a buffer of 50 feet until birds fledge out before resuming clearance.

Treatment Methods

The following treatment method alternatives are recommended and available for use on the site:

a. Mechanical treatment: Mowing or plowing may be used to establish fuel modification in grass, where terrain is within mechanical limits of mowing equipment. Use of mastication equipment is recommended for shrub fueled areas that are absent of large trees in generally level terrain on the site perimeter (equipment is limited to maximum 30-degree slope). Moderate costs of $2000-3,000 per acre and rapid completion may be expected, 1-3 treated acres per day.

   Recommended sites: Mowing: Any grass area in the south half of the property in terrain within mechanical limitations. This may also be used to extend parking lot or equestrian staging area clearance for safe refuge. Mowing or mastication will require presence of basic firefighting capability in case of

accidental strike/sparking of ignition. Mastication: West and north-west boundary areas in terrain within mechanical limitations.



Masticator at work

b. Grazing: Treatment by goat grazing is recommended for grass and lighter fueled sites such as sage scrub. Herding and fencing are recommended to ensure goats achieve treatment prescriptions and do not overgraze sites. Goats are less successful in heavier chapparal and are not recommended for such sites. Low costs of $800-$1,000 per acre and rapid completion may be expected, ½-1 treated acres per day with 50-goat herd.

   Recommended sites: Any grass and sage fueled area in the south half or north-west quarter of the site



Goat grazing near the Reagan Presidential Library, Ventura County

c. Hand treatment: Treatment by hand crews is recommended for steep sites and sites with heavy fuels. Costs may be expected between $5,000-$15,000 per acre and crews may be unavailable during periods of active wildfire. Currently CAL FIRE hand crews are at a premium due to lack of availability. California Conservation Corps or contract crews may be more available. Crew clearance rates will average ½ to 1 treated acre per day.

Recommended areas: Shrub fueled and steep sloped areas in the northwest quarter of the combined site.



Brush clearance
by hand crew

d. Treatment by broadcast prescribed burning is not recommended for the site given the risks associated with escaped fire and smoke in the Wildland-Urban Interface, and the unnatural high frequency return of high intensity wildfire in the area.

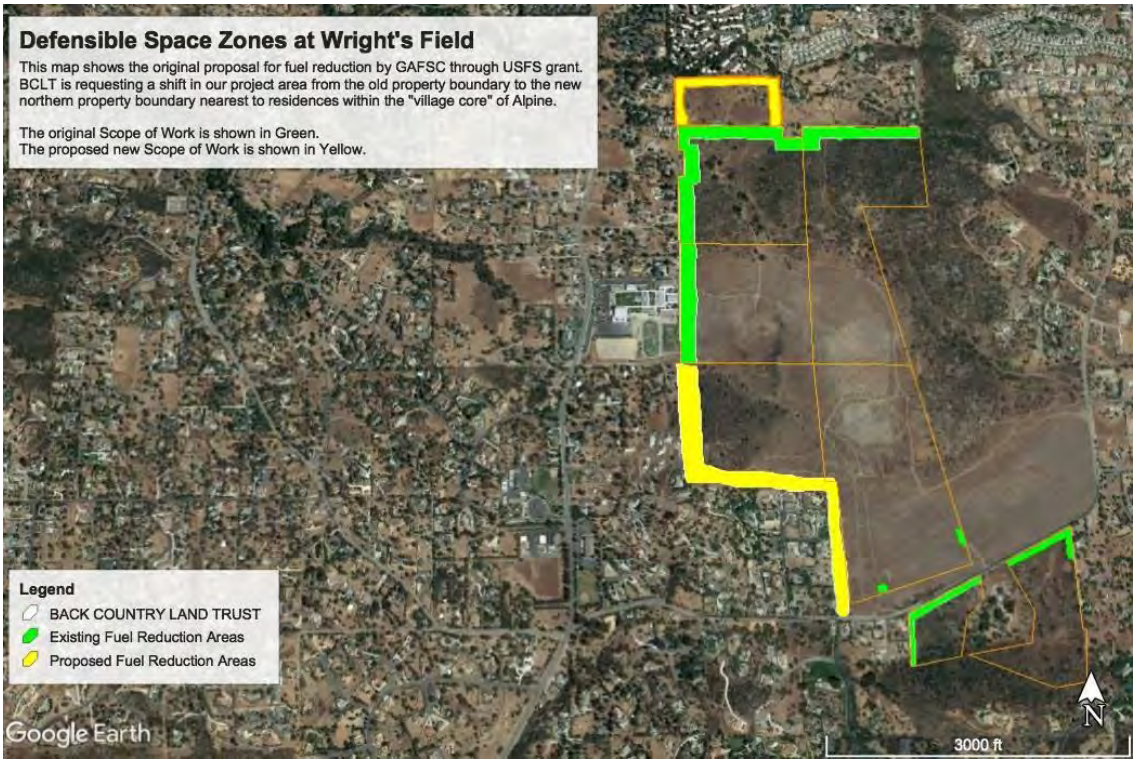
   Recommended use: Burning of brush piles in wet periods is an acceptable fire use, however, will likely require air quality permitting and manpower resources.

e. Treatment by herbicides: This form of broadcast treatment is not recommended due to water quality, environmental and public contact concerns.

   Recommended use: It may be acceptable for limited spot control of invasive plants when they pose critical risk to sensitive species. This may require permitting and involve significant cost.

<u>Past fuel modification efforts</u>

BCLT has conducted some fuel modification and planned other sites but has not completed all sites due to funding limitations. In 2020, BCLT accomplished fuel modification in accordance with the chart below:



The completed 2020 fuel reduction is in green, the proposed fuel reduction in yellow

Fuel Modification Limitations

On the northeast portion of the DPR/BCLT land, there is a property boundary on a mid-slope in heavy fuels. It is far from the nearest developed structures on Eltinge Drive and Boulder Oaks Lane. This site boundary is located in a position that fuel modification would not provide a reasonable firefighting control line or structure protection advantage.

It may be much more effective to have an alliance with the property owners in these areas that would achieve fuel modification more closely abutting structures rather than on property boundary lines. Collaboration is recommended with partner agencies and homeowners in this regard, rather than creation of limited value fuel modification at significant cost where it fails to achieve the best fire prevention advantage. Where County DPR lands and BCLT lands that are both dedicated as ecological preserve are adjoined, and no occupied structures are at risk, it is likely unnecessary for fuel modification to be conducted along the shared property line.

Looking south from Eltinge Pl. at heavy vegetation adjacent to a large residence. The BCLT property line is still at some distance from the home



Partner Collaboration for Fire Prevention

County DPR and BCLT should collaborate in and promote fire prevention and defensible space activities in coordination with neighboring entities including the Greater Alpine Fire Safe Counsel (GAFSC), the Alpine Fire District (ACP), the San Diego County Fire Authority/California Department of Forestry and Fire Protection, County Road Department, and the San Diego Gas and Electric Company. Cooperation should be sought on regional defensible space initiatives, fuel modification, and structural defense initiatives including sharing of resources, planning, and costs.

Regional Wildfire and Evacuation Plan

The San Diego County Wildland-Urban Interface Fire Emergency Response Plan has been updated for the Alpine South-East area as a part of this study. This document is attached to this report as Appendix A. This document is approved by the San Diego County Fire Chiefs and Police Chiefs and Sheriffs Associations and is the county standard emergency response and evacuation management plan format for wildfire. Staff are encouraged to become familiar with this plan and be prepared to integrate with public safety responders in response to emergencies at this site. Park staff are urged to develop additional emergency response plans consistent with this document and to develop the means and methods necessary for emergency communicating with the public. Staff should consider evacuation, “trigger point” criteria stated in this plan and determine if additional time is required to mobilize internal staff and implement this plan.

Assessment of Fire Services Impacts

Structural fire, rescue and emergency medical services are provided to Local government Responsibility Area (LRA) in the Alpine community by Alpine Fire Protection District (ACP). The District's Fire Station 17 staffs a Type-1 Advanced Life Support (ALS)/Paramedic Structure Fire Engine, cross staffs a Type-3 Wildland Fire Engine, has a Chief Officer and houses a Paramedic Ambulance, 24 hours every day. ACP also has a joint agreement for immediate services with neighboring fire agencies in the Central Zone of San Diego County and maintains dispatch services through the Heartland regional dispatch center.



Structure loss during the West Fire, Alpine, CA July 6, 2018

Wildland fire protection for the immediate area of Alpine is provided to "State Responsibility Area" (SRA) wildlands by California Department of Forestry and Fire Protection (CAL FIRE), San Diego Unit. CAL FIRE also provides structural fire and rescue services to the San Diego County unincorporated areas as the contract provider of services for the San Diego County Fire Authority. CAL FIRE provides regional dispatch services via the Monte Vista dispatch center. CAL FIRE also provides specialized wildfire support via air tankers, helicopters, bulldozers, hand crews, and related resources for wildfire suppression.

Some areas of Alpine pose concurrent responsibility for fire protection where LRA structural services are provided by the Alpine FPD and wildland fire protection is provided to SRA by CALFIRE. Both agencies respond concurrently in a coordinated manner for such response.

Nearby Federal lands of the Cleveland National Forest are under the jurisdiction of United States Department of Agriculture, Forest Service (USFS). The USFS is responsible for wildland fire protection on the National Forest and maintain a fire station in the Community of Alpine.

Automatic Aid agreements exists between CAL FIRE, USFS, and Alpine FPD for response of the closest appropriate resource to a reported emergency, regardless of jurisdictional boundary.

Response Time Analysis

With the ACP Fire Station 17 only 2.7 miles away from the Alpine County Park site, initial units for any type of fire or medical emergency to the Alpine County Park are within a five-minute response time. Augmentation of initial response resources may be required for certain call types including wildfires, structural fires, and heavy rescues. Augmentation is immediately provided to ACP when required by the Heartland dispatch center and surrounding fire agencies.

Initial structure fire response

Structure Fire Response	**Resource Numbers & Types Responded**
1st Alarm	5 Type-1 Engines, 1 Truck Company, 1 ALS Ambulance, 2 Chief Officers

Wildland response is tiered based upon the assessed daily wildfire risk.

Wildfire Hazard Level	**Resource Numbers & Types Responded**
Low	2 Type-1 Engines, 1 Type-3 Engine, 1 Chief Officer
Medium	3 Type-1 Eng., 2 Type-3 Eng., 1 Type-6 Eng., 1 Water Tender, 1 Type-2 Hand Crew, 1 Chief Officer, Aircraft
High	3 Type-1 Eng., 2 Type-3 Eng., 1 Type-6 Eng., 1 Water Tender, 1 Type-2 Hand Crew, 2 Chief Officers, Aircraft

Fire Station Order

Fire Stations are staffed by a number of fire service agencies in the Alpine region. The following chart indicates the location and types of fire resources available for response, based upon proximity to the Alpine County Park site:

Fire Station	**Location**	**Resources**	**Distance**	**Service Provided**
USFS, Descanso Ranger Dist. Alpine	3348 Alpine Blvd. Alpine	1 Type-3 Engine 1 Chief Officer	1.9 miles 4 minutes	Federal mission wildfire response only
Alpine Fire Protection District Station 17	1364 Tavern Rd. Alpine	1 Type-1 Engine ALS 1 ALS Ambulance 1 Chief Officer, Reserve: 1 Type-1 Eng, 1 Type-3 Eng	2.7 miles 5 mins.	All risk response

Viejas Indian Reservation Fire Department Station 25	1 Viejas Grade Rd. Alpine	1 Type-1 Eng., 1 ALS Amb. Reserve: 1 Type-1 Eng. ALS 1 Type-3 Eng. 1 Type-6 Eng. 1 Water Tender	3.4 miles 6 mins.	All risk response
SDCFA Station 24	551 Harbison Canyon Rd. El Cajon	1 Type-1 Engine ALS	6.3 miles 10 mins.	All risk response
Lakeside Fire Protection District Station 26	15245 Oak Creek Rd. El Cajon	1 Type-1 Engine ALS	7.6 miles 12 mins.	All risk response
CAL FIRE Station 21	9711 Flinn Springs Rd. El Cajon	1 Type-3 Engine	8.2 miles 13 mins.	All risk response-State wildfire mission
Lakeside Fire Protection District Station 3	15245 Oak Creek Rd. El Cajon	1 Type-1 Engine ALS 1 ALS Ambulance	10.0 miles 14 mins.	All risk response
SDCFA Station 45	24592 Viejas Grade Rd. Descanso	1 Type-1 Engine ALS Reserve: 1 Type-6	11.2 miles 15 mins.	All risk response
USFS Descanso Station	24321 Viejas Grade Rd.	2 Type-3 Engines	11.7 miles 15 mins.	Federal mission wildfire response only
Sycuan Indian Reservation Fire Department	5449 Sycuan Rd. El Cajon	1 Type-1 Engine ALS 1 Type-3 Eng., 1 Water Tender 1 ALS Amb., 1 Truck Company 1 Crew (Golden Eagles IHC)	7.3 miles 14 mins.	All risk response
SDCFA Station 44	28850 Old Hwy. 80 Pine Valley	1 Type-1 Engine 1 ALS Ambulance 1 Chief Officer Reserve: 1 Type-6 Engine 1 Water Tender, 1 USAR Unit	15.1 miles 16 mins.	All risk response
CAL FIRE Station 20	2249 Jamacha Rd. El Cajon	2 Type-3 Engines 1 Bulldozer Numerous Chief Officers	15.3 miles 25 mins.	All risk response
Santee Fire Sta. 4	8950 Cottonwood Ave., Santee	*Nearest truck company	18.7 miles 30 minutes	All risk response-nearest truck

Fire Service Summary Analysis

Fire services in the Alpine community area are designed for rural community all-risk services but are nevertheless robust. The significant resources available to the community ensure a full response of resources in under 5 minutes for the initial resource and within 15 minutes for most multi-unit responses. The single exception is for truck services which, if needed, must respond from the City of Santee. In the absence of this truck apparatus, other firefighters are trained to assume duties normally performed by truck company personnel.

Alpine Fire Station 17 incurs 1-3 service calls per day, a modest response workload. Significant capacity exists for additional service calls, and the development of the Alpine County Park facility is expected to add less than 1 call per day on average to this workload. This demand is estimated by the number of daily park users at estimated peak visitation. Therefore, no new or additional fire services beyond what is currently provided is necessary to support the proposed project, and no new or unreasonable wildfire risks will be created by the proposed development.

Summary of Findings

1. The two-adjoining park/preserve facilities, while managed separately by County Parks and BCLT, have many relationships and ties both geophysically and ecologically. They also share a similar wildfire risk, and fire prevention outcomes will be shared for better or worse by both facilities. A rich history of wildfire affects these lands, as does an annual experience of dangerous wildfire conditions.

2. The San Diego County Department of Parks and Recreation intends to establish signage, evacuation plans, and onsite volunteers as mitigations to wildfire and other types of foreseeable emergencies occurring at the park, They also plan to implement restrictions on overnight use, smoking, use of open flame, and vehicle access as part of its overall fire prevention program. These are appropriate and effective mitigations for the park given its fire history and onsite fire hazards.

3. A long-term fuel modification program is needed to protect the County Park/BCLT preserve from wildfire impacts due to offsite ignition, and to protect neighboring development from wildfire moving through or from park/preserve lands. Alternatives for completion of this effort are detailed in this study. The fuel modification program should be designed to achieve fire prevention needs while minimizing environmental impacts and maintaining habitat.

4. Funding resources for fuel modification maintenance has been inconsistent for BCLT preserve lands. County Parks and BCLT should collaborate with various stakeholders and government entities to acquire long-term funding and resources to support fuel modification.

5. Collaboration with adjacent property owners is needed to achieve best value and mitigation for wildfire threats to both Park/preserve lands and private property, especially where simple boundary treatment will not yield best fire prevention results.

6. Development of the Alpine County Park in accordance with the County of San Diego proposed park design and local fire and building codes will develop fire safe facilities that will be resilient to wildfire. The park will also be positioned to provide temporary safe refuge in its sports fields, parking, and equestrian facilities to the greater community in case of wildfire. Electrical utilities servicing park facilities should be placed underground.

7. Traffic turnouts on South Grade Road will need to be large enough to accommodate large vehicles with trailers and emergency apparatus, as well as be configured for safe turning. Parking areas should be able to accommodate large fire apparatus movement.

8. Development will not present unmitigable impacts or a significant increase in call volume for local emergency services and may be developed without addition to existing regional fire resources or establishment of new or unreasonable wildfire risks.

References

1. Proposed Park Development Conceptual Drawings, County of San Diego Department of Parks and Recreation, July 2020

2. Keeley, J.E, and C.J Fotheringham, 2001, “Historic Fire Regimes in Southern California Shrublands”, Conservation Biology 15: 1536-1538

3. “Fire Management of California Scrubland Landscapes”, Kelley, J.E., Environmental Management, Vol. 29, March 2002,

4. Fire Resources and Assessment Program (FRAP), State of California, Department of Forestry and Fire Protection (CAL FIRE), online resource, frap.fire.ca.gov/

5. Alpine South-East Wildland-Urban Interface Fire Emergency Response Plan, San Diego County Fire Chiefs Association, August 2020

6. “After-Action Review of the Woolsey Fire Incident”, County of Los Angeles, CA, Citygate Associates LLC, November 2019

7. “Wildfire Mitigation and Fire Safety Task Force Report”, City of Laguna Beach, CA, March 19, 2020

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11. “Vegetation Management Treatment Protocol”, City of Laguna Beach Fire Department, February 2020

12. County of San Diego, Dept. of Public Works, “Public Road Standards”, March 2012

13. Challands, Neil, “The Relationships Between Fire Service Response Time and Fire Outcomes, Fire Technology” July 2010

14. County of San Diego, “Fire, Defensible Space, and You”, Department of Planning and Development Services, https://www.sandiegocounty.gov/pds/fire_resistant.html

Appendix J1

Alpine County Park Project Fire Protection Memorandum

Fire Protection Memorandum

Alpine County Park Project

JULY 2026

Prepared for:

HELIX ENVIRONMENTAL PLANNING, INC.

Prepared by:

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1 Introduction

Dudek was retained by HELIX Environmental Planning, Inc. to respond to and provide additional analysis pursuant to a court order regarding the Alpine County Park Project (project) in the Community of Alpine in San Diego County. This technical memorandum serves as an addendum to the 2021 Fire and Emergency Operation Assessment report (FEOA) prepared for the project by Rohde & Associates to comply with a court order related to Wildfire impacts in the Writ of Mandate issued on January 23, 2026, for CASE NO: 37-2024-00000536-CU-WM-CTL (Writ), and as further detailed in the Minute Order issued on June 9, 2025 in the same proceeding (Minute Order). The court determined that the Environmental Impact Report (State Clearinghouse #2021030196, County of San Diego [County] 2023) (EIR) required further analysis related to Wildfire impacts to separately analyze the significant impact of the fire risk and its baseline conditions before proposing mitigation measures. To address the court order, this technical memorandum provides fire behavior modeling that separately establishes fire risk for baseline existing conditions and two project conditions: the project with an active park, including only the fire prevention measures required by code, and 2) the project with an active park, including both the required measures and additional fire protection measures selected by the County. The three conditions provide an analysis of the effectiveness of the project's proposed fire prevention measures in reducing fire behavior intensity and fire ignitions. Additionally, this technical memorandum provides an analysis of the project's alignment with the Attorney General's Guidance for Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act, which had not been issued when the EIR and associated technical reports were originally prepared.

The intent of this technical memorandum is to provide the information necessary to update the appropriate sections of the Recirculated Draft EIR, including updates to the existing conditions and regulatory setting, methodology, and wildfire impact analyses presented in Sections 4.09 Hazards and 4.20 Wildfire.

2 Project Description

The project proposes the development of an approximately 25-acre active park within 96.6 acres of undeveloped land within the unincorporated community of Alpine. The project would conserve approximately 70 acres of the property as open space and/or preserve. The project is located adjacent to the Back Country Land Trust's Wright's Field Preserve, north of South Grade Road, east of Tavern Road, and south of Alpine Boulevard. The project would develop an active park with amenities that include multi-use turf areas, a baseball field, an all-wheel area, bike skills area, recreational courts (i.e., basketball, pickleball, game table plaza), fitness stations, leash-free dog area, restroom facilities, an administrative facility/ranger station, equestrian staging and a corral, nature play area, community garden, a volunteer pad, picnic areas with shade structures, picnic tables, and multi-use trails. A parking area would accommodate up to 240 single vehicle spaces. The parking lots along the eastern portion of the project site would be built with an earthen berm between the parking lots and South Grade Road. By developing the park, the project will remove existing hazardous vegetation fuels and provide irrigated, fire-resistant landscaping common for a park that will result in creating defensible space and vegetation fuel modification and management required by the Alpine Fire Protection District (AFPD), the fire agency with jurisdiction for the project site, for projects in a State Responsibility Area Very High Fire Hazard Severity Zone.

3 Court Order

3.1 Writ

The language in the Writ regarding Wildfire is included below:

> *Wildfire Impacts: Respondent shall separately analyze the significant impacts of the fire risk and its baseline existing conditions before proposing mitigation measures, and shall provide information on how it analyzed the effectiveness of the proposed measures.*

3.2 Minute Order

The language in the Minute Order regarding Wildfire, which provides further background regarding the Writ's directive, is included below:

> *Petitioners argue the EIR does not contain analysis of the significance of the Project's wildfire impacts without the mitigation measures. OB at p.22. They argue that instead, the EIR improperly treated mitigation measures as Project components, which impermissibility treats the analysis of impacts and mitigation measures as one issue. OB at p.21, citing Lotus v. Department of Transportation (2014) 223 Cal.App.4th 645, 653; People ex rel. Bonta v. County of Lake (2024) 105 Cal.App.5th at 1235-36 ("[F]ailure to separately identify and analyze the significant impacts of the fire risk to the Project area and its baseline existing conditions before proposing mitigation measures violates CEQA.)"*
>
> *The County argues the EIR includes a wildfire impact analysis in Section 4.9, section 4.20, and Appendix J, K, and L. Oppo. at p.21 citing AR 2695 et seq. (Fire and Emergency Operation Assessment prepared that identified wildfire risks at the Project site, including ignition risks), 2881 et seq. (Project site is in a "Very High Fire Hazard Severity Zone;" and discussing together the ignition risks and recommended fire prevention measures such as creating buffer zones along the parcel, developing the land and considering undergrounding electric utility services, placing developed park features to contain wildfire, providing improved fire-safe parking, adding on-site volunteer, maintenance staff and a park ranger, and clearing vegetation), 2310 et seq. (discussing expected wildfire behavior, site development risk factors, and discussing risks and measures together); 2340 et seq. (fire evacuation analysis and assumptions), and 2374 et seq. (defensible space requirements letter).*
>
> *Here, the EIR states the measures will reduce wildfire risk to less than significant levels. Importantly, though, the EIR is missing information on how it analyzed the effectiveness of the proposed measures. There is no analysis of how ignition rates will be reduced by the proposed wildfire measures. Reply at p.18, citing Bonta, supra,105 Cal.App.5th at 1233 (an adequate analysis may include the number of ignitions that occur and how that rate has reduced with the proposed wildfire safety measures). Because the EIR does not separately analyze the significant impacts of the fire risk and its baseline existing conditions before it proposed mitigation measures but instead treats the impacts analysis and mitigation measures as one issue, the EIR's wildfire analysis is deficient under CEQA.*

4 Response to the Court's Order

To respond to the Court's order, this technical memorandum has been prepared to provide:

1. A summary of the prior analysis and additional details on consistency analysis with applicable fire regulations
2. Additional analysis to respond to the Court's order, including:
   - A description of the existing baseline wildfire risks at the project site under existing environmental conditions;
   - An analysis of the wildfire risks associated with implementation of the project in the absence of mitigation, assuming the project complies with all applicable provisions of the San Diego County Code of Regulatory Ordinance and the 2025 California Building Standards Code, including wildland-urban interface, building, and fire code requirements for construction and fire prevention and protection[1]; and
   - An analysis of the wildfire risks associated with implementation of the project, when additional fire prevention measures are included.

4.1 Summary of Prior Analysis and Additional Details on Consistency Analysis with Applicable Fire Regulations

4.1.1 Review of the Fire and Emergency Operation Assessment Technical Report

The first step to determine the type of additional analysis needed to respond to the Court's order was to review the existing Fire and Emergency Operation Assessment (FEOA) for consistency and compliance with the requirements for such assessments. A commonly used term for the FEOA prepared for the project is fire protection plan (FPP). The San Diego County Fire Protection District (SDCFD) in cooperation with the County of San Diego Land Use and Environmental Group, Planning and Development Services (County of San Diego 2024) has developed Fire Protection Plan Guidelines for Consultants (Guidelines). These guidelines inform approved consultants as to the type, scope, and contents of the fire protection plan needed for a project based on established criteria. The guidelines note that a fire protection plan "is a document that describes the level of fire hazard that would affect or be caused by a proposed development and the methods proposed to minimize or mitigate that hazard" (Guidelines pg. 114). The guidelines further note that a fire protection plan "is also required by County Policy found in the Safety Element, Chapter 7 and is used to demonstrate fire safety compliance in accordance with requirements of the California Environmental Quality Act" (Guidelines pg. 114).

[1] This project is in a Very High Fire Hazard Severity Zone, so there is no scenario where the project could be legally built without building and fire code requirements in place. As such, it is not possible to separate the project from these code requirements, some of which also function as fire prevention measures. Because these compliance requirements are legally required and cannot be removed from the project design, they are not mitigation measures, and an analysis of the project's "pre-mitigation" wildfire risks therefore includes mandatory fire prevention measures. Additional fire prevention measures beyond code compliance would only be considered mitigation measures if they were necessary to reduce impacts to a less than significant level (i.e. if the impact would be significant in their absence).

An FPP can be one of two formats approved by SDCFD depending on the level of hazard of the project site. A Full Report FPP is required for projects located within areas designated by the State Fire Marshal as a High Fire Hazard Severity Zone (HFHSZ) or a Very High Fire Hazard Severity Zone (VHFHSZ). Projects with an occupant load of 100 or more and projects where the site has topographic, geographic, and/or combustible vegetation conditions that require detailed review and analysis, regardless of a fire hazard severity designation, also require a Full Report FPP. A Letter Report FPP is typically required "for infill projects with no wildlands in the immediate vicinity or low hazard commercial projects in Moderate Fire Hazard Severity Zones" (Guidelines pg. 115). In accordance with these guidelines and requirements, a Full Report FPP was prepared for the project in 2021 by Rhode & Associates.

A Full Report FPP is required by SDCFD to follow prescribed formatting and address all the following elements:

- Wildfire hazard and risk assessment
- Siting of development
- Housing density considerations
- Construction
- Access, egress, and evacuation planning
- Water sources for firefighting
- Subdivision landscaping and vegetation management
- Protection of critical infrastructure
- Emergency Services - Availability and Travel Time

A critical aspect of conducting a wildfire hazard and risk assessment, according to the guidelines, is completing a fire fuel assessment using a recognized fire behavior model to provide a wildfire behavior assessment (Guidelines pgs. 115 and 127). A wildfire behavior assessment is a "summary narrative of wildfire behavior [that] includes discussion of wind, spotting potential, fire trajectory, fuel beds, topographical influences, and major fire history for the site and nearby areas" (Guidelines pg. 155). The guidelines state that "modeling origins and trajectories must be specific to the development site, reflect average-worst-case wildfire behavior, [and include] results that report: fireline intensity, average and maximum rate of spread, ember spotting distance, wind direction, fuel type, slope, and fuel moisture" (Guidelines pgs. 155-156).

In reviewing the Full Report FPP prepared for the project, referenced herein as FEOA, Dudek determined that the FEOA contains all required elements, including a wildfire behavior assessment using a recognized fire behavior model. Therefore, it was determined that the FEOA does not need to be wholly updated. Rather, an analysis of the project's baseline existing conditions compared to the project with and without additional fire prevention measures that exceed code requirements is needed as a supplement to the FEOA to provide evidence of the effectiveness of the project's proposed fire prevention measures. This technical memorandum serves that purpose.

4.1.2 Review of the 2023 FEIR

Section 4.9, *Hazards and Hazardous Materials* of the 2023 FEIR addressed risk of loss, injury, or death due to wildfire under Threshold 7. The discussion was based on the FEOA prepared for the project, which identified wildfire and ignition risks at the project site and rules and project design features that would minimize those risks. Similarly, FEIR Section 4.20, *Wildfire*, analyzed wildfire risks under Threshold 2. The analysis described best management practices, rules, and project design features intended to manage potential ignition sources and fire spread. Several

commenters on the Draft and Recirculated Draft EIRs (including the California Department of Fish and Wildlife [Letter A4]; the San Diego Chapter of the California Native Plant Society, Sierra Club San Diego Chapter, and Environmental Center of San Diego [Letter O2]; Preserve Alpine's Heritage [Letter O8], and various individuals) expressed concerns about wildfire risk, including the project's proposed fuel modification, ignition potential, and analysis of project design features. The County concluded that the project's design features and wildfire controls would prevent significant wildfire impacts and no substantive revisions to the wildfire risk impact analysis or conclusions were made.

4.1.3 Review of California Office of the Attorney General Guidance

In 2022, the California Office of the Attorney General issued guidance outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA). The guidance is not regulatory in nature and does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations. Rather, it is intended to provide guidance on some of the issues, alternatives, and mitigation measures that should be considered during the environmental review process. This guidance is based on the Office of the Attorney General's experience reviewing, commenting on, and litigating CEQA documents for projects in high wildfire prone areas, and is intended to assist lead agencies with their planning and approval of future projects. Specifically, the Attorney General's guidance requires a description of baseline conditions; encourages an EIR to qualitatively assess wildfire hazard and risk variables through modeling, to the extent feasible; and provides potential project measures to reduce wildfire risk.

The Attorney General had not yet issued the guidance when the FEOA and EIR sections were originally prepared. Attachment 3, Analysis of Attorney General's Guidance, provides a summary of the guidance and an analysis of the EIR's compliance with the applicable points of guidance. It is included in this technical memorandum to further demonstrate that the EIR and its supporting technical documents have considered all potential impacts related to wildfire.

4.2 Additional Analysis to Respond to Court's Order

4.2.1 Methodology

This technical memorandum provides a supplemental analysis to demonstrate the effectiveness of the project's proposed fire prevention measures by comparing the project site's baseline existing conditions to two project conditions: 1) the project with an active park, including only the fire prevention measures required by code, and 2) the project with an active park, including both the required measures and additional measures selected by the County. In other words, this analysis explains why the project, including its proposed fire prevention measures, would effectively reduce wildfire hazards compared to the existing baseline condition.

As described in the following sections, the project includes vegetation fuel modification fire prevention measures (such as vegetation clearing) and human activity fire prevention measures (such as the prohibition of smoking and open flames) to reduce the risk of wildfire ignition and spread. This two-pronged approach to fire prevention requires a two-pronged analysis, as fire behavior can be quantitatively predicted and modeled, while human behavior cannot. The resulting approach to the quantitative and qualitative analyses are described further below.

4.2.1.1 Vegetation Fuel Modification

The three major components of fire environment are topography, vegetation (fuels), and climate. The condition of each of these components and their interactions with each other determine the potential characteristics and behavior of a fire at any given moment. Wildland fire may transition to urban fire if structures are receptive to ignition. Inversely, under extreme conditions, it is possible for structure fires to transition into wildland fires. This is more likely to occur when multiple structures are burning simultaneously and in close proximity to receptive wildland fuels.

- Regarding topography, the proposed project site is primarily flat, while adjacent Wright's Field Preserve lands are more sloping and contoured. The proposed project would not change the topography of the site, which would remain primarily flat and similar to existing conditions in all three project analysis sections (Sections 4.2.2 through 4.2.4): existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures.
- Regarding vegetation (fuels), variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, non-native grass-dominated plant communities become seasonally prone to ignition under dry conditions and produce lower intensity, higher spread rate fires. In comparison, sage scrub and chaparral vegetation communities can produce higher heat intensity and higher flame lengths under strong, dry wind patterns, but do not typically ignite or spread as quickly as light, flashy grass fuels. Unlike wildfires in shrub and forest vegetation, grass fires are generally more easily contained and require fewer resources and planning to achieve fire containment. While grassland fires may spread rapidly and are influenced heavily by wind, fires in shrub and forest vegetation involve higher intensity fire behavior, present greater risk to structures, and often more difficult control measures. Vegetation hazards are analyzed quantitatively in the three project analysis sections below: existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures.
- A rapidly warming climate is expected to impact California and the western United States directly and indirectly. The project is a park that would not result in significant climate emissions, so climate conditions in all three project analysis sections (existing baseline condition, project with required fire prevention measures, and project with additional fire prevention measures) remain relatively consistent.

As indicated above, there would be no change in topography or climate change as a result of the project, and vegetation is the only fire environment component that differs among the three project analysis scenarios. Therefore, each section includes an analysis of vegetation (fuels). An overview of research related to the effectiveness of vegetation fuel modification is provided below.

4.2.1.1.1 Vegetation Fuel Modification Research

While the original intent of implementing vegetation fuel modification was to protect natural resources from fires originating in developed areas, vegetation fuel modification has since evolved to protect communities and structures from wildfire post-ignition. Vegetation fuel modification, like that proposed by the project, reduces the fire risk on a landscape by altering the interaction between fire, fuels, and weather (Cochrane et al. 2012). Vegetation fuel modification typically targets surface fires but can also reduce the likelihood of canopy fires, lower ember cast, and have an ancillary effect on the untreated landscape by lowering the probability of burning and the potential fire size (Cochrane et al. 2012) if ignited. Project-specific vegetation fuel modification zones are crucial as the strategic design and placement of fuels treatments can disrupt or slow fire spread, reduce fire intensity, and facilitate fire suppression (Braziunas et al. 2021). When fuel modification zones are designed properly, they protect homes as well as the surrounding environment.

For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival (Safford et al. 2009). In areas where fuel management had been conducted prior to the Angora Fire, home loss was substantially reduced in the adjacent community and 85% of the trees survived, as compared to the 22% tree survival rate in untreated areas (Safford et al. 2009). More recently, the Insurance Institute for Business and Home Safety (IBHS) conducted a post-event damage investigation into the 2025 Palisades and Eaton fires in Los Angeles County. The research found that reducing hazardous vegetation through the use of fuel modification zones helps limit fire spread (IBHS 2025).

However, converting natural vegetation to managed landscaping and defensible space does not entirely reduce the potential for ignitions. Instead, defensible space landscaping reduces the risk and likelihood of an on-site ignition becoming an off-site wildfire by reducing the fire intensity and rate of spread by replacing dense, fire-prone, volatile natural vegetation with managed landscaping and vegetation fuel modification zones. Therefore, the risk of a wildfire resulting from an on-site ignition can also be reduced by a landscaping plan that converts hazardous, more easily ignited vegetation fuels to irrigated landscaping that consists of fire- and ignition-resistant plants strategically located to reduce fire spread.

4.2.1.1.2 Vegetation Fuel Modification Code Requirements

The FEOA documents the requirements for vegetation fuel reduction and the establishment of fuel modification zones, which are identified in the FEOA as Fuel Modification Zone A and Fuel Modification Zone B. The requirements for Zone A and Zone B at the time the FEOA was prepared were:

> Fuel Modification Zone A – Code-compliant fuel modification around the Alpine Park facility per fire and building code requirements, with the goal of 100 percent fire exclusion from the project site. The objective of landscape replacement in Zone A will be to eliminate the potential for wildfire occurrence through establishment of a fire-resistive landscape around principal park facilities and structures at the minimum distances required by code. This has been designed through the proposed landscape around sports fields and buildings, subject to AFPD Fire Marshal review and approval during the permitting process (Rohde and Associates 2021).
>
> Fuel Modification Zone B – Fuel reduction shall occur adjacent to Zone A along property lines, where practical, and around key public facilities such as the parking areas, equestrian staging areas, and similar locations. Fuel modification in Zone B should be designed to achieve fire

> prevention goals while maintaining viable habitat and preserving ecological values. The objective of fuel treatment in Zone B is to achieve at least a 75 percent reduction in fire-line intensity from a wildfire moving from native fuels into a constructed fuel modification zone. The County will implement a 100-foot fuel reduction area extending from the volunteer pad under Zone A and Zone B compliance (Rhode and Associates 2021).

Subsequent to the approval of the FEOA, San Diego County adopted and amended the 2025 California Wildland-Urban Interface Code that designates fuel modification Zones 0, 1, and 2, which are the fuel modification zones currently required. The requirements for those fuel modification zones include:

> Zone 0 “Immediate Zone” 0-5 feet - Meaning from exterior wall surface or patio, deck or attachment to building or structure extending 5 feet on a horizontal plane. This zone shall be constructed of continuous hardscape or non-combustible materials. Removal of combustible materials surrounding the exterior wall area and maintaining area free and clear of combustible materials. The use of mulch and other combustible materials shall be prohibited.
>
> Zone 1 “Intermediate Zone” from Zone 0 to 50 feet - Meaning from the immediate edge of Zone 0 extending out in a horizontal plane. This zone shall consist of planting of low growth, drought tolerant and fire resistive plant species. The height of the plants in this zone starts at 6” adjacent to Zone 0 and extending in a linear fashion up to a maximum of 18” at intersection with Zone 2. Vegetation in this zone shall be irrigated and not exceed 6’ in height and shall be moderate in nature as per Sec. 603.4. Firewood inside this zone shall be piled a minimum of 30’ away from all buildings and structures. Cords of firewood shall also be maintained at least 10’ from property lines and not stacked under tree canopies drip lines.
>
> Zone 2 “Extended Zone” from Zone 1 to 100 feet - Meaning from the immediate edge of Zone 1 extending out in a horizontal plane for 50’. This zone consists of planting of drought tolerant and fire resistive plant species of moderate height. Brush and plants shall be limbed up off the ground, so the lowest branches are 1/3 height of bush/tree/plant or up to 6’ off the ground on mature trees. This area would be considered selective clearing of natural vegetation and dense chaparral by removing a minimum of 50% of the square footage of this area.

4.2.1.1.3 Vegetation Fuel Modification Analysis Approach

The below analysis is presented in three sections: existing site conditions and management strategies already in place that would remain with or without the project (Existing Baseline Condition); project with fire prevention/ management strategies required per building and fire code requirements, which are mandatory features that the project cannot legally exclude (Project With Required Fire Prevention Measures), and project with additional fire prevention measures proposed by the County (Project With Additional Fire Prevention Measures).

The fire behavior analysis for this project used the BEHAVE fire behavior modeling software, which was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. The BEHAVE fire behavior modeling software has become the most widely used and industry-standard model for predicting fire behavior on a given landscape. Since its inception, the model has undergone continued research, improvements, and refinement. BehavePlus the current iteration of the software, was used to model fire behavior for this project.

Dudek modeled four fire behavior scenarios for the existing baseline condition, as discussed in Section 4.2.2. While the modeling software does not predict future wildfire ignition locations or causes, the selected scenarios model likely ignition types and locations under specific circumstances, which are the model inputs, where an off-site wildfire burns onto the project site. Likely ignition types/causes and locations relevant to the project site were determined by analyzing data collected via fire investigation reports. The project site was then surveyed to determine the types of vegetation fuels that exist in those locations. Statistically significant ignition causes and locations were used to determine where a fire could start in or near the project site. BehavePlus then analyzes fuels along with weather inputs to predict fire behavior after an ignition.

Fire behavior was analyzed using the inputs required by SDCFD and AFPD. The previously referenced Guidelines state that users of the BehavePlus prediction system must be careful to input accurate data into the system so that accurate fire behavior forecasting is created. To ensure accuracy and consistency, SDCFD created charts that aggregated 20 years of average monthly weather data for San Diego County. The charts include temperature, relative humidity, and wind speed inputs that appropriate for fire behavior modeling in San Diego County using BehavePlus (Guidelines pgs. 159-163).

In addition to the existing baseline condition, fire behavior modeling of the four scenarios was also conducted with vegetation fuel modification and analyzed for two conditions in Sections 4.2.3 and 4.2.4, respectively: 1) the project if it were to include only the fire prevention measures required by the building and fire codes, including SDCFD and AFPD requirements and 2) the proposed project with the required measures and two additional measures, including a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer along the park footprint and a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel. This analysis provides the information necessary to compare existing baseline and with-project wildfire behavior conditions and determine whether the two additional buffers not required by existing regulations are necessary to support the less-than-significant wildfire impact conclusion (i.e. if the buffers are mitigation measures, or if they are simply features of the project that would further reduce wildfire risk but are not mandatory to achieve a less-than-significant determination under CEQA). All of the fire prevention measures, including the code requirements and the additional buffers, are proposed components of the project's design.

The BehavePlus modeling software determines fire behavior given a specific vegetation fuel under specific weather conditions. For example, it can calculate expected flame lengths in non-native grassland in winds of 10 miles per hour. However, BehavePlus does not analyze fire progression over time and across various vegetation fuels; for example, it does not calculate how the fire would change if it moved from non-native grassland to oak woodland. The project's proposed buffers involve vegetation modification that would trim or thin existing vegetation but would not remove the vegetation entirely (i.e. the vegetation fuel type within the buffer is the same with or without the fuel modification). The analysis of the vegetation modification within the additional buffer areas (which exceeds code requirements) compares fire behavior in the existing buffer vegetation to fire behavior in vegetation that is trimmed, thinned, or removed/replaced through management as a buffer zone fire prevention measure as proposed for the project. This allows for a comparison of wildfire hazard and risk for both conditions, which are described in Section 4.2.3 (implementing only the fire prevention measures required by code and leaving the existing natural vegetation cover within the additional buffer areas as it currently exists) and Section 4.2.4 (exceeding code requirements to modify the vegetation fuels in the additional buffer areas as proposed for the project).

4.2.1.2 Human Activity

As described under the Vegetation Fuel Modification section above, Dudek modeled four fire behavior scenarios for both existing conditions and vegetation modification conditions. Statistically significant ignition causes and locations were used to determine where a fire could start in or near the project site. However, as with other fire behavior modeling programs, BehavePlus does not *predict* wildfire ignition locations or causes, which are elements of human behavior. Therefore, the scenarios modeled cannot predict fire ignition caused by human activity. Because human activity related risks cannot be predicted and quantified by the modeling software, additional research was undertaken to assess effective means of reducing human related ignition risk. Proposed project fire prevention measures were then analyzed qualitatively to demonstrate effectiveness of the measures.

4.2.1.2.1 Human Activity Research

Humans and human-related activities are responsible for the majority of California wildfires (Syphard et al. 2007, 2008; Romero-Calcerrada et al. 2008). Recent research has determined that approximately 84% of wildfires in the United States are human caused (Balch et al. 2017). Urban interfaces with shrubland-dominated vegetation were found to be more fire-prone than those with grasslands or other natural spaces (Elia et al., 2019). Common ignition sources in Southern California are related to powerlines and vehicles (Keeley & Syphard 2018). Powerline-based ignitions are a concern with respect to off-site ignitions that could result in a wildfire progressing onto the project site. Certain everyday human activities often result in sparks, flames, or heat that may ignite vegetative fuels without proper prevention measures in place. These ignitions predominantly occur as accidents, but may also be purposeful, such as in the case of arson. While there is a relationship between population and fire ignitions, there is not a direct per capita correlation between population and fire ignitions. Research by Bistinas, et. al. (2013) shows that overall, the relationship between population density and wildfires does not have a consistent increase or decrease. Burned area initially increases with population density and then decreases when population density exceeds a threshold.

The US Forest Service asserts that the prevalence of human-caused ignitions, combined with the percentage of ignitions arising from discretionary behaviors such as recreational fires, use of open flames for outdoor cooking or ceremonial purposes, and smoking, point to opportunities for wildfire prevention and education efforts to reduce the risk of wildfires resulting from discretionary ignitions (USFS 2025). Research conducted by Edgeley, et al (2025) supports the position of the US Forest Service by documenting best practices that have resulted in fewer fire ignitions. Edgeley summarizes the research by finding that, “Effective interventions to prevent human-caused ignitions on public lands play a critical role in social and ecological adaption to wildfire.”

According to the research, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement (Edgeley, et al 2025). The research found that “scientists consistently underscore the interconnectivity between enforcement and education, often suggesting that enforcement should be a last resort in instances where education may resolve unwanted behaviors.” Among the recommended best practices for the use of education and enforcement in reducing fire ignitions are:

- Prioritizing educational outreach over enforcement to address illegal activities that result from a lack of knowledge or understanding.
- Increasing strategic patrolling, especially during periods of high fire risk, as patrolling is often connected to a meaningful decrease in illegal ignitions.

- Leveraging enforcement interactions as educational opportunities when issuing tickets, fines, or otherwise making contact with members of the public engaged in prohibited activities that can result in unwanted ignitions.
- Communicating the difference between law enforcement officers and park rangers to improve public relationships with residents and park patrons.
- Providing explicit messaging about what is and is not allowed to reduce confusion that may arise from public agency terminology.

4.2.1.2.2 Human Activity Code Requirements

In addition to the vegetation fuel modification code requirements described above, the project would be required to comply with the requirements in the San Diego County Code of Regulatory Ordinances, which contains enforceable regulations governing activities within the County's jurisdiction. The following sections regulate human activity that could result in fire ignition:

SEC. 41.117. WEAPONS AND FIREWORKS.

(a) It shall be unlawful for a person to possess any of the following in a County park: "explosives," as defined in Health and Safety Code section 12000, "fireworks," as defined in Health and Safety Code section 12511, a "firearm" as defined in Penal Code section 12001, an air gun, bow or crossbow, slingshot, paintball gun, blowgun or throwing knife.

(b) The Department may, however, grant written authorization:

(1) To a group to practice archery in a designated area of a County park.

(2) To allow bows and arrows to be carried during an historical reenactment.

(3) To allow "antique firearms," as defined in 18 U.S.C. section 921(a)(16), to be carried and discharged using blank ammunition, during an historical reenactment, upon satisfactory proof that all State and federal firearms regulations have been and will be complied with.

(4) To allow a mentored, juniors-only turkey hunt for up to 20 juniors and their mentors, using shotguns or bows and arrows, at Santa Ysabel East Preserve for a maximum of two days per year during a State-established juniors-only turkey hunting season, subject to all applicable State and federal laws and regulations.

(5) To allow the possession and use of a firearm or any other weapon listed in subsection (a) above to control any invasive, non-native animal in a County park that the Director determines is causing significant damage to the environment including, but not limited to, native plants and/or animals, provided the authorization complies with all applicable federal and state law. The authorization may include conditions to ensure the safety of the public, including, but not limited to a limit on the time when and/or the area where the person may possess and use the firearm, and specification of the type of firearm or weapon that may be used. Before granting an authorization, the department shall consider the environmental resources in the area where the animal is likely to be found. The authorization shall include conditions to protect any significant environmental resources, including sensitive plants or animals, in that area.

(c) The prohibition on the possession and use of a firearm in subdivision (a) above does not apply to the following persons when acting in the course and scope of their employment: any peace officer as defined

by state law, any federal law enforcement officer including, but not limited to, an employee of U.S. Customs and Border Patrol, or any other governmental employee or his or her agent who is authorized to carry a firearm.

SEC. 41.118. FIRE HAZARDS.

It shall be unlawful for any person in a County park to:

(a) Ignite a fire, except in a designated campfire ring or barbecue provided by the County when campfires or cooking are allowed by park rules or as specifically authorized by a park ranger.

(b) Ignite a fire when the County has given the person notice that the geographic area in which the park is located is subject to a red flag warning issued by the National Weather Service or the Director of Parks and Recreation has determined that it is not safe to start a fire.

(c) Discard any lighted tobacco product or any burning or combustible material or other thing that could set fire to grass, shrubs, buildings or any other combustible substance.

SEC. 41.118.5. SMOKING.

It shall be unlawful for any person in a County park to carry a lighted pipe, cigar, or cigarette; to use an electronic smoking device or other smoking device, containing tobacco or any other substance; or to light, smoke, activate, or in any way use a pipe, cigar, cigarette, or electronic smoking device or other smoking device, containing tobacco or any other substance.

4.2.1.2.3 Human Activity Analysis Approach

Along with the vegetation fuel modification analysis, an analysis of fire risks associated with human activity is presented in the three sections below: existing management strategies already in place that would remain with or without the project (Existing Baseline Condition; Section 4.2.2); project with fire prevention/management strategies required per code requirements, which are mandatory features that the project cannot legally exclude (Project With Required Fire Prevention Measures; Section 4.2.3), and project with additional fire prevention measures proposed by the County (Project With Additional Fire Prevention Measures; Section 4.2.4).

In Sections 4.2.2 through 4.2.4 below, the effectiveness of the human activity fire prevention measures is assessed qualitatively based on site-specific conditions, code requirements, and the research presented above. The analysis in Section 4.2.2 below considers the existing human activity measures in place on the project site. The analysis in Section 4.2.3 assumes the implementation of the code requirements listed above, while the analysis in Section 4.2.4 also includes additional site-specific human activity measures selected by the County.

4.2.2 Existing Baseline Condition

This section establishes the existing conditions on the project site to provide a baseline for comparison with the analyses presented in Sections 4.2.3 (project with required fire prevention measures) and 4.2.4 (project with additional fire prevention measures).

4.2.2.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks.

4.2.2.1.1 Vegetation Fuel Modification Measures

- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.2.1.2 Human Activity Measures

- EXISTING: Small swing gate as a vehicle control barrier.
- EXISTING: Weekly checks of the project site by rangers.

4.2.2.2 Analysis

4.2.2.2.1 Vegetation Fuel Modification Measures

Per the Court order and Attorney General Guidance, the following analysis addresses existing fire behavior in the project vicinity in the baseline condition. Four wildfire scenarios were modeled to analyze fire behavior in existing conditions, as described in Section 4.2.1 above. Table 1, Existing Vegetation Baseline Conditions Fuel Model Characteristics, describes the fuel types currently existing on the project site, which are used in the analysis below. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario.

Table 1. Existing Vegetation Baseline Conditions Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet) [1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
GS1	Low load dry climate grass- shrub	Represents the grass and sparse shrubs on the hillside in the off-site run to the west.	0.9 ft
GS2	Moderate load dry climate grass- shrub	Represents the vegetation in the areas in the northern portion of the project site.	1.5 ft
SH2	Moderate load dry climate shrub	Represents the shrub-brush in the northern portion of the project site and on the hillside in the off-site run to the west.	1 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 14.9 feet, have a fireline intensity of up to 2,029 BTU/feet/second, have a rate of spread of up to 4.1 mph, and produce ember spotting up to 1.0 mile.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 5.9 feet, have a fireline intensity of up to 266 BTU/feet/second, have a rate of spread of up to 0.8 mph, and produce ember spotting up to 0.3 miles.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Results: Expected to produce flame lengths up to 18.1 feet, have a fireline intensity of up to 3,071 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 7.1 feet, have a fireline intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

4.2.2.2.2 Human Activity Measures

The small swing gate currently restricts vehicle access to the project site at that location, reducing the potential for ignitions resulting from vehicle activity in vegetation fuels. However, there is no daily on-site enforcement presence to ensure that unrestricted pedestrian or vehicle access to the site is not occurring elsewhere. As described in Section 4.2.1, vehicles and associated human presence are a common ignition source in vegetation fuels. Vehicle malfunctions that result in sparks and/or exhaust system components contacting vegetation can result in vegetation fires.

As described in Section 4.2.1, patrolling is known to reduce illegal activities and presents an opportunity for education about wildfire risk and reduction. It can be concluded that weekly ranger checks currently reduce illegal activity, such as smoking, that has potential to cause ignitions. However, as described above, there is no daily on-site educational or enforcement presence to ensure that illegal activities are not conducted on the project site when rangers are not patrolling.

4.2.2.3 Conclusion

Under existing conditions, the project site and adjacent off-site areas consist primarily of annual grasslands and grass-shrub vegetation, which are highly receptive to ignition and rapid fire spread, particularly during offshore Santa Ana wind events. As described above, four wildfire scenarios were modeled, including on-site and off-site ignitions under both extreme offshore and average onshore wind conditions. Modeling results demonstrate that, under existing conditions, wildfire behavior could be severe.

During average onshore summer weather with 19-mph sustained winds, fires are expected to produce flame lengths of up to approximately 7.1 feet, fireline intensities of up to 402 BTU/feet/second, rates of spread of up to 1.2 miles per hour, and ember spotting distances of up to 0.3 miles. During extreme offshore Santa Ana wind events with 28-mph sustained winds and 41-mph wind gusts, fire behavior is substantially more extreme, with modeled flame lengths of up to approximately 18.1 feet, fireline intensities up to 3,071 BTU/feet/second, rates of spread up to 6.2 miles per hour, and ember spotting distances of up to 1.1 miles.

As noted in the FEOA, the project site is currently subject to occasional unauthorized vehicular and pedestrian public access to and within hazardous vegetation fuels, making it vulnerable to potential smoking, vehicle, or other ignition hazards that increase wildfire risk. The current use of the undeveloped land, including occasional unauthorized access, places the project area at risk for fire ignitions associated with both natural events and human activities.

4.2.3 Project with Required Fire Prevention Measures

This section analyzes wildfire impacts of building the project with only the fire prevention measures required by the relevant codes, including applicable wildfire, building, and fire codes and the County Code of Regulatory Ordinances. Each of these code requirements is described in detail in Section 4.2.1. These are the minimum requirements to obtain approvals to build that the project cannot legally exclude. There is no scenario where the project could be built without incorporating these mandatory fire prevention measures.

4.2.3.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks as well as the measures that would be implemented to meet minimum code requirements:

4.2.3.1.1 Vegetation Fuel Modification Measures

- REQUIRED BY CODE: Creating a 100-foot vegetation buffer, as part of the project, that would extend outward in all directions from the volunteer pad.
- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.3.1.2 Human Activity Measures

The project site is currently open space owned by the County but is not a designated park, preserve, or other public amenity with authorized public access. The project would turn the project site into a park, implementing and enforcing applicable County Code of Regulatory Ordinances on the project site.

- REQUIRED BY CODE: Prohibit the use of barbecues when a Red Flag Warning has been issued (County Code of Regulatory Ordinances Section 41.118).
- REQUIRED BY CODE: Prohibit smoking (County Code of Regulatory Ordinances Section 41.118.5).
- REQUIRED BY CODE: Prohibit the use, transport, carrying, firing, or discharging any fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind across, in, or into the park except as authorized under Section 41.117 of the County Code of Regulatory Ordinances (County Code of Regulatory Ordinances Section 41.117).
- EXISTING: Small swing gate as a vehicle control barrier.
- EXISTING: Weekly checks of the project site by rangers.

4.2.3.2 Analysis

4.2.3.2.1 Vegetation Fuel Modification Measures

The same four wildfire scenarios were re-analyzed for the project with vegetation fuel modification applied as required by SDCFD and AFPD. The vegetation fuel modification in the additional 20-foot buffer areas proposed by the County is excluded from this analysis by assuming the vegetation in the buffers remains unmaintained flat-topped buckwheat (GR2) in Table 2, Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics. The below results are for a hypothetical situation in which the project is developed with only the required fire prevention measures, which do not include the project's proposed vegetation fuel modification in the additional 20-foot buffer areas.

Table 2 presents the fuel modification assignments assumed in the analysis. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario.

Table 2. Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 18 feet, have a fire intensity of up to 3,037 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

The scenarios above model a condition in which existing hazardous vegetation fuels are converted to maintained landscaping and vegetation fuel modification zones that meet code requirements. As described above, this condition does not include vegetation modification in the 20-foot buffer areas, which is not required by code. The fire behavior modeling for this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling. Flame lengths, fire intensity, rate of spread, and ember spotting distance in the additional buffer areas (included in Scenario 3) would remain 18 feet; 3,037 BTU/feet/second; 6.2 mph; and 1.1 miles, respectively, the same as the existing condition. Flame lengths in areas with vegetation modification would be reduced by approximately 4.6 to 12 feet depending on the location. Similarly, fire intensity in the fuel modification areas would be reduced by up to 3,008 BTU/feet/second; rate of spread would be reduced by up to 4 mph; and ember spotting distance would be reduced by up to 0.8 miles. Therefore, the modeled vegetation fuel modification scenarios show the project with required fire prevention measures reduce flame length, fireline intensity, spread rate, and ember spotting distance when compared to existing baseline conditions.

4.2.3.2.2 Human Activity Measures

As described above, the project would turn the project site into a park introducing more human activity at the site but also implementing and enforcing applicable County Code of Regulatory Ordinances on the project site. The project is estimated to have 300-500 visitors per day at full facility build-out. This usage could increase to 1,000 visitors per day on weekends and up to 2,000 per day during special events.

With the required vegetation fuel modification measures proposed to be in place prior to increasing human activity to the area, less fuel would be available for human activity related ignition risks. Additionally, the code required measures, including prohibition of smoking (County Code of Regulatory Ordinances Section 41.118.5), barbecues during Red Flag Warnings (County Code of Regulatory Ordinances Section 41.118), and fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind (County Code of Regulatory Ordinances Section 41.117), would reduce the potential for human caused ignitions on the project site. Enforcement would be supported by the weekly ranger visits already occurring on the project site and on-site signage, which provide opportunities for visitor education about wildfire risk. However, weekly visits are not expected to be able to prevent occasional unauthorized public use. While the project proposes live-on staff, it is assumed that under this hypothetical analysis condition, there would be no daily on-site enforcement presence to ensure that education and enforcement of rules regarding smoking and barbecues would be consistently implemented. This is an unlikely condition and not consistent with management practices for typical County parks. However, the condition is provided to disclose the project's fire risks prior to proposing additional fire prevention measures.

As described in Section 4.2.1, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement. On-site signage would inform visitors about the prohibited activities on the project site, and continued weekly ranger visits would result in interactions with an increased number of visitors, creating opportunities for rangers to educate more visitors about the fire dangers associated with prohibited activities. The effectiveness of these continued and code required human activity measures is corroborated by the research conducted in Section 4.2.1 above.

4.2.3.3 Conclusion

Overall, the modeling results above show that building the project results in a reduction of potential fire activity and fire risk within the project site compared to existing baseline conditions. This is primarily because the existing baseline conditions include more fire prone grassland habitat compared to this project with required fire prevention measures condition, which will change the habitat type from fire prone vegetation to developed areas.

While the potential wildfire activity within the project site is reduced with the project compared to existing baseline conditions, the project is anticipated to lead to additional human presence at the site, which could increase fire risk by introducing additional opportunities for human-caused fire ignitions. However, the project would be subject to the restrictions in the County Code of Regulatory Ordinances, which prohibits ignition sources such as smoking or fireworks. On-site signage would inform visitors about the prohibited activities on the project site. The existing weekly ranger checks would enforce these prohibitions using clear communication and direct verbal warnings, which would also present opportunities for education about fire dangers. Ongoing enforcement, education, and signage would increase public awareness about the restrictions on the project site, minimizing ignition potential even when rangers are not present.

Through the combined vegetation fuel modification conditions and human activity measures required to implement the project, the project will reduce the risk of ignition for the nearby homes and provide an area of decreased fire behavior that will make fire containment and suppression more manageable for firefighters than the existing baseline conditions. The project would implement all defensible space and vegetation fuel modification required by the applicable codes and regulations, and the project's impact with regard to wildfire risk would be less than significant with no mitigation required.

4.2.4 Project with Additional Fire Prevention Measures

This section analyzes wildfire impacts of building the project with additional vegetation fuel modification and human activity fire prevention measures proposed by the County that exceed code requirements. Like Section 4.2.3 above, this analysis assumes the project complies with all applicable wildfire, building, and fire code requirements that would be needed to obtain approvals to build.

4.2.4.1 Fire Prevention Measures

This analysis considers the following vegetation fuel modification and human activity related activities currently occurring on site to monitor and minimize wildfire risks, measures that would need to be implemented to meet minimum code requirements, and additional vegetation fuel modification and human activity measures proposed by the County to minimize fire risk and management.

4.2.4.1.1 Vegetation Fuel Modification Measures

- ADDITIONAL MEASURE: An additional 20-foot buffer adjacent to the existing 30-foot buffer along the park footprint for a total of 50 feet of reduced vegetation cover.
- ADDITIONAL MEASURE: An additional 20-foot buffer adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel.
- REQUIRED BY CODE: Creating a 100-foot vegetation buffer, as part of the project, that would extend outward in all directions from the volunteer pad.
- EXISTING: Continued maintenance of an existing 30-foot buffer where vegetation has been cleared adjacent to the roadside along the County property, which has been historically cleared and is required by AFPD, and is not part of this project.
- EXISTING: Continued maintenance of a historically cleared and existing 100-foot buffer where vegetation has been cleared where there are adjoining properties along the northern boundary of the County-owned parcel, which is required by AFPD and is not part of this project.

4.2.4.1.2 Human Activity Measures

The existing human activity measures (small swing gate and weekly ranger checks) would be replaced by the additional measures below, which provide enhanced vehicle control barriers and a more regular enforcement presence.

- ADDITIONAL MEASURE FOR PROJECT: Strengthening the vehicle control barriers and providing improved fire-safe parking.

- ADDITIONAL MEASURE FOR PROJECT: A live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property.
- ADDITIONAL MEASURE FOR PROJECT: Prohibit campfires and open flames.
- ADDITIONAL MEASURE FOR PROJECT: Prohibit overnight use of the park.
- REQUIRED BY CODE: Prohibit the use of barbecues when a Red Flag Warning has been issued (County Code of Regulatory Ordinances Section 41.118).
- REQUIRED BY CODE: Prohibit smoking (County Code of Regulatory Ordinances Section 41.118.5).
- REQUIRED BY CODE: Prohibit the use, transport, carrying, firing, or discharging any fireworks, firearm, weapon, air gun, archery device, slingshot, or explosive of any kind across, in, or into the park except as authorized under Section 41.117 of the County Code of Regulatory Ordinances (County Code of Regulatory Ordinances Section 41.117).

4.2.4.2 Analysis

4.2.4.2.1 Vegetation Fuel Modification Measures

The same four existing condition fire scenarios were re-analyzed for the project with the code-required fire prevention measures *and* the additional measures proposed by the County, including a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer along the park footprint and a 20-foot vegetation buffer area adjacent to the existing 30-foot buffer approximately 100 feet south of the northeast corner of the County's parcel. As shown in Table 3, Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics, the GR2 fuels associated with the buffer area have been converted to code-compliant vegetation fuel modification. A full analysis of the modeling is included in the Fire Behavior Modeling Summary in Attachment 1. Below is a summary of the results of each scenario associated with the project as proposed.

Table 3. Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 3 feet, have a fire intensity of up to 63 BTU/feet/second, have a rate of spread of up to 0.2 mph, and produce ember spotting up to 0.3 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

In addition to the vegetation fuel modification required by code, the modeling above includes vegetation fuel modification within the additional 20-foot buffer areas (included in Scenario 3) that exceeds code requirements. Consistent with Section 4.2.3, the fire behavior modeling in this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling. Additionally, as shown under Scenario 3 above, modifying the vegetation within the additional 20-foot buffers would further reduce wildfire risk beyond the risk reduction achieved by incorporating only the required fuel prevention measures. The proposed project would result in a reduction in buffer area flame lengths (3 feet compared to 18 feet in Section 4.2.3), fire intensity (up to 63 BTU/feet/second compared to up to 3,037 BTU/feet/second in Section 4.2.3), rate of spread (0.2 mph compared to up to 6.2 mph in Section 4.2.3), and ember spotting (up to 0.3 miles compared to up to 1.1 miles in Section 4.2.3).

As described in Section 4.2.3, vegetation fuel modification within the additional 20-foot buffers is not required to achieve a less than significant wildfire risk impact. As described in Section 4.2.1, vegetation fuel modification has been demonstrated to limit fire spread. Defensible space landscaping reduces the risk and likelihood of an on-site ignition becoming an off-site wildfire by reducing the fire intensity and rate of spread by replacing dense, fire-prone, volatile natural vegetation with managed landscaping and vegetation fuel modification zones. The required vegetation fuel modification would reduce flame lengths, fire intensity, rate of spread, and ember spotting compared to existing conditions. As demonstrated through the research and modeling above, additional vegetation fuel modification within the 20-foot buffer areas would further reduce potential fire activity on the project site. The additional vegetation fuel modification features are not required to reduce impacts to less than significant and are therefore not mitigation measures.

4.2.4.2.2 Human Activity Measures

The project proposes additional human activity fire prevention measures beyond what is included in Sections 4.2.2 and 4.2.3.

Strengthening the vehicle control barriers and providing improved fire-safe parking would more comprehensively minimize the occasional unauthorized vehicle access to the site, preventing vehicle-caused ignition in vegetation fuels. Improved fire-safe parking would minimize ignition risk in designated parking areas by using non-burnable materials compared to existing conditions which include fire prone vegetation. As described in Section 4.2.1, vehicles are a common ignition source in vegetation fuels. Vehicle malfunctions that result in sparks and/or exhaust system components contacting vegetation can result in vegetation fires.

A live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property would play a key role in enforcement and education, the benefits of which are described in Section 4.2.1 above. A more active enforcement presence would ensure that visitors comply with the other human activity measures through verbal warnings or request removal of individuals who do not comply with park regulations. Additional site presence also presents opportunities for rangers to educate visitors about the fire risks associated with prohibited activities. Having multiple individuals on-site and responsible for enforcement ensures a higher level of enforcement.

Prohibiting campfires and open flames would directly reduce opportunities for ignition within the park, especially during high wind events. The enforcement and education conducted by the live-on staff, maintenance workers, and park rangers would reinforce the effectiveness of this measure. This enforcement would be supplemented with signage on site clarifying prohibited activities.

Prohibiting overnight use of the park would minimize opportunities for visitors to cause ignitions within the park through illegal activities such as lighting campfires or smoking. The enforcement and education conducted by the live-on staff, maintenance works, and park rangers would reinforce the effectiveness of this measure. This enforcement would be supplemented with signage on site clarifying prohibited activities.

4.2.4.3 Conclusion

As shown above, converting the fuels within the additional 20-foot buffer to code-compliant vegetation fuel modification would further reduce fire behavior within the project site. Consistent with Section 4.2.3, the fire behavior modeling in this section shows a reduction in expected flame length, fire intensity, spread rate, and ember spotting within the project site when compared to the existing conditions fire behavior modeling.

The fire prevention measures proposed for the park implement the applicable sections of the San Diego County Code of Regulatory Ordinances and additional human activity measures that closely align with the best practices found in fire prevention literature described in Section 4.2.1 above. These fire prevention measures will be enforced through on-site signage, a live-on volunteer, and additional staffing to increase ranger patrols to the area compared to existing conditions. Overnight use will be prohibited through these enforcement mechanisms in addition to a gate at the access point of the park which will only allow access during park hours (sunrise to sunset). As a code requirement, roadside vegetation management would further reduce the risk of vehicle-related ignitions relative to existing unmanaged roadside conditions. By implementing the proposed fire prevention measures, the project would reduce ignition risk associated with increased human use of the site through active site management,

regulated public use, and implementation of defensible space principles. Further, vegetation fuel modification implemented as a project fire prevention measure would reduce hazardous fuels within the project site and alter the interaction between fuels, weather, and fire behavior. Adopting and enforcing the applicable San Diego County Code of Regulatory Ordinances section policies governing the use of the project site through the proposed fire prevention measures would reduce the likelihood of fires being ignited by known human causes. Impacts would be less than significant without mitigation.

5 Impact Summary and Conclusion

As described in Section 3 above, the purpose of this document is to address the deficiencies in the EIR's wildfire analysis as identified by the Court's Writ (Section 3.1) and Minute Order (Section 3.2). To respond to the Court's order, a review of the previous FEOA, the 2023 FEIR, and the California Office of the Attorney General Guidance was conducted to determine the scope of the analysis required in this document. It was determined that as a supplement to the prior analyses, an analysis of the project's baseline existing conditions compared to the project with only those fire prevention measures required by code and a separate analysis with the proposed additional fire prevention measures that exceed code requirements is needed. Specifically, the analysis presented above addresses the effectiveness of the project's fire prevention measures by analyzing the project with required measures only (i.e., "pre-mitigation" per the Court's Writ and Minute Order) then analyzing the project with the additional fire prevention measures proposed by the project. Fire prevention measures beyond code compliance would only be considered mitigation measures if they were necessary to reduce impacts to a less than significant level (i.e., if the impact would be significant in their absence).

The project includes two categories of fire prevention measures: vegetation fuel modification fire prevention measures and human activity fire prevention measures. Fire activity in various vegetation types can be quantitatively modeled and analyzed, while human activity is unpredictable and cannot be quantitatively modeled. As such, the analysis relies on both quantitative fire behavior modeling using the BehavePlus program and qualitative research from industry experts to assess the effectiveness of the project's vegetation fuel modification fire prevention measures (such as vegetation clearing) and human activity fire prevention measures (such as the prohibition of smoking and open flames) for the following three conditions:

- The existing baseline wildfire risks at the project site under existing environmental conditions (Section 4.2.2);
- The wildfire risks associated with implementation of the project in the absence of mitigation, assuming the project complies with all applicable provisions of the San Diego County Code of Regulatory Ordinance and the 2025 California Building Standards Code, including wildland-urban interface, building, and fire code requirements for construction and fire prevention and protection (Section 4.2.3) without which the project could not be permitted or built; and
- The wildfire risks associated with implementation of the project, when additional fire prevention measures are included, beyond those required by code (Section 4.2.4).

Existing Baseline Condition

As described in Section 4.2.2, under existing conditions, the project site and adjacent off-site areas consist primarily of annual grasslands and grass-shrub vegetation, which are highly receptive to ignition and rapid fire spread, particularly during offshore Santa Ana wind events. Four wildfire scenarios were modeled, including on-site and off-

site ignitions under both extreme offshore and average onshore wind conditions. Modeling results demonstrate that, during a Santa Ana wind event, wildfire behavior in existing vegetation could be severe, with 28-mph sustained winds and 41-mph wind gusts, modeled flame lengths of up to approximately 18.1 feet, fireline intensities up to 3,071 BTU/feet/second, rates of spread up to 6.2 miles per hour, and ember spotting distances of up to 1.1 miles. Regarding human activity and ignition, the project site is currently subject to occasional unauthorized vehicular and pedestrian public access to and within hazardous vegetation fuels, making it vulnerable to potential smoking, vehicle, or other ignition hazards that increase wildfire risk. The current use of the undeveloped land, including occasional unauthorized access, places the project area at risk for fire ignitions associated with both natural events and human activities.

Project with Required Fire Prevention Measures

As described in Section 4.2.3, the project would be required to implement certain fire prevention measures mandated by building and fire codes, which would convert existing hazardous vegetation fuels to maintained landscaping and vegetation fuel modification zones that meet code requirements. There is no scenario in which the project could be constructed without these required fire prevention measures in place, as these features are legally required and cannot be removed from the project design. An analysis of the project with the required fire prevention measures thus represents a “pre-mitigation” condition that can be used to assess project impacts in the absence of mitigation. The same four wildfire scenarios were modeled for the project with the required vegetation fuel modification fire prevention measures listed in Section 4.2.3.1. The only vegetation fuel modification measure that is not required by the relevant codes is vegetation modification within two 20-foot additional buffer areas adjacent to two existing 30-foot buffer areas maintained by the County. The analysis for the project condition with the required fire prevention measures assumes that the vegetation (and fire activity) in the additional 20-foot buffer areas would remain the same as the existing condition.

Modeling results demonstrate that in the project with the required vegetation fuel modification measures condition, flame lengths in areas with vegetation modification would be reduced by approximately 4.6 feet to 12 feet depending on the location, compared to the existing condition. Similarly, fire intensity in the fuel modification areas would be reduced by up to 3,008 BTU/feet/second; rate of spread would be reduced by up to 4 mph; and ember spotting distanced would be reduced by up to 0.8 miles compared to the existing condition.

Regarding ignition and human activity, the project is anticipated to lead to additional human presence at the site, which could increase fire risk by introducing additional opportunities for human-caused fire ignitions. However, the project would be subject to the restrictions in the County Code of Regulatory Ordinances, which prohibits ignition sources such as smoking or fireworks. On-site signage would inform visitors about the prohibited activities on the project site. The existing weekly ranger checks would enforce these prohibitions using clear communication and direct verbal warnings, which would also present opportunities for education about fire dangers. Ongoing enforcement, education, and signage would increase public awareness about the restrictions on the project site, minimizing ignition potential even when rangers are not present. Still, due to the lack of a daily enforcement presence, the occasional unauthorized access of the project site is not expected to be meaningfully reduced for the project with required fire prevention measures condition, meaning some ignition potential would still exist for this hypothetical condition. However, the irrigated and managed landscaping proposed for the project reduces the risk of an on-site ignition becoming an off-site wildfire by replacing a nearly continuous field of hazardous, easily ignited vegetation with ignition-resistant landscaping arranged in accordance with defensible space and fuel modification requirements. Through the combined vegetation fuel modification conditions and human activity measures required

to implement the project, the project will reduce the risk of ignition for the nearby homes and provide an area of decreased fire behavior that will make fire containment and suppression more manageable for firefighters than the existing baseline conditions. The project would implement all defensible space and vegetation fuel modification required by the applicable codes and regulations, and the project's impact with regard to wildfire risk would be less than significant with no mitigation required.

Project with Additional Fire Prevention Measures

As described in Section 4.2.4, the only vegetation fuel modification fire prevention measure that exceeds code requirements are the additional 20-foot buffer areas. These buffer areas would further reduce fire activity on the project site by providing more area with maintained landscaping and irrigation. The proposed project would result in a reduction in buffer area flame lengths (3 feet compared to 18 feet in Section 4.2.3), fire intensity (up to 63 BTU/feet/second compared to up to 3,037 BTU/feet/second in Section 4.2.3), rate of spread 0.2 mph compared to up to 6.2 mph in Section 4.2.3), and ember spotting (up to 0.3 miles compared to up to 1.1 miles in Section 4.2.3) compared to existing conditions.

Regarding ignition and human activity, the project includes fire prevention measures that exceed the requirements of the County Code of Regulatory Ordinances; the proposed human activity measures are listed in Section 4.2.4.1. Additional measures include a live-on volunteer, maintenance staff, and a park ranger to help with maintenance and management of the property; strengthened vehicle control barriers and fire-safe parking; and the prohibition of campfires and overnight use of the park. As described in Section 4.2.1 above, one of the most effective means of reducing ignitions is to combine effective education with judicious enforcement. Pairing restrictions (such as the prohibition of smoking) with on-site enforcement personnel establishes a comprehensive compliance framework by providing the legal authority necessary to support enforcement actions and penalties for violations; active monitoring and enforcement capacity to identify noncompliance and request compliance or summoning assistance from law enforcement; and direct public education and outreach that promotes awareness of regulations and reduces the likelihood of future violations. With the additional vegetation fuel modification and human activity fire prevention measures, impacts related to wildfire would continue to be less than significant. As impacts were less than significant without the additional measures, and the additional measures would further minimize wildfire risk, the additional fire prevention measures proposed by the County are not mitigation measures necessary to reduce impacts to a less than significant level.

As described in Sections 4.2.2 through 4.2.4, the modeling demonstrates that building the project, both with required fire prevention measures only and with the additional fire prevention measures as proposed, would substantially reduce wildfire behavior within the project site compared to existing baseline conditions, with the proposed project (Section 4.2.4) providing the greatest reduction in wildfire risk. Based on the results of the fire behavior modeling, the proposed vegetation fuel management and operational control fire prevention measures, and accepted research into human activity and behavior, the project (with or without the additional fire prevention measures) would not exacerbate wildfire hazards. Instead, it would result in a net reduction in wildfire intensity, spread, and suppression difficulty compared to existing conditions. The project would reduce the risk of wildfire impacts to nearby residences, create a safer area for public use, and provide ancillary benefits by improving fire containment opportunities for emergency responders. Accordingly, the project will have a less than significant impact and would not substantially impair an adopted emergency response plan or emergency evacuation plan; exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire due to slope, prevailing winds, and other factors; require the installation or

maintenance of associated infrastructure, such as roads, fuel breaks, emergency water sources, power lines, or other utilities, that may exacerbate fire risks or result in temporary or ongoing impacts on the environment; or expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. **Impacts related to wildfire hazards would be less than significant with no mitigation required. Compared to existing conditions, the project would result in an overall reduction in wildfire risk.**

6 References

Includes references in the Fire Behavior Modeling Summary attachment.

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Attachment 1

Fire Behavior Modeling Summary

1 BehavePlus Fire Behavior Modeling History

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used as the industry standard for predicting fire behavior on a given landscape. That model, known as "BEHAVE", was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Marsden-Smedley and Catchpole 1995, Grabner et. al. 1997, Alexander 1998, Grabner et al. 2001, Arca et al. 2007). In this type of study, Behave is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of Behave and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling conducted on this site includes a relatively high-level of detail and analysis which results in reasonably accurate representations of how wildfire may move through available fuels on and adjacent to the property. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, spread rates, and fireline intensities, this analysis incorporated predominant fuel characteristics, slope percentages, and representative fuel models observed on site. The BehavePlus fire behavior modeling system was used to analyze anticipated fire behavior in key areas within and adjacent to the proposed project site. Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of BehavePlus must be understood. First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior. Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash. Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions. Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone/defensible space widths. However, it does provide the average length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition.

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand

the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire or other disturbance history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

It is important to note that BehavePlus models fire behavior after ignition in specific vegetation fuels and under specific weather conditions. BehavePlus was not intended to, nor is it capable of, predicting ignition locations and causes of ignitions. Locations and causes of ignition are generally associated with human behavior, which is the underlying cause of the majority of California wildfires (Syphard et al. 2007; Romero-Calcerrada et al. 2008). Common locations and causes of ignition are determined from data obtained from fire investigation reports. A background knowledge of locations and causes of fire ignitions, and the associated human behavior, assists with informing the locations within and adjacent to a project site that potential fires should be modeled.

2 Modeling Inputs

Dudek utilized the BehavePlus software package to analyze fire behavior potential for the proposed development site in Alpine, San Diego County, California. For this analysis, four existing conditions scenarios were evaluated, including two average summer weather conditions (on-site and in the open space to the west of the project site) and two extreme weather offshore wind conditions (both on-site). Additionally, all of the on-site scenarios were modeled for vegetation modification conditions (one average and two extreme weather conditions respectively). The project site currently is undeveloped, largely vegetated by grassland, some native shrubs and oak trees on the project site. The majority of the on-site topography is relatively flat, with a hill in the northeast portion of the project site, and a drainage/wash running east-west along the northern border of the site. With that said, fuels and terrain in proximity to the development area could produce embers that may affect the project, but the majority of the site will be irrigated vegetation or paved hardscapes, and defenses will be built into the limited on-site structures to reduce the risk of ember penetration and to contain fires that may result from ember penetration. It is the fuels to the west and northwest of the project site that could have the potential to affect the project's structures from a radiant and convective heat perspective; however, the ignition-resistant structures would be surrounded by irrigated landscape and hardscape areas.

BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The outputs produced by this analysis include flame length measured in feet, rate of spread measured in miles/hour, fireline intensity measured in BTU/feet/second, and ember spotting distance measured in miles. The following provides a description of the input variables used in processing the BehavePlus models for the project site. In addition, data sources are cited and any assumptions made during the modeling process are described.

2.1 Vegetation (Fuels)

The seven fuel characteristics help define the 13 standard fire behavior fuel models and the five custom fuel models developed for Southern California (Anderson 1982; Weise & Regelbrugge 1997). According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field at the project site determines which fuel models should be applied in BehavePlus. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

- Grasses Fuel Models 1 through 3
- Brush Fuel Models 4 through 7, SCAL 14 through 18
- Timber Fuel Models 8 through 10
- Logging Slash Fuel Models 11 through 13

In addition, the aforementioned fuel characteristics were utilized in the development of 40 more fire behavior fuel models developed for use in BehavePlus modeling efforts (Scott & Burgan 2005). These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

To support the fire behavior modeling efforts conducted for the project, a Dudek Fire Protection Planner analyzed the different vegetation types observed on and adjacent to the site and they were subsequently classified into the aforementioned fuel models. As is customary for this type of analysis, the terrain and fuels directly adjacent to the site and proposed fuel modification zones (FMZ) are used for determining flame lengths and fire spread. Fuel model attributes are summarized in Table 1, Existing Baseline Conditions Fuel Model Characteristics; Table 2, Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics; and Table 3, Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics.

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Table 1. Existing Vegetation Baseline Conditions Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet) [1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
GS1	Low load dry climate grass- shrub	Represents the grass and sparse shrubs on the hillside in the off-site run to the west.	0.9 ft
GS2	Moderate load dry climate grass- shrub	Represents the vegetation in the areas in the northern portion of the project site.	1.5 ft
SH2	Moderate load dry climate shrub	Represents the shrub-brush in the northern portion of the project site and on the hillside in the off-site run to the west.	1 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005).

Table 2. Project Vegetation with Required Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
GR2	Short, sparse dry climate grass	Represents the annual grasslands on and off the project site	0.4 ft
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005

Table 3. Project Vegetation with Additional Fire Prevention Measures Fuel Model Characteristics

Fuel Model Assignment	Vegetation Description	Location	Fuel Bed Depth (Feet)[1]
FM8	Compact Litter	On-site Zone 1 and 2 fuel modification	0.2 ft.
NB	Non-burnable	Paved areas throughout the proposed project site.	0 ft

Note:
[1] Listed fuel bed depths reflect the fuel models that best depict the vegetation in and around the project site and not an exact measure of local vegetation (Anderson 1982; Scott & Burgan 2005

2.2 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower fire spread down-slope in the absence of wind. Flat terrain tends to have little effect on fire spread, resulting in fires that are driven by wind. The site for the proposed Alpine County Park is primarily flat grasslands

with coastal sage in its northern-most segment. Adjacent Back Country Land Trust preserve lands are more sloping and contoured. While some areas are dominated by grass, most are mainly covered with a mix of sage scrub and chapparal with some oak woodlands. The combined 315 acres of the preserve and park lands include a range of elevation from 1900 to 2150 feet (Rhode & Associates, 2021).

2.3 Weather Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths (feet), fireline intensities (BTU/feet/second), rate of spread (feet/minute), and spotting distance (miles) for four modeling scenarios. Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent the site. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation to the west, and in addition to measured slope gradients, and wind and fuel moisture values derived from Remote Automated Weather Stations (RAWS) weather data sets for both the 50th percentile weather (summer, on-shore winds) and the 97th percentile weather (fall, off-shore winds). Weather and wind inputs for fire behavior modeling conducted in support of this FPP utilized the guidelines and standards presented by the County of San Diego, Department of Planning and Land Use (County of San Diego 2022a). These guidelines identify acceptable fire weather inputs for fire conditions during summer months and Santa Ana fire weather patterns. The County analyzed and processed 44 years of fire weather data from fire stations and Remote Automated Weather Stations (RAWS) between April 15 to December 31 in order to represent the general limits of the fire season. Data provided by the County's analysis included temperature, relative humidity, and sustained wind speed and is categorized by weather zone, including Maritime, Coastal, Transitional, Interior, and Desert.

As identified in the County's guidelines, Dudek utilized the Fine Dead Fuel Moisture (FDFM) tool within BehavePlus fire behavior modeling software package to determine fuel moisture. The temperature, relative humidity, and wind speed data for the Transitional weather zone were utilized based on the project's location. Reference fuel moistures were calculated in the FDFM tool and were based on site-specific topographic data inputs. Table 4, BehavePlus Fine Dead Fuel Moisture Calculation, summarizes the FDFM inputs and the resulting fine dead fuel moisture values. Table 5, Fuel Moisture and Wind Inputs, presents the fuel moisture and wind speed inputs for the fire behavior modeling efforts conducted for this analysis.

Table 4. BehavePlus Fine Dead Fuel Moisture Calculation

Variable	50th Percentile Summer Weather	97th Percentile Peak Weather (Santa Ana)
Dry Bulb Temperature	90–109 deg. F	90–109 deg. F
Relative Humidity	10–14 %	0–4 %
Reference Fuel Moisture	2 %	1 %
Month	May June July	May June July
Time of Day	12:00–13:59	12:00–13:59
Elevation Difference	Level (within 1,000 ft.)	Level (within 1,000 ft.)
Slope	0–30%	0–30%
Aspect	South/East	South/East
Fuel Shading	Exposed (< 50% shading)	Exposed (< 50% shading)
Fuel Moisture Correction	0%	0%
Fine Dead Fuel Moisture	2%	1%

Historical weather data for Alpine was utilized in determining appropriate fire behavior modeling inputs for the project area. Average, onshore weather conditions were derived from Remote Automated Weather Stations (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. The Sweetwater RAWS Station (RAWS ID 045744) was utilized to find average and extreme weather values for the project area. The station is approximately 5 miles east of the project site and adequately approximates project site weather conditions. Data from fire seasons dating back to 2005 and up through 2025 were included in the analysis.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97th percentile) and typical (50th percentile) weather conditions. Data from the RAWS was evaluated from August 1 through December 31 for each year between 2005 and 2025 for 97th percentile weather conditions and from June 1 through September 30 for each year between 2005 and 2025 for 50th percentile weather conditions.

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulting from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the five BehavePlus runs were manually entered during the data input phase. The input wind speed and direction are an average surface wind at 20 feet above the vegetation over the analysis area.

Table 5. Fuel Moisture and Wind Inputs

Model Variable	Summer Weather (50th Percentile) Onshore Wind	Peak Weather (97th Percentile) Offshore Wind
Fuel Models	GR2, GS1, SH2	GR2, GS2, SH2
1 h fuel moisture	5%	1%
10 h fuel moisture	6%	2%
100 h fuel moisture	9%	4%
Live herbaceous moisture	33%	30%
Live woody moisture	75%	59%
20 ft. wind speed	19 mph (sustained winds)	28 mph (sustained winds) wind gusts of 41 mph
Wind Directions from north (degrees)	240	95
Wind adjustment factor	0.4	0.4
Slope	3-20%	3-7%

Note: Wind speed was obtained from Table 1, County of San Diego Fire Protection Plan Guidelines for Staff

3 Fire Behavior Modeling Scenarios

Four focused scenarios were completed for existing fuels conditions, and three scenarios were completed for the post-development conditions. The results of the modeling include anticipated values for surface fires, which include flame length, rate of spread, fireline intensity, and ember spotting distance. The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the

active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2008). Fireline intensity is a measure of heat output from the flaming front and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts (Rothermel and Rinehart 1983). Spotting distance is the distance a firebrand or ember can travel down wind and ignite receptive fuel beds. Four existing conditions and three post-development fire modeling scenario locations were selected to better understand the different fire behaviors that may be experienced on or adjacent to the site based on slope and fuel conditions; these fire scenarios are explained in more detail below.

Fire Scenario Locations and Descriptions:

Existing Conditions On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Project with Required Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot-wide buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Project with Additional Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

4 Fire Behavior Modeling Results

The fire behavior modeling results presented herein depict values based on inputs to the BehavePlus software and are not intended to capture changing fire behavior as it moves across a landscape. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis; rather, the models provide a worst-case wildfire behavior condition as part of a conservative approach. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Existing Conditions On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

> **Results:** Expected to produce flame lengths up to 14.9 feet, have a fireline intensity of up to 2,029 BTU/feet/second, have a rate of spread of up to 4.1 mph, and produce ember spotting up to 1.0 mile.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the project site during an average summer onshore wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 5.9 feet, have a fireline intensity of up to 266 BTU/feet/second, have a rate of spread of up to 0.8 mph, and produce ember spotting up to 0.3 miles.

Scenario 3. Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds advancing the fire in a southwesterly direction.

Results: Expected to produce flame lengths up to 18.1 feet, have a fireline intensity of up to 3,071 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. Fire flaming front approaching the project site from the west, burning through grass-shrubs in the off-site open space west of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 7.1 feet, have a fireline intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

Project with Required Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation and low-load, dry climate grass in the additional 20-foot-wide buffer areas in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 18 feet, have a fire intensity of up to 3,037 BTU/feet/second, have a rate of spread of up to 6.2 mph, and produce ember spotting up to 1.1 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the required fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

Project with Additional Fire Prevention Measures On-Site and Off-Site Scenarios

Scenario 1. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the irrigated, maintained vegetation in the on-site fuel modification zones from the northeastern boundary to the southwestern boundary of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph wind gusts.

Results: Expected to produce flame lengths up to 2.9 feet, have a fire intensity of up to 57 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.3 miles.

Scenario 2. Fire flaming front started by a possible roadside ignition on South Grade Road, burning through the annual grasslands until it reaches the irrigated, maintained vegetation in the on-site fuel modification zones and hardscaped areas on the project site from the southwestern boundary to the northeastern boundary of the project site during an average onshore summer wind event with 19 mph sustained winds.

Results: Expected to produce flame lengths up to 1.3 feet, have a fire intensity of up to 9 BTU/feet/second, have a rate of spread of up to 0.1 mph, and produce ember spotting up to 0.1 miles.

Scenario 3. Fire flaming front burning through irrigated, maintained vegetation in the on-site fuel modification zones in the northeastern portion of the project site during an extreme offshore Santa Ana wind event with 28 mph sustained winds and 41 mph gusting winds.

Results: Expected to produce flame lengths up to 3 feet, have a fire intensity of up to 63 BTU/feet/second, have a rate of spread of up to 0.2 mph, and produce ember spotting up to 0.3 miles.

Scenario 4. The vegetation in this scenario will not change with development of the project with the additional fire prevention measures because it is an off-site scenario and not subject to vegetation fuel modification. The scenario would produce the same fire behavior modeling outputs as modeled in the existing conditions Scenario 4.

Results: Expected to produce flame lengths up to 7.1 feet, have a fire intensity of up to 402 BTU/feet/second, have a rate of spread of up to 1.2 mph, and produce ember spotting up to 0.3 miles.

The results of fire behavior modeling for vegetation characteristics under existing conditions, project with required fire prevention measures, and project with additional fire prevention measures are presented in Table 6, Fire Behavior Model Results – Existing Conditions, Table 7, Fire Behavior Model Results – Project with Required Fire Prevention Measures, and Table 8, Fire Behavior Model Results – Project with Additional Fire Prevention Measures. The following describes the fire behavior outputs (Heisch and Andrews 2010) presented in the tables:

Surface Fire:

Flame Length (feet): The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.

Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of

spread and heat per unit area and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.

Surface Rate of Spread (mph): Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush, and other dead and live vegetation within about 6 feet of the ground.

Spotting Distance (mi): Spotting distance is the maximum distance at which potential spot fires may occur based on fire brands from a spreading wind-driven surface fire.

Table 6. Fire Behavior Model Results – Existing Conditions

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1, 2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site.				
Low load, dry climate grass (GR2) (On-site)	11.6 (14.9)	1,175 (2,029)	2.4 (4.1)	0.6 (1.0)
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on site.				
Low load, dry climate grass (GR2) (On-site)	5.9	266	0.8	0.3
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Low load, dry climate grass (GR2) (On-site)	14.0 (18.0)	1,773 (3,037)	3.6 (6.2)	0.7 (1.1)
Moderate load dry climate grass- shrub (GS2) (On-site)	14.0 (18.1)	1,772 (3,071)	1.8 (3.2)	0.7 (1.1)
Moderate load dry climate shrub (SH2) (On-site)	11.2 (14.2)	1,075 (1,805)	0.5 (0.8)	0.6 (1.0)
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

Table 7. Fire Behavior Model Results – Project with Required Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on-site.				
Compact Litter (FM8) (On-site)	2.3 (2.9)	33 (57)	0.1 (0.1)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on-site.				
Compact Litter (FM8) (On-site)	1.3	9	0.1	0.1
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Low load, dry climate grass (GR2) (On-site)	14.0 (18.0)	1,773 (3,037)	3.6 (6.2)	0.7 (1.1)
Compact Litter (FM8) (On-site)	2.7 (3.0)	50 (63)	0.1 (0.2)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

Table 8. Fire Behavior Model Results – Project with Additional Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 1: 6% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on-site.				
Compact Litter (FM8) (On-site)	2.3 (2.9)	33 (57)	0.1 (0.1)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A

Table 8. Fire Behavior Model Results – Project with Additional Fire Prevention Measures

Fire Scenarios	Flame Length[1,2] (feet)	Fireline Intensity[1,2] (BTU/feet/ second)	Spread Rate[1,2] (mph)	Spotting Distance[1,2] (miles)
Scenario 2: 12% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, on-site.				
Compact Litter (FM8) (On-site)	1.3	9	0.1	0.1
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 3: 7% slope; Extreme Santa Ana winds (97th percentile offshore), sustained 28 mph wind (41 mph gusts), on site, northeast portion of the site				
Compact Litter (FM8) (On-site)	2.7 (3.0)	50 (63)	0.1 (0.2)	0.2 (0.3)
Non-Burnable (NB) (On-site)	N/A	N/A	N/A	N/A
Scenario 4: 8% slope; Average summer winds (50th percentile onshore), sustained 19 mph wind, off site to the west.				
Low load, dry climate grass (GR2) (Off-site)	7.1	402	1.2	0.3
Low load dry climate grass- shrub (GS1) (Off-site)	5.3	211	0.5	0.3
Moderate load dry climate shrub (SH2) (Off-site)	6.5	335	0.2	0.3

Note:
1 Wind-driven surface fire.
2 Values in parentheses represent the respective output in the presence of 41 mph gusts.

The information in Table 9, Fire Suppression Interpretation, presents an interpretation of the flame length and fireline intensity outputs as related to fire suppression efforts. Identification of modeling run locations is presented graphically in Figure 4 of the FPP.

Table 9. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks with hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head with hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

5 Project Area Fire Risk Assessment

Wildfires are a common natural hazard in most of Southern California with a long and extensive history (Keeley & Syphard 2021). Southern California landscapes include a diverse range of plant communities, including vast tracts of shrublands and grasslands, like those found on and/or adjacent to the project development site. Wildfire in this Mediterranean-type ecosystem ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley & Fotheringham 2003). Supporting this are the facts that native landscapes, from forest to grasslands, become highly flammable each fall. The climate of Southern California has been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds occurring during autumn after a six-month drought period each year. Based on this research, the anticipated growing population expanding into WUI areas, and the regions' fire history, it can be anticipated that periodic wildfires may start on, burn onto, or spot into the site. The most common type of fire anticipated in the vicinity of the development area is a wind-driven fire from the northeast or southwest moving through the natural vegetation found on the adjacent lands.

With the conversion of the landscape to ignition-resistant development, wildfires may still encroach upon and drop embers on the site but would not be expected to burn through the development site or produce sustainable spot fires due to the lack of available fuels post-development. Vegetation fuel modification zones designed in accordance with California Wildland-Urban Interface Code are known to protect structures, landscaping, and the adjacent environment from the harmful effects of wildfire.

For example, when the Tahoe Basin experienced the Angora Fire in 2007, fuel treatments had the dual effect of saving homes and increasing forest survival (Safford et al. 2009). In areas where fuel management had been conducted prior to the Angora Fire, home loss was significantly reduced in the adjacent community and 85% of the trees survived, as compared to a 22% tree survival rate in untreated areas (Safford et al. 2009). Fuel management treatments also facilitated the ecological benefit of reduced fire severity, including higher post-fire soil litter cover, higher herbaceous plant cover, higher diversity, and lower levels of invasive beetles (Safford et al. 2009). At a minimum, managing defensible space can reduce the risk and impact of fire (Braziunas et al. 2021).

More recently, the Insurance Institute for Business and Home Safety (IBHS) conducted a post-event damage investigation into the 2025 Palisades and Eaton fires in Los Angeles County. The research found that "reducing combustible connective fuels between structures helps limit fire spread and ensures building materials serve as the last line of defense against ignition" (IBHS 2025). The IBHS analysis of the 5-foot-wide Zone 0 fuel modification zone around the perimeter of a structure showed the value of reducing or eliminating combustible materials adjacent to and near structures. IBHS reported that when Zone 0 fuel coverage exceeded 25% of the ground area, the likelihood of a structure being damaged or destroyed during a wildfire event was 87% to 100%. IBHS concluded that "Home hardening and a non-combustible Zone 0 are essential to remove the weak links fire looks to exploit" (IBHS 2025).

Studies indicate that wildfires declined steadily over time after development (Syphard, et. al. 2007 and 2013) and further, the acreage burned remained relatively constant, even though the number of ignitions temporarily increased. This is due to the conversion of landscapes to ignition-resistant, maintained areas, more people monitoring areas resulting in early fire detection and discouragement of arson, and more timely notification of the fire suppression resources that are located within these developing areas.

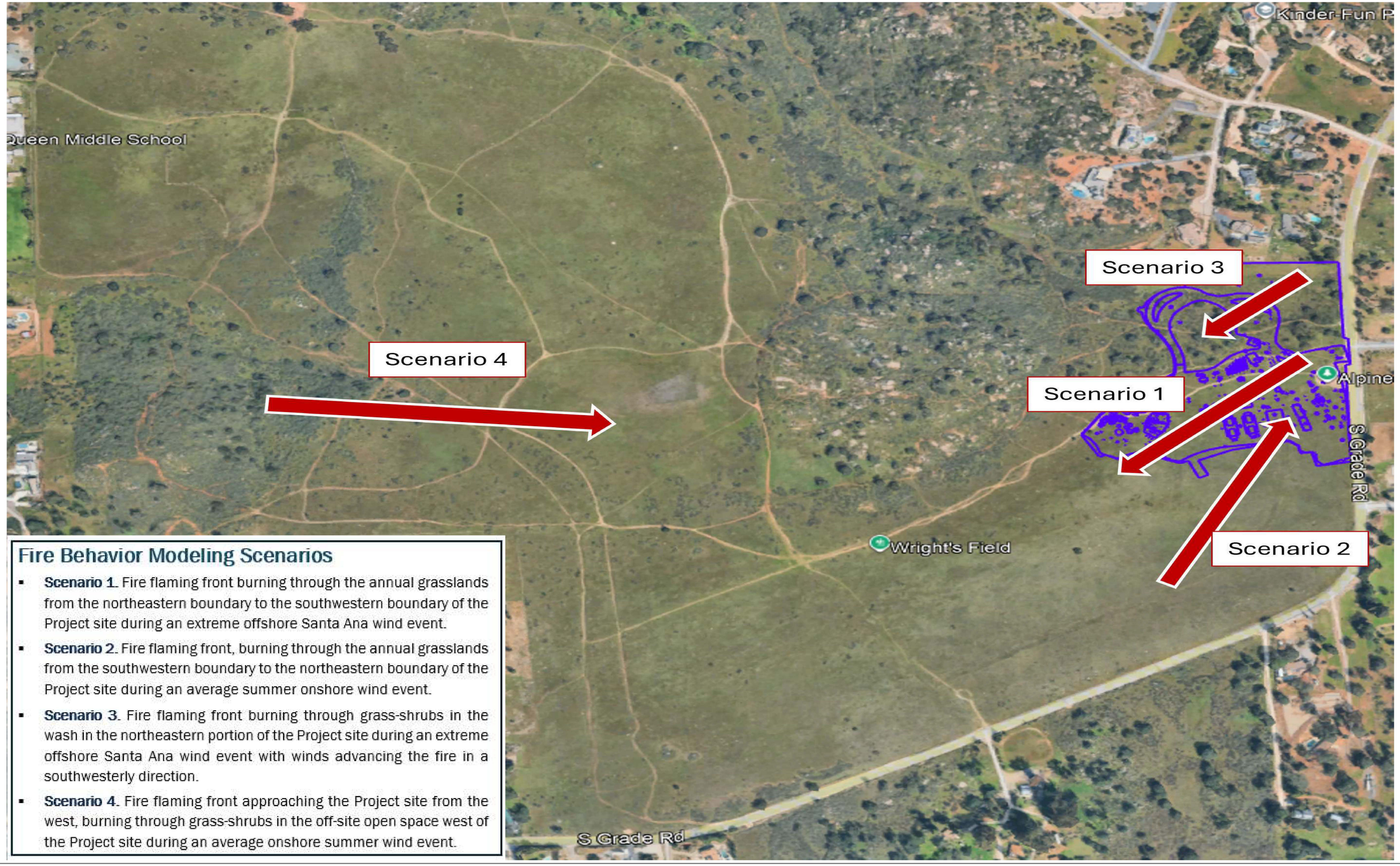
Therefore, it will be important that the latest fire protection technologies, developed through intensive research, real-world wildfire observations, and findings by fire professionals, for both ignition-resistant construction and for creating defensible space in the ever-expanding WUI areas, are implemented and enforced. The project, once developed, would not facilitate wildfire spread and would reduce projected flame lengths within the proposed fuel modification zones to levels that would be manageable by firefighting resources, especially given the ignition resistance of the structures and the planned ongoing maintenance of the landscaping throughout the project site. In addition, the project's FMZs are substantially wider than the longest calculated flame length for grass-shrub vegetation adjacent to the project site.

Given the climatic, vegetative, and topographic characteristics, along with the local fire history of the area, the project site, once developed, is anticipated to experience periodic wildfires that may start nearby and burn towards or spot into the development. The potential for off-site wildfire encroaching onto or showering embers into the site is considered low and the risk of ignition from such encroachments or ember showers is considered low given the ignition-resistant construction and landscaping, along with fire protection features that will be provided for the structures.

While it is true that humans are the cause of most fires in California, and it is anticipated that the project would increase the number of people using the project site, there is no data available that links increases in wildfires with the development of ignition-resistant communities or projects like the proposed project. The project will include fire prevention measures and policies that both reduce the risk of ignitions and prevent on-site fire from spreading to off-site vegetation.

Attachment 2

Fire Behavior Analysis Scenarios Figure



Fire Behavior Modeling Scenarios

- **Scenario 1.** Fire flaming front burning through the annual grasslands from the northeastern boundary to the southwestern boundary of the Project site during an extreme offshore Santa Ana wind event.
- **Scenario 2.** Fire flaming front, burning through the annual grasslands from the southwestern boundary to the northeastern boundary of the Project site during an average summer onshore wind event.
- **Scenario 3.** Fire flaming front burning through grass-shrubs in the wash in the northeastern portion of the Project site during an extreme offshore Santa Ana wind event with winds advancing the fire in a southwesterly direction.
- **Scenario 4.** Fire flaming front approaching the Project site from the west, burning through grass-shrubs in the off-site open space west of the Project site during an average onshore summer wind event.

Attachment 3

Analysis of Attorney General's Guidance

1 Background for Attorney General's Guidance on Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act

In 2022, the California Office of the Attorney General issued guidance outlining best practices for analyzing and mitigating wildfire impacts of development projects under the California Environmental Quality Act (CEQA). The guidance is not regulatory in nature and does not impose additional legal requirements on local governments, nor does it alter any applicable laws or regulations. Rather, it is intended to provide guidance on some of the issues, alternatives, and mitigation measures that should be considered during the environmental review process. This guidance is based on the Office of the Attorney General's experience reviewing, commenting on, and litigating CEQA documents for projects in high wildfire prone areas, and is intended to assist lead agencies with their planning and approval of future projects.

2 Summary and Analysis of Attorney General's Guidance Relevant to the Alpine Park Project

The following provides a summary of the guidance and an analysis of the project's compliance with the applicable points of guidance.

Attorney General Guidance for Analyzing Project's Impacts on Wildfire Risks

Baseline Conditions – The guidance states that an environmental impact report (EIR) is required to include a description of the physical environmental conditions in the vicinity of the project, at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced. This description establishes the baseline of existing environmental conditions and should include information about open space areas and habitats within the project area that may be fire prone, as well as a discussion of fire history and fuels on the project site. Including a discussion of existing available water supplies for firefighting is also critical. Providing details about existing environmental conditions at the project site that may exacerbate or minimize wildfire impacts will help ensure that the EIR fully considers the project's impacts on wildfire risk.

Project Analysis for Guidance on Baseline Conditions– Baseline conditions of the project site have been provided in the Alpine County Park Project Fire Protection Memorandum. The project description includes information about the existing use of the site, the existing wildfire hazards and risks, the existing vegetation cover, and the existing vegetation fuel modification required by AFPD and maintained by the County. Section 4.9.2.5 of the Hazards section and Section 4.20.2 of the Wildfire section also include a description of the baseline conditions relevant to wildfires.

Modeling – The guidance encourages an EIR to qualitatively assess wildfire hazard and risk variables and use fire behavior modeling and other spatial and statistical analyses to quantify the risks to the extent feasible. Modeling should include extreme weather conditions that exacerbate fire spread and should consist of a variety of different fire scenarios and include scenarios for fires that start in, near, and far from the project site. Modeling should include baseline conditions as well as post-development conditions with an analysis that provides lead agencies with sufficient data to quantify increased or decreased wildfire risks resulting from a project adding more people to wildfire prone areas and to assess the risks according to the threshold of significance.

Project Analysis for Guidance on Modeling– Fire behavior modeling has been completed for the project using the BehavePlus fire behavior modeling software, a state-of-the-art model originally developed in cooperation with the US Department of Agriculture. BehavePlus has become the industry standard and the most widely used model for predicting fire behavior on a given landscape. Fire behavior modeling for the project has been provided in the Alpine County Park Project Fire Protection Memorandum and includes modeling for baseline conditions and post-development conditions, which provides a clear comparison of the effectiveness of code-compliant vegetation fuel modification prescribed to reduce wildfire risks associated with development projects. The modeling for the project showed that vegetation fuel management and landscaping proposed for the project results in reductions in flame lengths, energy outputs, and ember spotting distances.

Project Density – The guidance notes that development density influences how likely a fire is to start or spread, and how likely it is that the development and its occupants will be in danger when a fire starts. Fire spread and structure loss is more likely to occur in low- to intermediate-density developments. The guidance encourages projects to utilize more concentrated, higher density development patterns that disrupt fire spread by removing or substantially fragmenting wildland vegetation.

Project Analysis for Guidance on Project Density – This general guidance is not applicable to the project because it is a park project and not a project that proposes to construct multiple buildings where development density and structure location are determining factors in wildfire risk reduction.

Location in the Landscape – The guidance reminds reviewing agencies that project placement in the landscape relative to fire history, topography and wind patterns also influences wildfire risk, and how a development project is planned within the landscape determines to what extent it will influence fire risk.

Project Analysis for Location in the Landscape – The project proposes a structure for use by volunteers who provide services to patrons of the park site. The structure is located well away from the edges of the project boundary and the adjacent natural vegetation fuels. The structure is located within the project boundary such that the required 100 feet of defensible space vegetation fuel medication can be provided on all sides of the structure.

Water Supply and Infrastructure – As part of evaluating a project's wildfire risk impacts, the guidance notes that an EIR should analyze the adequacy of water supplies and infrastructure to address firefighting within the project site.

This analysis should consider the potential loss of water pressure during a fire, which may decrease available water supply and the potential loss of power, which may eliminate the supply.

> Project Analysis for Water Supply and Infrastructure – As demonstrated in sections 4.15.4.3 and 4.19.4.3 of the FEIR, the project will be required to meet all code requirements related to fire flow and prove that the existing public water system is capable of providing water supply, including sufficient fire flow to control fires that might occur within the project site.

Evacuation – For projects located in high wildfire risk areas that present an increased risk of ignition and/or evacuation impacts, the guidance recommends that evacuation modeling and planning should be considered and developed at the time of project review and approval when there is greater flexibility to modify a project's design, density, siting, and configuration to address wildfire considerations rather than deferred to a later stage of the development process. The ultimate objective is to allow for informed decision-making that minimizes the environmental and public safety hazards associated with new developments that increase the risk of ignition and impede evacuation in high wildfire prone areas.

> Project Analysis for Evacuation – The project's original Fire and Emergency Operational Assessment (FEOA) noted that the San Diego County Wildland-Urban Interface Fire Emergency Response Plan has been updated for the Alpine South-East area as a part of the initial study for the project. It was noted that South Grade Road, which is adjacent to the project site, currently serves as a regional evacuation route. The FEOA encourages the County to plan for the project's special evacuation needs, which includes a plan to relocate large animals from the project's equestrian facilities and the presence of larger vehicles and livestock trailers on the evacuation routes.

Mitigating Wildfire Risk – Potential Measures

The guidance identifies "potential mitigation measures and design alternatives" (pg. 12) that may reduce a project's wildfire risk impacts, such as:

- Avoiding and minimizing low-density development patterns or leapfrog-type developments with undeveloped wildland between developed areas.
- Decreasing the extent and amount of "edge" or wildland interface area where development is adjacent to undeveloped wildlands.
- Creating buffer zones and defensible space measures within and adjacent to the project.
- Siting projects to maximize the role of low-flammability landscape features that may buffer the development from fire spread.
- Undergrounding power lines.
- Limiting development along steep slopes and amidst rugged terrain, so as to decrease exposure to rapid fire spread and increase accessibility for firefighting.
- Placement of development close to existing or planned ingress/egress and designated evacuation routes to efficiently evacuate the project population and the existing community population, consistent with evacuation plans, while simultaneously allowing emergency access.
- Providing additional points of ingress and egress and modification of evacuation routes to minimize or avoid increasing evacuation times or emergency access response times.

- Hardening structures and homes against fire by upgrading building materials and installation techniques to increase a structure's resistance to heat, flames, and embers.
- Requiring a water supply capable of meeting fire flow demand during a wildfire.
- Limiting on-street parking to ensure access and egress roads are not obstructed by parked vehicles.

Analysis – Most of the potential mitigation measures and design alternatives suggested by the Attorney General's guidance are focused on projects that include the construction of buildings and associated infrastructure. This project consists of converting previously undeveloped and undisturbed land into a multi-use community park. However, the Project has incorporated several of the Attorney General's recommendations, including:

- Creating buffer zones and defensible space measures within and adjacent to the project.
- Consideration of undergrounding power lines
- Placement of development close to existing or planned ingress/egress and designated evacuation routes to efficiently evacuate the project population and the existing community population, consistent with evacuation plans, while simultaneously allowing emergency access.
- Requiring a water supply capable of meeting fire flow demand during a wildfire.
- Planning the project design to decrease the extent and amount of "edge" or wildland interface area where development is adjacent to undeveloped wildlands.
- Limiting development along steep slopes and amidst rugged terrain, so as to decrease exposure to rapid fire spread and increase accessibility for firefighting. The project parcel contains areas of steep slopes, however, development of the project site was limited to areas with fewer slopes for greater accessibility.
- Limiting on-street parking to ensure access and egress roads are not obstructed by parked vehicles by providing dedicated parking for Park patrons.

3 Conclusion

A thorough analysis of the project finds that it would align with the Attorney General's guidance for reducing or mitigating impacts associated with wildfire and will provide code-compliant defensible space vegetation fuel modification and fire prevention measures that will reduce the impacts of locating the project in a fire hazard severity zone to less than significant.

Appendix K

Alpine Park Fire Evacuation Plan Analysis

Prepared by:



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TO:	Mary Bilse, Senior Planner/Manager, ICF International
FROM:	Phuong Nguyen, RE; CR Associates (CRA)
DATE:	October 31, 2022
RE:	Alpine Community Park Fire Evacuation Analysis – Technical Memorandum

This technical memorandum aims to assess the time required for the site-emergency evacuation from Alpine Community Park ("Project"), under several scenarios, assuming a wind-driven fire that results in a required evacuation affecting the project site and surrounding community. The traffic evacuation simulations and related analysis presented here is to identify the vehicle travel times required under the various simulated evacuation events.

Executive Summary

The evacuation analysis assumes that up to 240 vehicles would evacuate from the proposed Project site. This assumption represents full occupancy of the Project's site. The analysis also assumes up to 4,029 vehicles and 4,432 vehicles would evacuate from the surrounding land uses, under the Existing and Cumulative scenarios, respectively. Key points from the analysis results are provided below, detail results and discussions are provided under the respective sections of this memorandum.

- It would take up to 2 hours and 31 minutes to evacuate the existing land uses via South Grade Road and Alpine Boulevard (Scenario 1). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 33 minutes (Scenario 2).

- Evacuating the Project Traffic only (Scenario 3) would take up to 31 minutes.

- Evacuating all existing land uses and the Project would take up to 2 hours and 40 minutes to evacuate the existing land uses via South Grade Road and Alpine Boulevard (Scenario 4). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 41 minutes (Scenario 5). Thus, the Project increases the total evacuation time by 9 Minutes and 8 Minutes, respectively.

- Under the cumulative year scenario, it would take up to 2 hours and 41 minutes to evacuate the cumulative land uses via South Grade Road and Alpine Boulevard (Scenario 6). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 44 minutes (Scenario 7).

- Evacuating all cumulative land uses and the Project would take up to 2 hours and 53 minutes to evacuate the cumulative land uses via South Grade Road and Alpine Boulevard (Scenario 4). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 50 minutes (Scenario 5). Thus, the Project's increase the total evacuation time by 12 minutes and 8 minutes, respectively.

The Project provides several features that would enhance evacuation, but which are not reflected in the average evacuation time results above. These features include substantial fuel modification zones within the Project site as well as fuel modification along the Project's frontage, and temporary areas for safe refuge and "shelter-in-place" options. Because the Project would provide a sizable ignition resistant landscape that emulates urbanized areas that have halted wildfire spread, emergency

managers may halt evacuations of the Project at any point during an evacuation event to move traffic that is of higher priority. The Project may also serve as a temporary evacuation point for evacuees from other areas due to its design as a fire-resistant zone. Evacuations throughout San Diego County operate on a priority basis, with those populations that are of greatest risk or highest exposure considered the highest priority. Downstream traffic flow is managed to move these populations first and the Project provides an opportunity to protect the park uses and nearby residents (if they evacuate to the Project's site) while prioritizing movement of populations that are at greater risk, reducing the evacuation times for those populations, possibly substantially.

Neither CEQA, nor the County has adopted numerical time standards for determining whether an evacuation timeframe is appropriate. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. The County considers a project's impact on evacuation significant if the project will significantly impair or physically interfere with implementation of an adopted emergency response or evacuation plan; or if the project will expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

Based on the evacuation simulations above, evacuation traffic generated by Project would not significantly increase the average evacuation travel time or result in unsafe evacuation timeframes. Evacuation flow would be able to be effectively managed.

Background and Purpose

This memorandum provides a summary of the various traffic simulation analyses conducted relative to evacuation of the Project site and surrounding community due to a wildfire. The simulations have been conducted for a variety of evacuation scenarios described below. Modeling potential evacuation traffic impacts requires that numerous assumptions be made to address the many variables that will impact a real-life evacuation scenario, including the number of existing vehicles in the community, the number of project vehicles that will need to evacuate, the roadway capacities and whether enhancements are provided (e.g., extra lanes, lane widening, signaling intersections), the total number of intersections and how they will be operating, the final destination, the targeted evacuation area, the total mobilization time, vegetation communities, weather and wind, fire spread rates, humidity, topography, risk to homes, locations of ignitions and new fire starts, lead time needed, etc. There are thousands of potential model scenarios, and each fire scenario poses variations that regularly change and would be reassessed "real-time" during a wildfire. Agencies involved in implementing an evacuation order may be informed by the project-specific modeling in this memorandum but will also rely on situational awareness and wildfire pre-plans, which act as operational tools to provide high-level fire assessments of assets at risk, preferred evacuation approaches, and safety information to inform evacuation decision-making. Analysis presented herein are consistent with the methodology and guidelines in the County of San Diego Operational Area Emergency Operations Plan (Annex Q) by the Unified San Diego County Emergency Services Organization and County of San Diego (September 2022).

The following analysis is intended to present representative evacuation scenarios using the best available information, conservative assumptions, and the best available modeling technology[1]. In an actual emergency, fire command will take into account numerous factors including fire location and spread rates, wind speeds and direction, humidity, topography, fuel loading, emergency access routes, evacuation routes, shelter-in-place options, time needed to evacuate, and other variables, and will issue specific evacuation or shelter-in-place directives consistent with the process and protocols

[1] This evacuation analysis was conducted using the Vissim microsimulation software, which is one of the leading microsimulation software models available that can accurately replicate human driving behavior during an evacuation, including yielding at a congested location and delay due to stop & go traffic.

outlined in the County of San Diego's Emergency Operations Plans. The evacuation traffic model used herein is appropriate for planning and comparison purposes and would provide useful information to agencies and emergency managers regarding evacuation timeframes for purposes of informing managers' issuance of specific evacuation or shelter-in-place orders. For that reason, it will be provided to agencies and emergency managers. However, during a wildfire, residents and park users should comply with directives from authorities and first responders conducting the evacuation or emergency response, not rely on this evacuation traffic model.

This technical memorandum and associated analyses were performed in accordance with the requirements of the Annex Q for the determination of evacuation times. The roadway network and vehicle input assumptions have been selected to simulate a "worst-case" evacuation scenario that would occur when park usage if the highest. This "worst-case" evaluation is not required by CEQA; indeed, CEQA requires the application of reasonable standards and criteria only. Nonetheless, this preparer imposed a "worst-case" evaluation out of an abundance of caution. In an actual wildfire event, it is likely that fewer park users would be presented on-site and fewer residents/customers would be presented in the evacuation area. While other evacuation scenarios are also possible, such as evacuation during morning or evening peak hours, however, during those hours, residents are likely to be away from their respective homes, and park users are not likely to arrive at the Project, thus they are already in a safe area. Under an evacuation order, first responder and law enforcements would not allow residents to return an endangered area. Therefore, the worst case is when everyone is already at home and attempt to leave all at once with all their vehicles.

The wildfire evacuation scenarios selected for this analysis were based on a comprehensive approach that included review of fire history, including review of the Cedar Fire evacuations in 2003, and West Fire in 2019, fire behavior science, area topography, fuel types, and the evolved approach to evacuations, which has become more targeted and surgical in recent evacuations instead of large, area wide, mass evacuations, which were the normal protocol prior to about 2015. In the highest probability wildfire scenarios that would result in evacuation, the perimeter populations in certain wildland urban interface locations are likely to comprise the priority populations to be targeted for evacuation. The entire Project will include fire hardening construction, which will provide significant additional protection against exposure to wildfire via fuel management zones, fire-resistant landscape, hardscape, and other measures. In certain cases, evacuation authorities may use the Project site as an evacuation site due to the availability of parking and fire-resistant designs.

Project Description

The proposed Project will be located on the west side of South Grade Road, east of Tavern Road, and south of Alpine Boulevard, within the unincorporated community of Alpine, in San Diego County. The Proposed Project will construct 24 acres of community park space including baseball fields, soccer fields, a skate park, equine staging area, corral, amphitheater, dog park, bike park, community garden, playground, shade structure, restrooms, picnic areas, RV Volunteer pad, and a parking lot. **Figure 1** displays the proposed Project location and **Figure 2** displays the proposed Project site plan.

The proposed Project will also improve South Grade Road, along the Project's frontage to provide wider pavements and buffer bike lanes on both sides. The buffer bike lanes will also act as a by-pass in case of emergency.



Alpine Community Park Evacuation Analysis
Technical Memorandum

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Figure 1
Proposed Project Regional Location



Alpine Community Park Evacuation Analysis
Technical Memorandum

Figure 2
Project Site Plan

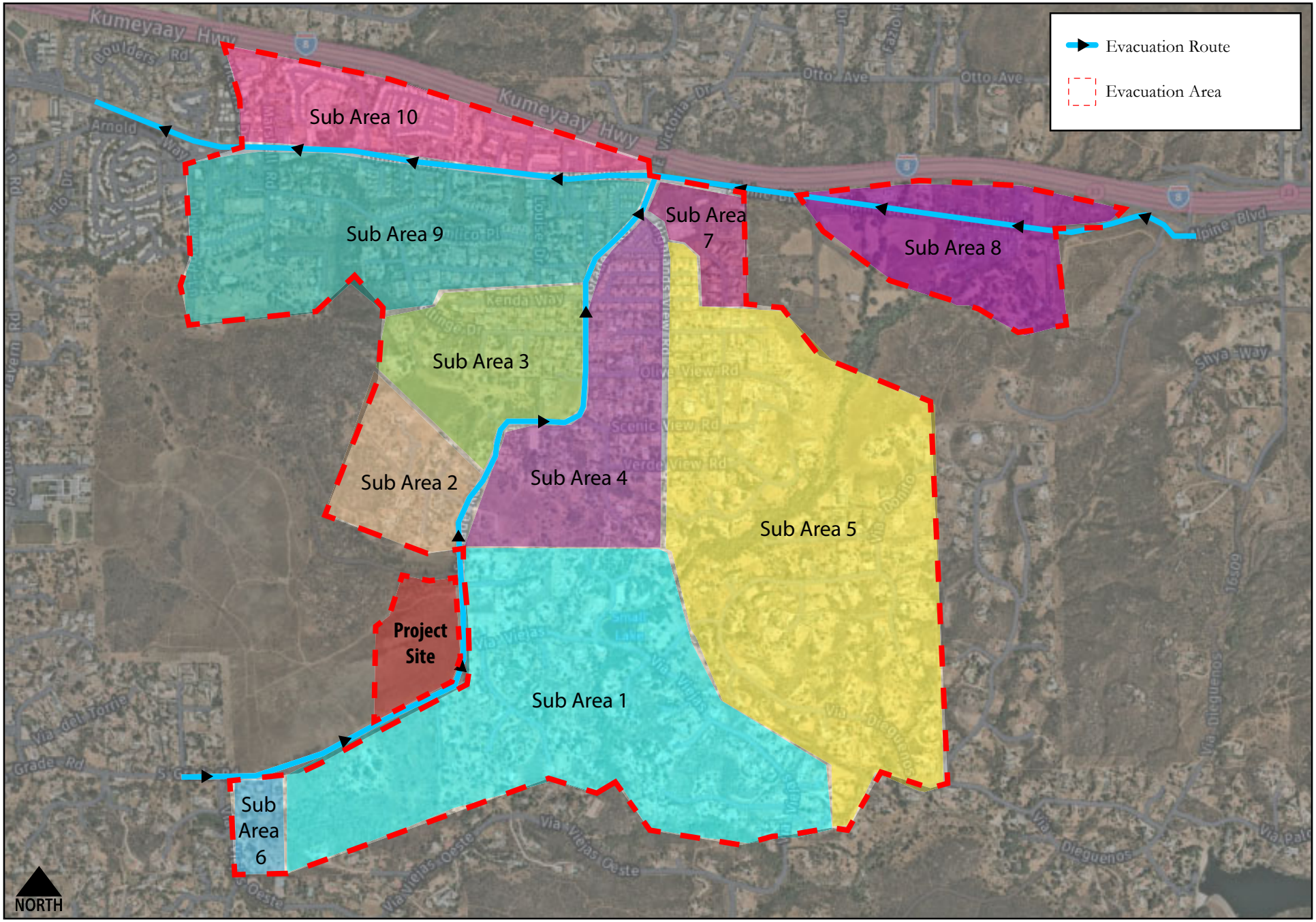
Assumptions

This evacuation analysis was performed for the Project to determine approximately how long it would take for park users from the Project and the surrounding community to evacuate to nearby urban areas in case of a fire emergency. Current evacuation practice typically targets the scope of the evacuation only to the area in immediate danger. This practice allows for better evacuation operations, reduces gridlock, and reserves sufficient travel way for emergency vehicles. It is assumed that first responders or law enforcement will direct traffic at all major intersections during the evacuation process.

During the evacuation process, which can proceed aided by the roadside fuel modification zones and unexposed corridors, wildfire progress may be slowed by fire-fighting efforts that would likely include fixed wing and helicopter fire-fighting assets. Hand crews would also be deployed toward containment. None of the evacuation scenarios presented here assumed counter-flow lanes, as these lanes are reserved for first responders, law enforcement, and fire fighters in case of unforeseen circumstances.

The following is a brief description of each of the nine (9) evacuation scenarios analyzed in this memo. Additional details regarding each scenario are provided below in the section entitled Scenario Description:

- **Scenario 1** – *Existing Land Uses*: This scenario estimates the evacuation time for the existing land uses along Alpine Boulevard, between West Victoria Drive and Willows Road, as well as land uses along South Grade Road, between Alpine Boulevard and Via Viejas Oeste. This evacuation area was selected for the analysis due to the tendency for the land use and evacuating vehicles in this area to share the same roadways as the Project. Other evacuation routes such as other mobility element roadways are also available in an evacuation, however, for a conservative analysis, it is assumed that these roadways are reserved for other areas of the Alpine community. This scenario assumed that all evacuating vehicles would utilize the existing lanes to exit the evacuation area. Vehicles are assumed to be in a safe zone once they pass W Victoria Road. **Figure 3** displays the area assumed to be evacuated under this scenario. **Figure 4** displays the Mobility Element roadways and evacuation routes within the study area.
- **Scenario 2** – *Existing Land Uses with Two-Way Left-Turn Lane (TWLTL)*: This scenario is the same as Scenario 1, with one different. The TWLTL along Alpine Boulevard would be use as a emergency evacuation lane. **Figure 5** displays the TWLTL segment.
- **Scenario 3** – Project Only: This scenario estimates the time for full evacuation of the Project site. **Figure 6** displays the area assumed to be evacuated under this scenario.
- **Scenario 4** – *Existing with the Project*: This scenario is like Scenario 1, with the addition of all Project traffic.
- **Scenario 5** – *Existing Land Uses with the Project with Two-Way Left-Turn Lane*: This scenario is like Scenario 2, with the addition of all Project traffic.
- **Scenario 6** – *Cumulative Land Uses:* This scenario is like Scenario 1, with the addition of potential growth in evacuation traffic in the area. Review of the County of San Diego Accela Records only show one additional cumulative project with 19 single family dwelling units. However, for a conservative analysis, a ten percent (10%) growth was applied to all evacuation areas.
- **Scenario 7** – *Cumulative Land Uses with Two-Way Left-Turn Lane:* This scenario is the same as Scenario 6, with the utilization of the TWLTL along Alpine Boulevard as an evacuation lane.
- **Scenario 8** – *Cumulative Land Uses with Project:* This scenario is similar to Scenario 6, with the addition of all Project traffic.
- **Scenario 9** – *Cumulative Land Uses with Project with Two-Way Left-Turn Lane:* This scenario is similar to Scenario 7, with the addition of all Project traffic.



Alpine Community Park Evacuation Analysis
Technical Memorandum

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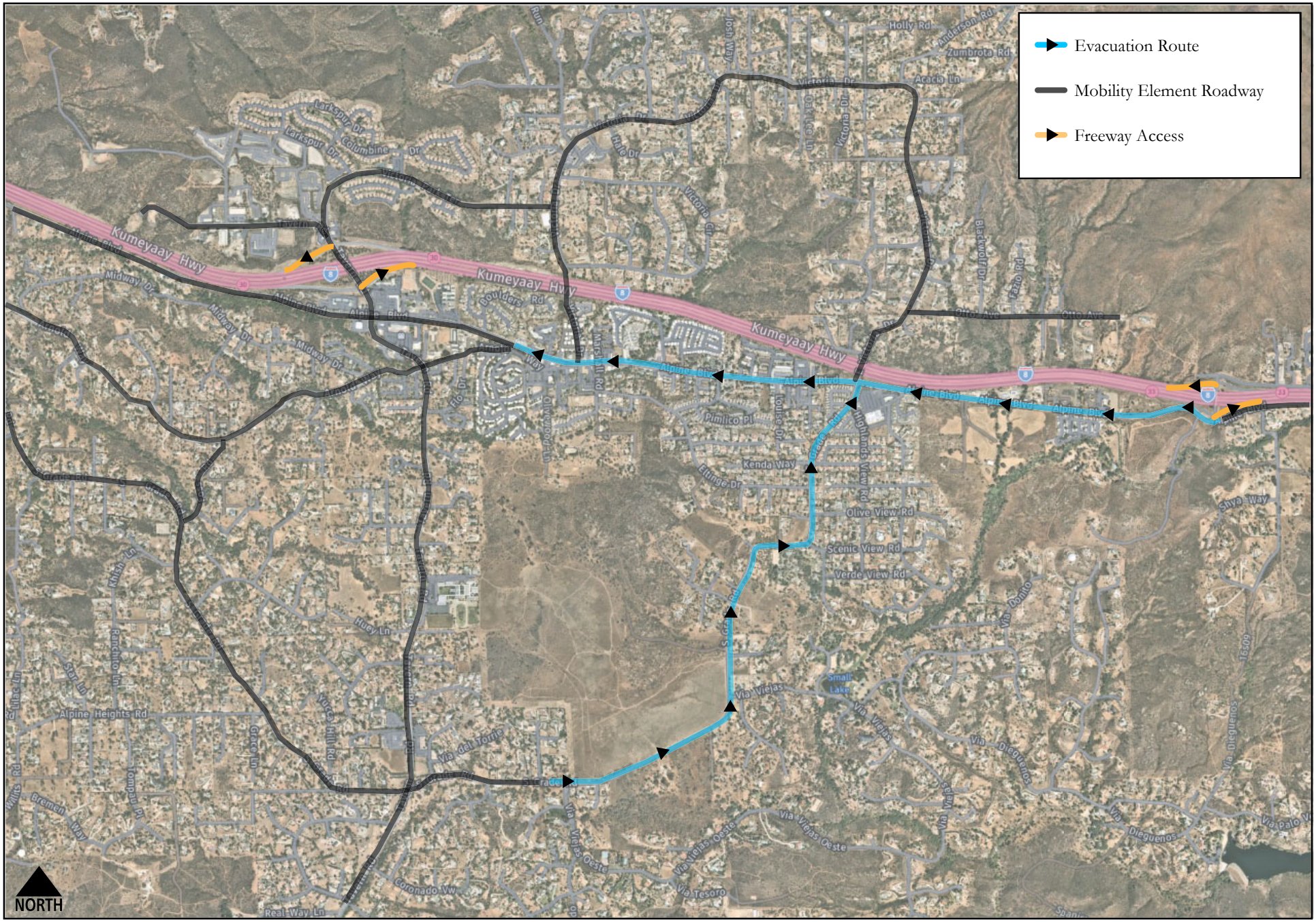
Figure 3
Existing Land Uses Evacuation Area



Alpine Community Park Evacuation Analysis
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Figure 4
Mobility Element Roadways and Evacuation Routes

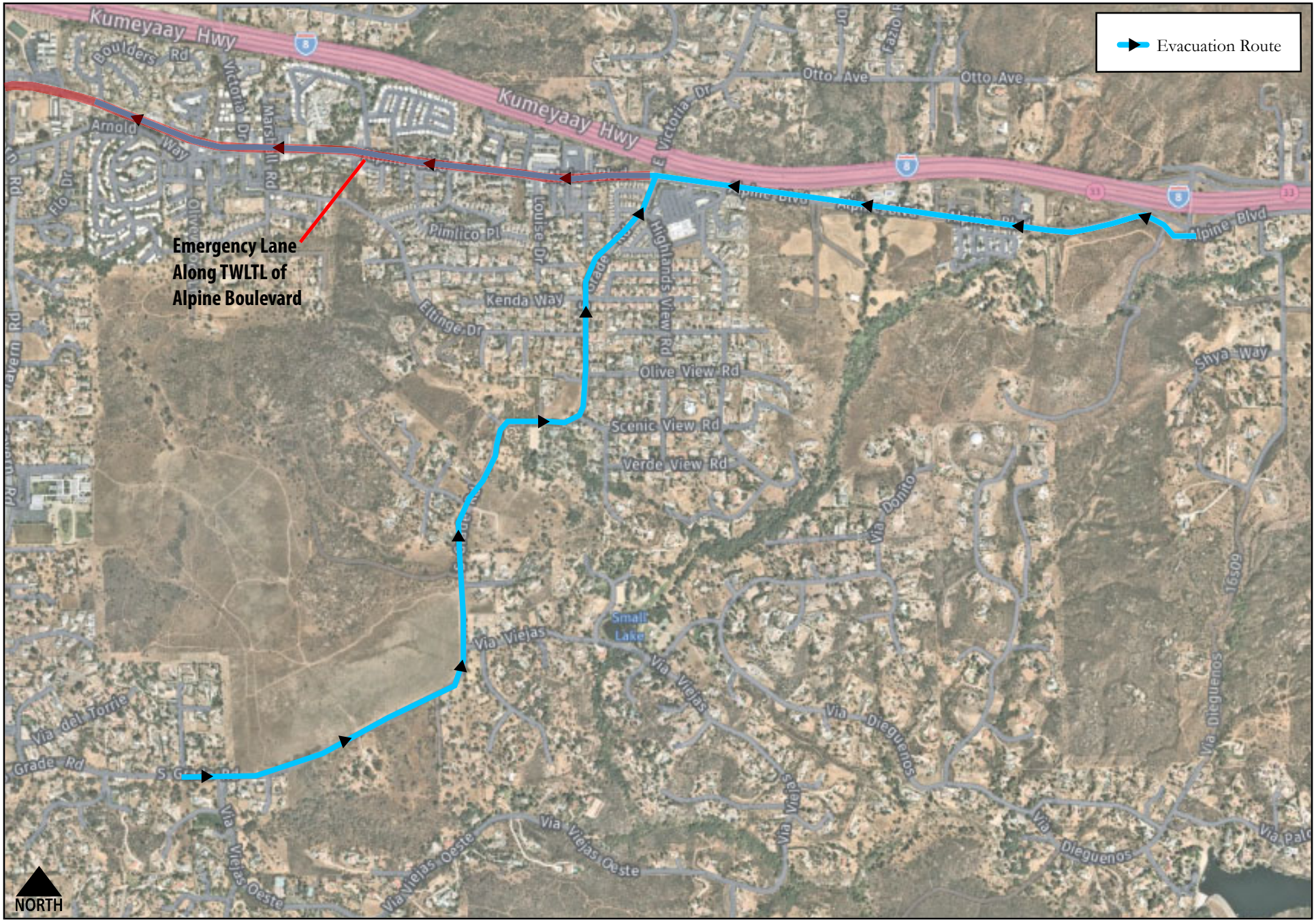

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Figure 5
Evacuation Routes with Two-Way Left-Turn Lane

Evacuation Assumptions

This section provides a description of the different assumptions used to calculate the number of evacuating vehicles and evacuation routes within the study area. Because of uncertainty regarding each household level of readiness to mobilize under an evacuation order, the analysis presented below does not include the time it takes for a household to mobilize once an evacuation order is issued. Note that while some households may leave the area prior to an evacuation order for personal reasons, for a conservative analysis, it is assumed that all the households and vehicles would leave together once an evacuation order is issued.

Evacuating Vehicles

The number of vehicles evacuating under each scenario was calculated for each individual land uses. Assumption for the different land uses within the study area are as follows:

The total number of evacuating vehicles associated with residential land uses was calculated by taking the total number of housing units within the study area and multiplying it by the average vehicle ownership (2.071 vehicles per dwelling unit). The total number of housing units and average vehicle ownership was obtained from the American Community Survey Census. Note that this is a conservative analysis, as the total housing units includes both occupied and unoccupied housing.

The total number of evacuating vehicles associated with office and retail land uses were calculated by taking the square footage each land uses and multiplying them by the average parking generation rate for the respective land uses from the Institute of Transportation Engineer (ITE) Parking Generation Manual or the Alpine Village Core Form-Based Code (AVC Code). It is assumed that all parked vehicles would evacuate in an emergency. Additional field review was conducted to adjusted for land uses that many generate more weekend trips, for example, it is assumed that both Janet's Montana Café and Shadow Mountain Grace Church are fully occupied in the analysis.

Table 1 displays the total evacuating vehicles for the study area. Average vehicle ownership and residential unit calculations are provided in **Attachment A**.

Table 1 – Evacuating Vehicles

Land Uses	Amount	Rate	Source	Total
Residential	1,517	2.071	US Census	3,142
Office	19,900	0.76	ITE	15
General Commercial	147,000	3.5	AVC Code	515
Neighborhood Commercial	70,500	3.64	ITE	257
Industrial	11,000	0.65	ITE	7
Shadow Mountain Grace Church		Assumed fully occupied		61
Janet's Montana Café		Assumed fully occupied		32
			Total Without Project	**4,029**
		Project Assumed fully occupied		240
			Total With Project	**4,269**

For the analysis, it is assumed that two percent (2%) of the evacuating vehicles would be heavy vehicles (trucks with trailers). Two percent is the nationally accepted ratio of heavy vehicles to all vehicles[2].

Mass Evacuation versus Targeted Evacuation

Several mass evacuation scenarios are modeled in which all area residents would evacuate at the same time: Scenarios 1, 2, and 4 through 9. The mass evacuation assumption presents a worst-case scenario as all traffic would be directed to the evacuation roadways at once. Mass evacuation events can overwhelm a roadway's capacity which results, when reaching a threshold traffic density, in decreasing traffic flow.

In an actual "real-life" wildfire event, a phased, or targeted, evacuation would be implemented where orders are given to evacuate based on vulnerability, location, and other factors, which reduces or prevents traffic surges on major roadways and improves traffic flow. The phased evacuation strategy also prioritizes the evacuation of residents in proximity to the immediate danger, giving emergency managers the ability to monitor the fire situation and decide in real time based on changing conditions whether to order additional evacuations as needed, or not. The Federal Emergency Management Agency (FEMA) Planning Considerations: Evacuation and Shelter-in-Place Guidance for State, Local, Tribal, and Territorial Partners (July 2019) guidelines recommend phase or zonal evacuation, as this approach prioritizes endangered populations.

Extreme Wildfire Event

The evacuation analysis presented here assumes a Santa Ana-wind driven fire from the north and/or east of the study area and traveling in a westerly and southerly direction. This fire condition is the one most likely to require a large-scale evacuation, and the one that would create the most risk to property and humans. Traffic evacuating from both the Project site and nearby developments are anticipated to use South Grade Road and Alpine Boulevard under a Santa Ana-wind driven fire scenario. While some of the land uses are located close to Willows Road, due to exposure to the wildland interface, this roadway and interchange was not used in the analysis.

In California, wildfire-related large-scale evacuations are almost exclusively associated with wildfires that occur on extreme fire weather days, also known as "Red Flag Warning" days. These days occur when relative humidity drops to low levels and strong winds from the north/northeast are sustained. With climate change, periods in which such wildfires occur may increase. During Red Flag Warning days, vegetation is more likely to ignite and fire spread is more difficult to control. In San Diego County, these extreme weather days typically occur during limited periods in the late summer, fall and, occasionally, in the spring, but may occur at other times on a less frequent basis. Currently, it is not common to experience more than 15 to 20 Red Flag Warning days in a typical year. Wildfires that occur during these periods of extreme weather are driven by winds –referred to as "Santa Ana" winds – that originate in the north or east and blow toward the south or west. Fires driven by these winds move very quickly, making them difficult to control. In response to such fires, emergency managers typically activate pre-planned evacuation triggers that require down-wind communities to sequentially be notified to evacuate and move to nearby urbanized areas prior to the fire's encroachment.

Wildfires that occur on non-extreme weather days behave in a much less aggressive manner and pose fewer dangers to life and property because they include less aggressive fire behavior and are easier to control. Terrain and fuel are typically the wildfire drivers. During these non-extreme weather days,

[2] https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_599.pdf (p.5)

vegetation is much more difficult to ignite and does not spread fire as rapidly. In these situations, firefighters have a very high success rate of controlling fires and keeping them under 10 acres. CALFIRE estimates that 90% of all vegetation fires occur during normal, onshore weather conditions and that such fires account for only 10% of the land area burned. Conversely, the 10% of wildfires that occur during extreme fire weather account for 90% of the land area burned. This data highlights that the most dangerous fire conditions are those related to a fire that moves rapidly due to high winds and low humidity, whereas under normal conditions fires are likely to be controlled with no evacuation or possibly limited, focused evacuations.

While it is possible that a fire driven by onshore wind (i.e., wind from the west) could require evacuation of the Project site, such an event would be highly unusual. Moreover, due to the reduced fire behavior during normal weather periods, the evacuation would not be expected to be a large-scale evacuation of large areas. Instead, most of the Project area population would be anticipated to remain at their locations and within their communities, with a more targeted evacuation being ordered, if any.

Primary Evacuation Routes

The analysis presented here assumes that traffic evacuating from both the Project and nearby land uses would use Otay Lakes Road to travel west into the more urbanized areas of Alpine and beyond. This presents a worst-case scenario by assuming more traffic would utilize these roadways despite the other available options that may be employed in an actual evacuation scenario, including use of other roadways or shelter in place.

This assumption selects a reasonable evacuation route for the assumed extreme weather scenario and a fire traveling in a southwesterly direction. Detailed evacuation analysis information is provided in **Attachment B**.

No contraflow lanes were assumed to provide additional evacuation capacity under the analysis. Contraflow or lane reversal involves reversing the usual flow of one or more lanes to serve additional outbound evacuation traffic, increasing outbound traffic capacity to move people away from the wildfire or other hazard. Such a strategy can be used to eliminate bottlenecks in communities with road geometrics that prevent efficient evacuations or to otherwise hasten and facilitate traffic flow. However, among the considerations in planning emergency contraflow are whether sufficient traffic control officers are available, potential negative impact on responding fire apparatus, access management, merging, exiting, safety concerns, and labor requirements.[3] None of the evacuation scenarios analyzed here assumed contraflow traffic flow would be implemented; instead, two-way travel was assumed, with evacuating vehicles traveling outbound to the Safe Zone, and inbound lanes assumed to be reserved for use by first responders, law enforcement, and fire fighters. It is assumed that first responders or law enforcement will direct traffic at all major intersections during the evacuation process. Should evacuation managers determine that contraflow is preferred or necessary in the context of an actual wildfire event, contraflow remains a tool in the evacuation manager's toolbelt that would increase evacuation capacity and decrease evacuation times.

Safe Zone

Based on review of the County's fire history[4], fires have generally not advanced into newer urbanized areas, including to Alpine Village Core. Densely urbanized, irrigated, and hardscaped areas are highly ignition resistant and interrupt fire spread patterns and provide defensible landscape features for

[3] Dudek July 2014. "Wildland Fire Evacuation Procedures Analysis" for City of Santa Barbara, California, page 65.
[4] Cedar Fire 2003 After Action Report. San Diego Fire and Rescue Department and CAP Radio History of California Wildfires https://projects.capradio.org/california-fire-history/#14.29/32.8359/-116.75856

firefighter tactical control measures. Thus, it is assumed that evacuees would be directed into the Alpine Village Core, where more evacuation routes are available, including access to I-8 to evacuate toward San Diego. Evacuees are considered to have reached a safe area once they travel past the intersection of W Victoria Road and Alpine Boulevard.

Analysis Methodology

The analysis methodology utilized in this report is consistent with the methodologies provided in the County of San Diego – Operational Area Emergency Operations Plan – Annex Q Evacuation Plan (2018). Annex Q provides the following equation for determining evacuation time:

Evacuation Time = (Evacuation Population / Average Vehicle Occupancy) / Roadway Capacity

Note that the evacuation capacity calculated in this report, including the methodology provided in Annex Q (2018) is for planning purpose only. During real life evacuation scenario, the evacuation authority will determine the appropriate evacuation routes and evacuation areas based on different factors. Factors that could affect the evacuation routes are provided Annex Q, which includes but not limited to the following:

- Shortest route to the designated destination areas
- Maximum capacity
- Ability to increase capacity and traffic flow using traffic control strategies.
- Maximum number of lanes that provide continuous flow through the evacuation area.
- Availability of infrastructure to disseminate real-time conditions and messages to evacuees en route, such as changeable message signs.
- Minimal number of potentially hazardous points and bottlenecks, such as bridges, tunnels, lane reductions, etc.
- Traffic conditions must be monitored along evacuation routes and operational adjustments should be made as necessary to maximize throughput.

Evacuation authority will disseminate the evacuation information to evacuees using the methodology outline in the Annex Q Evacuation Coordination Checklist.

To analyze the evacuation events, CR Associates (CRA) conducted simulations using *Vissim*, a microscopic, multimodal traffic flow modeling software used to simulate different traffic conditions. In *Vissim* simulations, roadway capacity is accounted for and each vehicle in the traffic system is individually tracked through the model, and comprehensive measures of effectiveness, such as average vehicle speed and queueing, are collected on every vehicle during each 0.1-second of the simulation. This software enables drivers' behaviors during an evacuation to be replicated. A total of 20 simulations were conducted to yield a reasonable sample size to determine the performance of the study area roadways and impacts during evacuation scenarios. As previously noted, to be conservative, CRA assumed a worst-case scenario in which all vehicles belonging to the households in the study area would be used in the evacuation, instead of the necessary number of vehicles needed to evacuate the impacted population. Detailed evacuation analysis information is provided in Attachment B.

Evacuation Routes

The evacuation areas under each scenario are anticipated to utilize the following facilities as evacuation routes:

Alpine Boulevard – Alpine Boulevard is a two-lane roadway with TWLTL and bike lanes on both sides and a posted speed limit of 40 miles per hour. Sidewalk facilities and parking are intermittently present along both sides of the roadway.

South Grade Road – Within the project study area, South Grade Road is a two-lane undivided roadway between Alpine Boulevard and Tavern Road with a posted speed limit of 40 miles per hour. Sidewalk facilities are intermittently present along both sides of the roadway. Additionally, there are no bicycle facilities along the roadway and parking is prohibited along both sides of the roadway. The Project will improve South Grade Road, along the Project's frontage to provide buffer bike lanes on both sides, which will also act as emergency bypass area for law enforcement and emergency vehicles during congested condition.

Evacuation Analysis & Results

Based on the analysis methodology described above, **Table 2** reflects the evacuation times for each scenario.

Table 2 – Evacuation Vehicles and Time Summary – All Scenarios

Scenario	Total Vehicles	Evacuation Time
Scenario 1 – Existing Land Uses	4,029	2 hours 31 minutes
Scenario 2 – Existing Land Uses with Two-Way Left-Turn Lane (TWLTL)	4,029	1 hour 33 minutes
Scenario 3 – Project Only	240	31 minutes
Scenario 4 – Existing with the Project	4,269	2 hours 40 minutes
Scenario 5 – Existing Land Uses with the Project with Two-Way Left-Turn Lane	4,269	1 hour 41 minutes
Scenario 6 – Cumulative Land Uses	4,432	2 hours 43 minutes
Scenario 7 – Cumulative Land Uses with Two-Way Left-Turn Lane	4,432	1 hour 50 minutes
Scenario 8 – Cumulative Land Uses with Project	4,672	2 hours 53 minutes
Scenario 9 – Cumulative Land Uses with Project with Two-Way Left-Turn Lane	4,672	1 hour 55 minutes

Source: CR Associates (2022).

The modeling does not depict the evacuation time for *each* population modeled, but rather the time needed to evacuate *all* populations. However, it can be reasonably assumed that those populations located in closer proximity to the safe zone would safely evacuate sooner than the calculated evacuation times shown in Table 2.

As shown in Table 2, it would take up to 2 hours and 31 minutes to evacuate the existing land uses via South Grade Road and Alpine Boulevard (Scenario 1). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 33 minutes (Scenario 2).

Evacuating the Project Traffic only (Scenario 3) would take up to 31 minutes.

Evacuating all existing land uses and the Project would take up to 2 hours and 40 minutes to evacuate the existing land uses via South Grade Road and Alpine Boulevard (Scenario 4). If the TWLTL along

Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 41 minutes (Scenario 5). Thus, the Project increases the total evacuation time by 9 Minutes and 8 Minutes, respectively.

Under the cumulative year scenario, it would take up to 2 hours and 43 minutes to evacuate the cumulative land uses via South Grade Road and Alpine Boulevard (Scenario 6). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 50 minutes (Scenario 7).

Evacuating all cumulative land uses and the Project would take up to 2 hours and 53 minutes to evacuate the cumulative land uses via South Grade Road and Alpine Boulevard (Scenario 4). If the TWLTL along Alpine Boulevard is utilized as an evacuation lane, then the evacuation time reduces to 1 hours and 55 minutes (Scenario 9). Thus, the Project's increase the total evacuation time by 10 minutes and 5 minutes, respectively.

The Project provides several features that would enhance evacuation, but which are not reflected in the average evacuation time results above. These features include substantial fuel modification zones within the Project site as well as fuel modification along the Project's frontage, and temporary areas for safe refuge and "shelter-in-place" options. Because the Project would provide a sizable ignition resistant landscape that emulates urbanized areas that have halted wildfire spread, emergency managers may halt evacuations of the Project at any point during an evacuation event to move traffic that is of higher priority. The Project may also serve as a temporary evacuation point for evacuees from other areas due to its design as a fire-resistant zone. Evacuations throughout San Diego County operate on a priority basis, with those populations that are of greatest risk or highest exposure considered the highest priority. Downstream traffic flow is managed to move these populations first and the Project provides an opportunity to protect the park uses and nearby residents (if they evacuate to the Project's site) while prioritizing movement of populations that are at greater risk, reducing the evacuation times for those populations, possibly substantially.

Analysis and Conclusion

Neither CEQA, nor the County has adopted numerical time standards for determining whether an evacuation timeframe is appropriate. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. The County considers a project's impact on evacuation significant if the project will significantly impair or physically interfere with implementation of an adopted emergency response or evacuation plan; or if the project will expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

The County of San Diego has historically had an extremely high success rate for safely evacuating large numbers of people and doing so in a managed and strategic way using available technological innovations. Safely undertaking large-scale evacuations may take several hours or more and require moving people long distances to designated areas. Further, evacuations are fluid and timeframes may vary widely depending on numerous factors, including, among other things, the number of vehicles evacuating, the road capacity to accommodate those vehicles, residents' awareness and preparedness, evacuation messaging and direction, and on-site law enforcement control.

Notwithstanding evacuation challenges and variables, the success rate in the County of San Diego in safely managing both mass and targeted evacuations is nearly 100% safe evacuations based on research showing there were no fire-caused deaths during an evacuation. Technological advancements and improved evacuation strategies learned from prior wildfire evacuation events have resulted in a system that is many times more capable of managing evacuations. With the technology in use today in the County, evacuations are more strategic and surgical than in the past, evacuating

smaller areas at highest risk and phasing evacuation traffic so that it flows more evenly and minimizes the surges that may slow an evacuation. Mass evacuation scenarios where large populations are all directed to leave simultaneously, resulting in traffic delays, are thereby avoided, and those populations most at risk populations are able to safely evacuate.

Based on the evacuation simulations above, evacuation traffic generated by Project would not significantly increase the average evacuation travel time or result in unsafe evacuation timeframes. Evacuation flow would be able to be effectively managed.

The information presented here will be provided to emergency managers for use in pre-planning scenarios to better inform the field decisions made pursuant to adopted Emergency Operations Plans. Emergency personnel who issue an evacuation order may take into account these time estimates in determining when and where to issue evacuation orders. In a real evacuation scenario, emergency managers may use alternative actions/options to further expedite evacuation. Such actions may include providing additional lead time in issuing evacuation orders, providing alternative signal control at downstream intersections, utilizing additional off-site routes or directing traffic to roadways with additional capacity, implementing contra-flow lanes, issuing "shelter-in-place" orders when determined to be safer than evacuation, or considering the possibility of a delayed evacuation where parts of the population could be directed to remain on-site until the fire burns out in the sparse fuels around the evacuation route. These options require "in the field" determinations of when evacuations are needed and how they are phased to maximize efficiency. Overall, safe evacuation of the Project and the surrounding community is possible under all modeled scenarios.

Limitations

CRA has presented here a conservative analysis simulating evacuation during an extreme wildfire event. As previously noted, the analysis presents the total time to complete evacuation of all evacuees under the various scenarios, and not the average travel time for a single evacuee.

However, as discussed above, wildfires are variable events. The underlying planning principle for fire preparedness, given the dynamic nature of a fire, is to demonstrate the availability of multiple route alternatives and response strategies to permit emergency professionals to manage their response according to the specific circumstances. The Project area provides route and response alternatives too numerous to be considered in this model. Emergency responders will coordinate the safest possible evacuation based on the dynamic circumstances of the actual event, including the appropriate phasing of the evacuation, and utilization of the most appropriate ingress and egress routes for area residents and emergency responders.

The scope of route alternatives and response strategies available to emergency professionals to manage a potential fire in the County cannot be and should not be evaluated using this evacuation analysis alone. However, a more comprehensive view of the Project's fire safety is gained by understanding this memorandum, Alpine County Park Fire & Emergency Assessment by Rohde & Associates (June 2021), and decision making of emergency responders as detailed in the County Emergency Operations Plan.

The net result of changing the variables selected could yield an average evacuation travel time shorter or longer than the results detailed in the analysis. Many factors can shorten or lengthen the vehicle time from the results shown herein. For example:

1. Changing the possible evacuation routes selected would affect the results. For instance, utilizing roads for ingress and/or egress that are not utilized in this analysis could shorten vehicle travel times relative to the results shown herein.

2. Increasing or decreasing the number of path permutations and percentage of the population utilizing each route that leads out of the immediate area could shorten or lengthen vehicle travel time relative to the results shown herein.

3. Emergency professionals electing to reserve certain travel lanes for emergency vehicle ingress for periods of time could affect the travel time relative to the results shown herein.

4. Assuming evacuees utilize fewer or more vehicles to evacuate from their homes relative to the vehicle utilization rate selected in the analysis would shorten or lengthen vehicle travel time relative to the results shown herein.

5. Changing the mix of vehicle trips allocated to each evacuation route could shorten or lengthen vehicle travel time relative to the results shown herein.

6. Assuming different road condition adjustment factors could shorten or lengthen the vehicle travel time relative to the results shown herein.

7. Assuming fewer people are at home when the evacuation notice is given would reduce the number of vehicle trips and shorten vehicle travel time relative to the results shown herein.

8. Assuming some portion of vehicle trips are made in advance of the evacuation notice would reduce the number of vehicle trips relative to the results shown herein.

9. Assuming emergency professionals elect to implement contraflow on certain roadways to open up additional lanes for emergency evacuation egress could reduce the travel time results shown herein.

This evacuation time analysis is necessarily limited in scope given the numerous variables inherent in a wildfire and evacuation event. However, as discussed above, it is not anticipated that the Project will significantly impact evacuation of the Project site or existing surrounding communities based on evacuation times and other qualitative considerations.

Prepared by

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Senior Transportation Engineer
CR Associates

Average Vehicle Ownership Summary

VEHICLES AVAILABLE			
Occupied housing units	Housing Unit	Veh Ownership	Total
No vehicles available	205	0	0
1 vehicle available	1567	1	1567
2 vehicles available	2459	2	4918
3 or more vehicles available	2453	3	7359
Total	6684		13844
Average Veh Ownership			2.071

SELECTED HOUSING CHARACTERISTICS

United States® Census Bureau

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Notes | Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | CSV | ZIP | Print | Map

	Total housing units	Occupied housing units				
Label			No vehicles available	1 vehicle available	2 vehicles available	3 or more vehicles available
Census Tract 212.02, San Diego County, California						
Estimate	1,288	1,100	28	178	335	559
Percent	1,288	1,100	2.5%	16.2%	30.5%	50.8%
Census Tract 212.04, San Diego County, California						
Estimate	1,902	1,848	42	200	808	798
Percent	1,902	1,848	2.3%	10.8%	43.7%	43.2%
Census Tract 212.05, San Diego County, California						
Estimate	2,781	2,603	112	1,012	828	651
Percent	2,781	2,603	4.3%	38.9%	31.8%	25.0%
Census Tract 212.06, San Diego County, California						
Estimate	1,147	1,133	23	177	488	445
Percent	1,147	1,133	2.0%	15.6%	43.1%	39.3%

Sub Area	Number of Dwelling Units	Average Veh. Ownership	Acres of Office	SF of Office	ITE Park Gen (Saturday - Highest)	Acres of Retail	SF of Retail	Category	ITE Park Gen Rate	SF of Other	Category	ITE Park Gen Rate	Other Parking - full occupancy	Total (Existing)	Cumulative
1	88	2.071	0			0								182	200
2	17	2.071	0			0								35	39
3	60	2.071	0			0								124	136
4	131	2.071	0			0								271	298
5	174	2.071	0			0								360	396
6	6	2.071	0			0								13	14
7	19	2.071	0.9	4214	0.76	7.9	70,469	Neighborhood Shopping Center	3.64					300	330
8	149	2.071	0			0				11,008	Light Industrial	0.65	61	377	415
9	467	2.071	3.1	15600	0.76	7.2	64,136		3.5					1,204	1324
10	406	2.071	0.5			10.7	82,830		3.5				32	1,163	1280
Total														**4,029**	**4,432**
Project													240	240	240
Total with Project														**4,269**	**4,672**

Source: SF of land uses - SANDAG Parcel Data

Note: Sub Area 8 Other Parking = Shadow Mountain Grace Church, Sub Area 10 Other Parking = Janet Montana Cafe

Attachment B
Evacuation Analysis Worksheets

Run	Min (Start)	Max (End)	Total (Seconds)
1	421.8	9576.2	9154.4
2	423.7	9348.7	8925
3	422.2	9563.7	9141.5
4	399.3	9383.9	8984.6
5	397.7	9406.3	9008.6
6	401.4	9194	8792.6
7	398.3	9260.8	8862.5
8	399.1	9331.3	8932.2
9	399.2	9342.2	8943
10	410.3	9496.8	9086.5
11	407.8	9662.2	9254.4
12	408.5	9429.3	9020.8
13	400	9596.2	9196.2
14	427.9	9550.2	9122.3
15	421	9709.7	9288.7
16	419.3	9652	9232.7
17	409.4	9527.3	9117.9
18	409.6	9607.2	9197.6
		Average	9070.083333
		Time	2:31

Scenario 2 – Existing Land Uses with Two-Way Left-Turn Lane (TWLTL)

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.3	5935.7	5507.4
2	403.1	5884.4	5481.3
3	421.8	5997.3	5575.5
4	423.7	6174.8	5751.1
5	422.2	5887	5464.8
6	399.3	5806.1	5406.8
7	397.7	6439.8	6042.1
8	401.4	5686.8	5285.4
9	398.3	5740.7	5342.4
10	399.1	6231	5831.9
11	399.2	6274	5874.8
12	410.3	5810.8	5400.5
13	407.8	6072.8	5665
14	408.5	5925	5516.5
15	400	6092.7	5692.7
16	427.9	5838.9	5411
17	421	6252.4	5831.4
18	419.3	6319.1	5899.8
19	409.4	6107.9	5698.5
20	409.6	5791.1	5381.5
		Average	5603.02
		Time	1:33

Scenario 3 – Project Only

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.1	2284.9	1856.8
2	438.2	2390.2	1952
3	425.7	2282.8	1857.1
4	476.4	2313	1836.6
5	409.6	2265.9	1856.3
6	428.1	2313.2	1885.1
7	446.4	2317	1870.6
8	449.5	2344.7	1895.2
9	415.2	2331.9	1916.7
10	430.8	2352.7	1921.9
11	448.8	2261.9	1813.1
12	425.8	2294.3	1868.5
13	449.4	2274.8	1825.4
14	409.7	2421.4	2011.7
15	428.2	2300.9	1872.7
16	446.6	2400.6	1954
17	441.8	2247	1805.2
18	415.3	2291.2	1875.9
19	416.2	2265	1848.8
20	458.7	2340.3	1881.6
		Average	1880.26
		Time	0:31

Scenario 4 – Existing with the Project

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.3	9830.9	9402.6
2	403.1	10077.3	9674.2
3	421.8	10071.5	9649.7
4	423.7	9918.9	9495.2
5	422.2	10098.4	9676.2
6	399.3	9921.3	9522
7	397.7	9898.7	9501
8	401.4	9679.5	9278.1
9	398.3	9784.4	9386.1
10	399.1	9890.7	9491.6
11	399.2	9905.3	9506.1
12	410.3	10084.1	9673.8
13	407.8	10216.4	9808.6
14	408.5	10021.8	9613.3
15	400	10155	9755
16	427.9	10073.1	9645.2
17	421	10149.7	9728.7
18	419.3	10145.4	9726.1
19	409.4	10162	9752.6
20	409.6	10141.2	9731.6
		Average	9600.885
		Time	2:40

Scenario 5 – Existing Land Uses with the Project with Two-Way Left-Turn Lane

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.3	6424.1	5995.8
2	403.1	6481.9	6078.8
3	421.8	6465.4	6043.6
4	423.7	6655	6231.3
5	422.2	6468.3	6046.1
6	399.3	6300.3	5901
7	397.7	6996.2	6598.5
8	401.4	6095.1	5693.7
9	398.3	6223.8	5825.5
10	399.1	6575.8	6176.7
11	399.2	6708.4	6309.2
12	410.3	6154.8	5744.5
13	407.8	6569.4	6161.6
14	408.5	6452.8	6044.3
15	400	6646.4	6246.4
16	427.9	6033.6	5605.7
17	421	6798.7	6377.7
18	419.3	6798.8	6379.5
19	409.4	6678	6268.6
20	409.6	6221.8	5812.2
		Average	6077.035
		Time	1:41

Scenario 6 – Cumulative Land Uses

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.1	10121.3	9693.2
2	428.1	10121.3	9693.2
3	402	10090.1	9688.1
4	421.5	10172.2	9750.7
5	423.7	10170.1	9746.4
6	422.1	10215.4	9793.3
7	398.9	10141.9	9743
8	397.3	10280.4	9883.1
9	400.8	9919.5	9518.7
10	397.9	10171	9773.1
11	398.7	10139.1	9740.4
12	398.7	10318.2	9919.5
13	409.9	10201.9	9792
14	407.5	10319.8	9912.3
15	408.2	10391	9982.8
16	399.5	10491.3	10091.8
17	427.7	10511.8	10084.1
18	419.4	10242	9822.6
19	417.3	10386.6	9969.3
20	409.1	10430	10020.9
		Average	9830.925
		Time	2:43

Scenario 7 – Cumulative Land Uses with Two-Way Left-Turn Lane

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.1	6830.7	6402.6
2	402	6867	6465
3	421.5	7023.7	6602.2
4	423.7	7190.5	6766.8
5	422.1	6624	6201.9
6	398.9	6706	6307.1
7	397.3	6748.4	6351.1
8	400.8	6772.8	6372
9	397.9	7211.9	6814
10	398.7	7023.5	6624.8
11	398.7	7210.1	6811.4
12	409.9	7224.5	6814.6
13	407.5	6943.6	6536.1
14	408.2	7151.9	6743.7
15	399.5	7012.7	6613.2
16	427.7	6648.1	6220.4
17	419.4	7245.5	6826.1
18	417.3	7392	6974.7
19	409.1	7363.6	6954.5
20	408.9	7274.6	6865.7
		Average	6613.395
		Time	1:50

Scenario 8 – Cumulative Land Uses with Project

Run	Min (Start)	Max (End)	Total (Seconds)
1	428.1	10640.4	10212.3
2	402	10661.2	10259.2
3	421.5	10796.2	10374.7
4	423.7	10727.9	10304.2
5	422.1	10640.6	10218.5
6	398.9	10659.6	10260.7
7	397.3	10784.8	10387.5
8	400.8	10480.5	10079.7
9	397.9	10576.3	10178.4
10	398.7	10631.4	10232.7
11	398.7	10824.8	10426.1
12	465.3	10717.4	10252.1
13	407.5	10811.6	10404.1
14	408.2	10961.4	10553.2
15	399.5	11067	10667.5
16	427.7	11051	10623.3
17	419.4	10909.3	10489.9
18	417.3	10848.8	10431.5
19	409.1	11015.4	10606.3
20	408.9	11038.9	10630
		Average	10379.595
		Time	2:53

Scenario 9 – Cumulative Land Uses with Project with Two-Way Left-Turn Lane

Run	Min (Start)	Max (End)	Total (Seconds)
1	422.5	7825.7	7403.2
2	424.7	7392.5	6967.8
3	421.5	7423.7	7002.2
4	423.7	7190.5	6766.8
5	399.9	7215.9	6816
6	412.9	7430.5	7017.6
7	398.9	7213.9	6815
8	411.9	7228.5	6816.6
9	377.9	7211.9	6834
10	410.9	7226.5	6815.6
11	398.7	7210.1	6811.4
12	409.9	7224.5	6814.6
13	407.5	7343.6	6936.1
14	408.2	7251.9	6843.7
15	399.5	7012.7	6613.2
16	427.7	7448.1	7020.4
17	419.4	7245.5	6826.1
18	417.3	7592	7174.7
19	409.1	7363.6	6954.5
20	408.9	7274.6	6865.7
		Average	6905.76
		Time	1:55

Appendix L

Defensible Space Requirements Letter

ALPINE FIRE PROTECTION DISTRICT

County of San Diego Parks and Recreation
5500 Overland Ave
San Diego, Ca. 92123

September 9, 2022

Attn: Anna Prowant

Re: Defensible Space Requirements

Ms. Prowant,

Thank you for contacting me about the existing measures in place for the County Park property located at 2500 South Grade Road. Back in 2016 Alpine Fire Protection District had an agreement with the landowners then to maintain the defensible space clearance along the northern side of South Grade Road by cutting all seasonal grasses and brush at a height of 6". The Apollo Group owned the parcel then and complied each year once Alpine Fire sent a notice to abate. The Apollo Group sold the land to developer and the maintenance continued under their ownership. County purchased the parcel of land in 2019 and they have been managing the brush clearing and weed whacking since taking over. Alpine Fire works closely with the Department of Public Works and working with Marco Mares in County Parks & Rec since 2019 fuels are managed as per the following description of work.

1. Cut and clear all weeds and brush along the frontage of South Grade Road for 30' to the north of edge of roadway. Cut at a height no higher than 6".
2. Limb up all low hanging tree branches 6' off the ground on trees over 18' in height. Trees less than 18' in height limb up the lower 1/3 of branches.
3. To the NE corner of the property cut and maintain the 100' defensible space to the homes off Boulder Road. The open field area may be mowed at a height not to exceed 6".
4. Around all the trees in the scope of work area flashy fuels shall be maintained as needed.
5. The large dead oak tree has a very large pocket of poison oak at the base. When permitted to spray treatment on the broadleaf do so to manage the overgrowth.

All work is done at the request of the Alpine Fire Protection District to maintain safe means of travel along the South Grade Road evacuation corridor and to provide the required 100' defensible space to homes to the north of park land. Work has been consistently performed since 2016 by all owners at request of a notice to abate hazards. Brush clearing is to be completed prior to 4th of July.

I am available for any further questions if you have any,

Jason McBroom
Fire Marshal

1364 Tavern Road Alpine, Ca. 91901-3831 Business: (619) 445-2635 Fax: (619) 445- 2634

Appendix M
Project Court Documents

SUPERIOR COURT OF CALIFORNIA,
COUNTY OF SAN DIEGO
CENTRAL

MINUTE ORDER

DATE: 06/09/2025 TIME: 5:00 PM DEPT: C-63

JUDICIAL OFFICER: KATHERINE A. BACAL
CLERK: Annie Yim
REPORTER/ERM: Not Reported
BAILIFF/COURT ATTENDANT: N/A

CASE NO: **37-2024-00000536-CU-WM-CTL** CASE INIT.DATE: 01/05/2024
CASE TITLE: **California National Forest Foundation vs County of San Diego [IMAGED]**
CASE CATEGORY: Civil CASE TYPE: (U)Writ of Mandate: Writ of Mandamus - Other

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HEARING TYPE: Ex Parte
MOVING PARTY:

The Court having taken this matter under submission on 05/16/2025, now rules as follows:

The petition for writ of mandate is **GRANTED** as to the first cause of action for violation of CEQA**.** The Court intends to address setting a hearing for the remaining causes of action at the upcoming status conference.

Preliminary Matters

Petitioners' unopposed request for judicial notice (ROA # 46) of exhibits 1 and 2 is granted. Evid. Code § 452(b)&(h).

Discussion

This action challenges the County's decision to approve the Alpine Community Park project (the "Project"). Pet. (ROA # 1) ¶ 1. The Project's proposed 25-acre park is within 96.6 acres of undeveloped land; the remaining approximately 70 acres of the property will be preserved for open space. AR 62, 2401, 2463 (proposed active park concept plan map). The Project plans to build a sports complex including several amenities such as a baseball field, all-wheel and bike skills areas, a fitness station, recreational courts, leash free dog area, equestrian staging with corral, a community garden, and picnic areas. *Id.* ¶ 2.

The verified petition for writ of mandate and complaint for declaratory and injunctive relief alleges four causes of action: (1) violations of the California Environmental Quality Act ("CEQA"); (2) violation of California Planning and Zoning Law; (3) violation of the County Biological Mitigation Ordinance; and (4) declaratory relief. ROA # 1. Respondent County of San Diego and its Board of Supervisors and

Department of Parks and Recreation ("County") filed its answer (ROA # 40), and the matter is fully briefed. Opening Brief ("OB"), ROA # 45; Opposition Brief ("Oppo."), ROA # 48; Reply Brief, ROA # 53.

A. CEQA

Review of a public agency's decision under the CEQA is done in accordance with CCP section 1094.5. Pub. Res. Code § 21168. In reviewing an agency's compliance with CEQA the Court's inquiry extends "only to whether there was a prejudicial abuse of discretion." *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 512. "[A]n agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence." *Id.*, citing Pub. Res. Code § 21168.5. Whether the agency employed correct procedures is reviewed *de novo*, whereas the agency's substantive factual conclusions are accorded "greater deference." *Id*.

Mitigation Measures

1. **Quino Checkerspot Butterfly**

The Quino Checkerspot Butterfly ("Quino") is classified as a federally endangered species. AR 5485. Petitioners argue the EIR acknowledges the significant impacts to the Quino's habitat loss and its population, and that the EIR's claimed mitigation plans to reduce the impacts to less than significant levels are unsupported by evidence. MPA at p.12. Petitioners argue that the mitigation plan to enhance, restore, and monitor the habitat is flawed because under the plan the County need only show at least one Quino on the site or adjacent parcel, and that the measure could be deemed "successful" even if the project causes a net loss of occupied habitat. *Id.* at pp.12-14.

Respondents argue petitioners' claim fails because substantial evidence in the record supports the mitigation measures. First, that under the EIR the County will be required to meet the Endangered Species Act and obtain approval from U.S. Fish and Wildlife Service for an incidental take permit ("ITP"), under which that federal agency will review and approve a habitat conservation plan's measure, monitoring requirements, and implementation. Oppo. at p.11, citing AR 2589. Second, even setting aside the ITP, "[i]mpacts would be mitigated to less-than-significant levels through implementation of MM-BIO-3, which would ensure no net loss of host plants through restoration and enhancement of habitat, provide permanent protection of [Quino] habitat within the proposed preserve portion of the Project, and ensure ongoing monitoring by the County." AR1953. At the hearing, respondents also cited to the special-status wildlife Alpine Park Project map, which shows much of the Quino occurrence sightings from 2019-2020 were within the Project site, but outside the planned park. AR 2555 (figure 4.4-3).

Petitioners argue the ITP evidence is not sufficient because it is essentially a future restoration or conservation plan that constitutes improperly deferred mitigation. OB at p.14-15, citing *Preserve Wild Santee v. City of Santee* (2012) 210 Cal.App.4th 260, 281(holding future habitat management plan inadequate to mitigate impacts on Quino checkerspot butterfly); Reply at p.8. The Court agrees on this point. *Preserve Wild*, *supra* at p.281 (the fact that the City and wildlife agencies must ultimately approve a habitat plan does not cure informational defects).

However, as to the second point, the biological resources report found that MM-BIO-3 specifies the performance standard (i.e., no net loss of Quino host plants) and includes onsite mitigation and monitoring standards. AR 73. Petitioners argue the report does not actually contain any facts to support the County's expert's opinion and thus does not constitute substantial evidence. Reply at p.10. Here, the report states that "regardless of the conservation measures required under the ITP, the County will mitigate for impacts on occupied [Quino] habitat (as further described in MM-BIO-3). MM-BIO-3 also states that "construction activities shall not occur until the ITP is secured. The performance standard is specified (i.e., no net loss of [Quino] host plants), and compensatory onsite mitigation and monitoring standards are also included in MM-BIO-3. MM-BIO-3 was revised slightly in the RS-Draft EIR to make it clear that the County intends to provide compensatory mitigation and habitat restoration as well as monitoring regardless of the status of the ITP." AR 73. MM-BIO-03 also provides that regardless of the ITP conservation measures, the County will mitigate for impacts on occupied [Quino] habitat by providing, at a minimum, on-site preservation of occupied habitat for [Quino] within the open space and ensure that no net loss of [Quino] host plants will occur because of the project. The County DPR shall ensure that there is no net loss of [Quino] host plants by performing on-site enhancement and restoration activities within [Quino] habitat, including planting dot-seed plantain, removing thatch to support healthy populations of dot-seed plantain, and maintaining and monitoring these enhancement areas for a minimum of 5 years." AR2589. Additionally, the County will demonstrate that [Quino] persists on the Project site at the end of the 5-year restoration and enhancement period. If [Quino] can no longer be found on either the County's preserve or within the adjacent Wright's Field in a normal flight-year at the end of the 5-year restoration period, the County will secure a specific off-site parcel that will contribute meaningfully to the species' long-term conservation." *Id.* In light of this, the report contains substantial evidence showing the County is not impermissibly deferring mitigation measures. Unlike in *Preserve Wild Santee,* the EIR here set performance standards and explained how the impact can be mitigated in a specified way via vegetation management and timing for assessment. Accordingly, the petition is denied as to this issue.

2. **Western Spadefoot Toad**

The Western Spadefoot Toad ("Spadefoot") is a candidate for listing under the federal endangered species act. AR 1497. Petitioners argue the EIR's finding that the Project will have no impact on the surrounding Spadefoot population lacks evidence. OB at p.16. They argue their expert showed the Spadefoot can travel up to 600 meters from their breeding pools, meaning they may migrate into the development footprint and thus transmit waterborne contamination from vehicles, animal waste and landscaping, and Argentine Ants that impact Spadefoot's prey. *Id*., citing AR 1340-1342 (also noting the USGS recommended an undeveloped buffer measuring 300 to 400 meters around breeding ponds). Petitioners argue the EIR's conclusion that the Spadefoot would only travel approximately 262 meters from pools to conclude no impact would occur ignores petitioners' expert evidence, and the EIR failed to address this in response to petitioners' comments. OB at p.17, citing *Banning Ranch Conservancy v. City of Newport Beach* (2017) 2 Cal.5th 918, 940 (The Guidelines state that an EIR should identify '[a]reas of controversy known to the lead agency including issues raised by [other] agencies." (Guidelines, § 15123, subd. (b)(2).) 'Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts." (Guidelines, § 15151.) '[M]ajor environmental issues raised when the lead agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail. (Guidelines, § 15088, subd.(c).").

The County argues petitioners' comments on the recirculated Spadefoot analysis was late and, thus, the County did not have a duty to respond. Oppo. at p.16, citing AR 5369 (Nov. 7, 2023 letter) and citing *Gray v. Cnty. of Madera* (2008) 167 Cal.App.4th 1099, 1111 (under CEQA, lead agency is not required to respond to late comments). Petitioners argue they submitted expert comments on the edge effects in the draft EIR in 2021, and the recirculated and final EIR did not respond to those comments. Reply at p.12-13, citing AR 1336, 1341.

Here, the record shows petitioners submitted comments on the Spadefoot, including the need to mitigate potential adverse effects associated with the development edge to provide for buffer distances of 300 to 400 meters around breeding ponds in 2021. AR 1336, 1340-1341. The EIR does not appear to address petitioners' expert comments on this issue. The County's analysis of indirect impacts on Wright's Field biological resources -- potential impacts approximately 600 to 800 feet from the eastern edge of the field -- also does not respond to the issue.

In its briefing and at the hearing, the County argued it relied on the study cited by petitioners' own expert (the 2019 Baumberger study) to adopt the datapoint of 262 meters in the EIR. Oppo. at p.16, citing *Claremont Canyon Conservancy v. Regents of Univ. of California* (2023) 92 Cal. App. 5th 474, 483 (for the proposition that an EIR does not need to analyze every permutation of the data or address all variations of the issues). Petitioner's expert review, however, explained that a more recent study – by Halstead et al. in 2021 – followed up on Baumberger's earlier study findings, and that Halstead's study found a distance of 486 meters. AR1339-1340. The expert's review also noted the USGS recommended an undeveloped buffer measuring 300 to 400 meters. AR 1340. Thus, the issue with the EIR's reliance on the 262 meters datapoint is not merely about an agency's discretion of what is ultimately included in an EIR. Rather, it is that the EIR does not address and provide a reasoned analysis as to why the smaller buffer distance would support the EIR's conclusions on the Project's impacts to Spadefoot despite the newer conflicting evidence in the record. Accordingly, petitioners have shown the County erred when it concluded the Project's impact to Spadefoot would be less than significant after mitigation.

3. **Pallid Bat**

The Pallid Bat species is known to roost in San Diego County and the bats rely on grasslands for foraging. AR 2575-78. Petitioners argue the EIR's proposed mitigation measures under MM-BIO-7 to install bat boxes before removing vegetation and commencing construction, and MM-BIO-8 requiring construction occur at least 200 feet from potential roost sites, lack substantial evidence to show these measures are effective to reduce the Project's impact to less than significant. OB at p.18-19.

The EIR provides substantial evidence that the bat boxes will be included with other measures to mitigate impacts to less than significant. Oppo. at p.18, citing AR 1948–49 and AR 1955 (discusses restoration of native grassland and preservation of property in addition to active management on-site for the proposed preserve land, plus implementing mitigation measures of pallid bat boxes, bat roost avoidance, native grassland restoration, preservation of sensitive habituates; and construction is expected to occur during daytime hours and it is not expected to alter bats' natural nocturnal behaviors), AR 2593–95. The EIR also contains substantial evidence to show consideration will be given regarding

temperature and monitoring of the bat boxes. AR 2593 (County will work with bat expert to design and install the bat boxes; and design and placement will be considered for how to best maintain proper roost temperature; monitoring will be conducted quarterly for first 2 years and twice-yearly for years 3 through 5 after installation).

However, as for the sound buffer distance to potential roosting sites – the County's expert recommended that mitigation "preclude[] construction activities within a minimum 500 feet of potential roost sites during the pupping season." Reply at p.13, citing AR 12249. The County does not show that mitigation efforts of requiring construction occur at least 200 feet from the nearest potential roosting spot (AR 2593) is supported by substantial evidence. Accordingly, the petitioners have shown no substantial evidence supports the EIR's proposed mitigation of only a 200-foot buffer construction zone.

At the hearing, the County argued that no Pallid bats have been identified on the Project site. This argument appears to have been raised for the first time at the hearing. The County's opposition does not appear to cite to the administrative record or other authority on this point. Even assuming no Pallid bats have been spotted, this does not change the analysis, as the record shows that Pallid bats are very difficult to detect and the EIR identified Pallid bat impacts that requires mitigation measures. AR 2578.

Wildfire Impacts

Petitioners argue the EIR does not contain analysis of the significance of the Project's wildfire impacts without the mitigation measures. OB at p.22. They argue that instead, the EIR improperly treated mitigation measures as Project components, which impermissibility treats the analysis of impacts and mitigation measures as one issue. OB at p.21, citing *Lotus v. Department of Transportation* (2014) 223 Cal.App.4th 645, 653; *People ex rel. Bonta v. County of Lake* (2024) 105 Cal.App.5th at 1235-36 ("[F]ailure to separately identify and analyze the significant impacts of the fire risk to the Project area and its baseline existing conditions before proposing mitigation measures violates CEQA.)"

The County argues the EIR includes a wildfire impact analysis in Section 4.9, section 4.20, and Appendix J, K, and L. Oppo. at p.21 citing AR 2695 *et seq*. (Fire and Emergency Operation Assessment prepared that identified wildfire risks at the Project site, including ignition risks), 2881 *et seq*. (Project site is in a "Very High Fire Hazard Severity Zone;" and discussing together the ignition risks and recommended fire prevention measures such as creating buffer zones along the parcel, developing the land and considering undergrounding electric utility services, placing developed park features to contain wildfire, providing improved fire-safe parking, adding on-site volunteer, maintenance staff and a park ranger, and clearing vegetation), 2310 *et seq*. (discussing expected wildfire behavior, site development risk factors, and discussing risks and measures together); 2340 *et seq*. (fire evacuation analysis and assumptions), and 2374 *et seq*. (defensible space requirements letter).

Here, the EIR states the measures will reduce wildfire risk to less than significant levels. Importantly, though, the EIR is missing information on *how* it analyzed the effectiveness of the proposed measures. There is no analysis of how ignition rates will be reduced by the proposed wildfire measures. Reply at p.18, citing *Bonta*, *supra,*105 Cal.App.5th at 1233 (an adequate analysis may include the number of ignitions that occur and how that rate has reduced with the proposed wildfire safety measures). Because

the EIR does not separately analyze the significant impacts of the fire risk and its baseline existing conditions before it proposed mitigation measures but instead treats the impacts analysis and mitigation measures as one issue, the EIR's wildfire analysis is deficient under CEQA.

Vehicle Traffic Public Safety Impacts

The petition alleges the Project is adjacent to a high-speed roadway that contains areas of low visibility and has been the location of multiple fatal accidents. The petition alleges the Project would create a multi-way stop in a low visibility area, increasing traffic risks. Pet. ¶¶ 35, 55.

Petitioners argue the EIR does not contain any analysis of the Project's potential traffic hazard impacts to pedestrians and bicyclists. MPA at pp.24-25. They argue that the Project is anticipated to draw approximately 300-500 people per day on weekdays, 1,000 per day on weekends, and up to 2,000 at the same time during special events. AR 2314. They argue the visitors who park on the shoulder of South Grade Road would need to walk on the road shoulder, and that South Grade Road is known for several accidents, including some fatal. MPA at p.24, citing AR 2462 (240 parking space lot); AR 5544 (noting three crashes along South Grade Road, with two involving pedestrians and two of the three resulting in fatalities).

The County argues substantial evidence supports the EIR's determination that the Project will not substantially increase hazards because the Project does not conflict with the circulation system of transit, roadway, bike and pedestrian facilities. Oppo. at p.25, citing AR 75, AR 2843-44. The County also contends the Project does not include any "incompatible uses" such as farm equipment that might increase congestion on the road. *Id.,* citing AR 2846. Additionally, argues the County, the Project is anticipated to generate a number of trips onto South Grade Road that will not "degrade" the road to a "substandard level of service." *Id.,* citing AR 76. It plans to install traffic control devices at a later date for the Project's driveway and South Grade Road, but the type of device has not yet been determined because the location of the driveway is not yet known. *Id.* at p.26.

> CEQA requires that an EIR include a "detailed statement" setting forth the "significant effects on the environment of the proposed Project." (Pub. Res. Code, § 21100, subd. (b)(1).) It also requires that an EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail." (Guidelines, § 15128.) "[A] 'significant effect on the environment' under CEQA is a substantial or potentially substantial adverse change in the physical conditions existing within the area affected by the project.

City of Maywood v. Los Angeles Unified School Dist. (2012) 208 Cal.App.4th 362, 390–391.

Appendix G to the CEQA Guidelines recommends that, in determining whether a project will have significant traffic impacts, lead agencies consider whether it will "[s]ubstantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?" 14 Cal. Code Regs. ("Guidelines") appen. G, § XVII, subd. (c). The Guidelines also ask whether the project will "conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?" *Id.*, subd. (b).

Here, although evidence in the record addresses the Guidelines in Appendix G regarding incompatible uses, the EIR lacks substantial evidence to the potential traffic hazard impacts to pedestrians and bicyclists concerning South Grade Road. In particular, the EIR lacks substantial evidence as to the yet to-be-determined sight distance analysis for the traffic control device at the project's driveway, and analysis as to pedestrians who would be parking and walking along South Grade Road when the 240-vehicle space parking lot is full. The Court agrees with petitioners that *City of Maywood v. Los Angeles Unified School Dist*. is instructive. *Id.* (2012) 208 Cal.App.4th 362, 392 (concluding the FEIR did not analyze pedestrian hazards associated with the project and the extent to which the presence of an active roadway would impact pedestrian safety). The County does not cite to evidence in the record showing it analyzed and disclosed the traffic hazard impacts concerning South Grade Road.

Additionally, though an EIR is not required to include information that is "not 'reasonably feasible' for the agency to obtain and provide," *Gooden v. County of Los Angeles* (2024) 106 Cal.App.5th 1, 17) the County does not provide any supported reason as to why it could not yet determine the project's driveway location to assess the sight distance analysis and appropriate intersection control device. The purpose of an EIR is to inform the public and officials of "the environmental consequences of their decisions before they are made." *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564; see also Pub. Res. Code § 21061 ("The purpose of an environmental impact report is to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project"). Petitioners have shown the County did not proceed in the manner required by CEQA by delaying the analysis and potential impacts of the driveway, multi-way stop control, and sight distance analysis on traffic collisions, including as to pedestrians and bicyclists.

At the hearing, the County made a "reverse CEQA" argument. This argument was made for the first time at the hearing, does not apply here, and does not lead to a different result. The California Supreme Court has also noted that it finds the term "reverse CEQA" to be "misleading and inapt. Because CEQA does sometimes require analysis of the effect of existing conditions on a project's future residents or users, such analysis is not the 'reverse' of what CEQA mandates." *California Building Industry Assn. v. Bay Area Air Quality Management Dist*. (2015) 62 Cal.4th 369, 386, fn. 11.

Off-Site Alternatives

Petitioners argue the EIR should have considered an off-site alternative. They argue the County's reasoning for concluding off-site alternatives would not meet many of the project objections is unsupported – the County did not provide any information on the properties it supposedly vetted and rejected, and the document to which the County cited that supposedly contained details of the sites (i.e., the Master Response document) does not actually contain any such information. MPA at p.28, citing AR 167 (referencing MR-12 (Parks Master Plan) for details related to the sites the County considered prior to purchasing the property), AR 85 (no details in the Parks Master Plan included). The County counters that the EIR analyzed five alternatives for consideration: No Project (Alternative 1); Sports Complex (Alternative 2); Reconfigured Project (Alternative 3); Reduced Project (Alternative 4); and Passive Park (Alternative 5). AR 2955-2957.

The Guidelines require that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decisionmaking and public participation. An EIR is not required to consider alternatives which are infeasible." Guidelines, § 15126.6(a). The Guidelines define "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." Guidelines, § 15364. "Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries ... and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site." Guidelines, § 15126.6, subd. (f)(1).

Petitioners fault the County for failing to analyze an off-site alternative. Reply at p.21. However, the County was not obligated to consider that type of alterative. "CEQA Guidelines section 15126.6, subdivision (a), which prescribes the scope of an alternative analysis, states that an agency must 'describe a range of reasonable alternatives to the project, *or* to the location of the project." (Italics added.) The guideline anticipates that a different location can constitute one of a range of reasonable alternatives, but it does not require such an alternative." *Yerba Buena Neighborhood Consortium, LLC v. Regents of University of California* (2023) 95 Cal.App.5th 779, 797. Petitioners also argue the County's citation to documents in the administrative record to support its alternatives analysis was inadequate because the documents were not included in the EIR. Reply at pp.22-23. Yet the Guidelines allow for additional information explaining the choice of alternatives to be included in the administrative record. Guidelines § 15126.6(c). Accordingly, no abuse of discretion has been shown regarding failing to provide a reasonable range of alternatives or dismissing viable alternatives without substantial evidence.

Conclusion

For the reasons stated, petitioners' first cause of action for violation of the CEQA is **GRANTED**.

Parties to meet and confer to prepare the proposed writ in accordance with this ruling.

The minute order is the order of the Court.

The Clerk to serve notice.

IT IS SO ORDERED.

Katherine A. Bacal

Judge Katherine A. Bacal

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CLEVELAND NATIONAL FOREST FOUNDATION and CALIFORNIA NATIVE PLANT SOCIETY

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN DIEGO – CENTRAL DIVISION

CLEVELAND NATIONAL FOREST FOUNDATION and CALIFORNIA NATIVE PLANT SOCIETY

Petitioners,

v.

COUNTY OF SAN DIEGO; SAN DIEGO COUNTY BOARD OF SUPERVISORS; and DOES 1 through 20 inclusive,

Respondents,

SAN DIEGO COUNTY DEPARTMENT OF PARKS AND RECREATION; and DOES 21 through 40, inclusive,

Real Party in Interest.

Case No. 37-2024-00000536-CU-WM-CTL
Hon. Katherine A. Bacal, Dept. 63

(California Environmental Quality Act)

[Code Civ. Proc. § 1094.5 (alternatively, § 1085; California Environmental Quality Act, Pub. Resources Code, §§ 21000 et seq.; California Planning and Zoning Law, Gov. Code § 65300, et seq.; County of San Diego Code of Regulatory Ordinances § 86.501 et seq.]

NOTICE OF ENTRY OF AMENDED JUDGMENT GRANTING PEREMPTORY WRIT OF MANDATE

Action Filed: January 5, 2024
Trial Date: May 16, 2025; August 1, 2025

TO ALL PARTIES AND THEIR ATTORNEYS OF RECORD:

PLEASE TAKE NOTICE that on January 20, 2026, the Court in the above-captioned action, entered the Amended Judgment Granting Peremptory Writ of Mandate. A true and correct copy of the Amended Judgment is attached hereto as **Exhibit A**.

DATED: February 5, 2026

SHUTE, MIHALY & WEINBERGER LLP

By: _____

JOSEPH D. PETTA
SHASTA M. FIELDS

Attorneys for Petitioners
CLEVELAND NATIONAL FOREST FOUNDATION and CALIFORNIA NATIVE PLANT SOCIETY

Exhibit A

FILED
San Diego Superior Court
Central Division

JAN 20 2026

Clerk of the Superior Court
By: A. Yim, Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN DIEGO

CLEVELAND NATIONAL FOREST FOUNDATION and CALIFORNIA NATIVE PLANT SOCIETY,

Petitioners,

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COUNTY OF SAN DIEGO; SAN DIEGO COUNTY BOARD OF SUPERVISORS; and DOES 1 through 20, inclusive,

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SAN DIEGO COUNTY DEPARTMENT OF PARKS AND RECREATION; and DOES 21 through 40, inclusive,

Real Party in Interest

No. 37-2024-00000536-CU-WM-CTL
Action Filed: January 5, 2024

[~~PROPOSED~~] JUDGMENT

Dept: C-63
Judge: Hon. Katherine A. Bacal
Trial Dates: May 16, 2025; August 1, 2025

[IMAGED FILE]

The above-captioned action came on for regular hearing in Department C-63 of the above-entitled court, the Honorable Katherine A. Bacal presiding. Petitioners Cleveland National Forest Foundation and California Native Plant Society (collectively, "Petitioners") were represented by Shute, Mihaly & Weinberger LLP, Joseph D. Petta and Shasta M. Fields. Respondent County of San Diego (also sued as the San Diego County Board of Supervisors, and also sued as Real Party in Interest San Diego County Department of Parks and Recreation) ("Respondent" or "County") were represented by Office of County Counsel, Michael P. Masterson.

Petitioners' Petition for Writ of Mandate and Complaint for Declaratory and Injunctive Relief alleges four causes of action: (1) violations of the California Environmental Quality Act ("CEQA"); (2) violation of California Planning and Zoning Law; (3) violation of County Ordinance; and (4) Declaratory Relief. (ROA 1.)

On May 15, 2025, this Court issued a tentative ruling bifurcating the matter to hear arguments only as to the alleged violations of CEQA at the May 16, 2025 merits hearing, and for the remaining causes of action to be heard at a later date. (ROA 62.) On May 16, 2025, the Court heard argument from counsel on the CEQA cause of action, and issued a Minute Order taking the matter under submission and setting a Status Conference for June 13, 2025. (ROA 65.) On June 9, 2025, the Court issued a Minute Order granting in part the petition for writ of mandate as to the first cause of action for violation of CEQA. (ROA 68; Attached hereto as Exhibit A.)

At the June 13, 2025 status conference, Petitioners dismissed the petition's second and third causes of action. (ROA 70.) The Court also set the hearing on the remaining cause of action, declaratory relief regarding the County's Biological Mitigation Ordinance (BMO), for August 1, 2025. (ROA 70.) On July 31, 2025, the County submitted a statement of decision request, asking the Court to address identified factual and legal issues. (ROA 77–78.) At the August 1, 2025 hearing, the Court found in favor of the County on the fourth cause of action for declaratory relief regarding the BMO, ordered the County to prepare a proposed statement of decision on this issue, and set a status conference for August 7, 2025. (ROA 76.) At the August

7, 2025 status conference, the Court found the County's request for a statement of decision on the CEQA issue to be untimely.

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that judgment be entered as follows:

1. As to the first cause of action for violation of CEQA, the petition for writ of mandate is granted in part and denied in part, for the reasons stated in the Court's June 9, 2025 Minute Order. (ROA 68; Attached hereto as Exhibit A.) A peremptory writ of mandate shall issue directing Respondent to take the steps needed to comply with the June 9, 2025 Minute Order.

2. The second and third causes of action, for violations of the Planning and Zoning Law and County Ordinance, are dismissed with prejudice.

3. The fourth cause of action, for declaratory relief regarding the County's BMO, is dismissed with prejudice for the reasons stated in the Statement of Decision. (Attached hereto as Exhibit B.)

4. Pursuant to Public Resources Code section 21168.9(b), the Court retains jurisdiction over Respondent's proceedings by way of a return to the peremptory writ of mandate until the Court has determined that Respondent has complied with the provisions of the writ of mandate.

5. Awards of costs and attorneys' fees, if any, will be provided by the Court per subsequent memorandum of costs and/or motions. Following said memorandum and/or motions and rulings by the Court in response thereto, the clerk of the Court is to insert the award of such fees and costs, if any, in this judgment in the space provided below. Costs and attorneys' fees are awarded to Petitioners and against Respondent in the amount of $_____.

DATED: 1/20/26

Honorable Katherine A. Bacal
Judge of the Superior Court

2015268.1

PROOF OF SERVICE

Cleveland National Forest Foundation, et al. v. County of San Diego, et al.
Case No. 37-2024-00000536-CU-WM-CTL
San Diego Superior Court

At the time of service, I was over 18 years of age and **not a party to this action**. I am employed in the County of San Francisco, State of California. My business address is 396 Hayes Street, San Francisco, CA 94102.

On January 20, 2026, I served true copies of the following document(s) described as:

[PROPOSED] JUDGMENT

on the parties in this action as follows:

Claudia G. Silva, County Counsel
By: Joshua M. Heinlein, Chief Deputy
Michael P. Masterson, Senior Deputy
OFFICE OF COUNTY COUNSEL, COUNTY OF SAN DIEGO
1600 Pacific Highway, Room 355
San Diego, CA 92101-2469
Tel: (619) 531-5850
Fax: (619) 531-6005
Email: joshua.heinlein@sdcounty.ca.gov
michael.masterson@sdcounty.ca.gov

Attorneys for Respondents:
COUNTY OF SAN DIEGO; SAN DIEGO COUNTY BOARD OF SUPERVISORS; and SAN DIEGO COUNTY DEPARTMENT OF PARKS AND RECREATION

BY E-MAIL OR ELECTRONIC TRANSMISSION: I caused a copy of the document(s) to be sent from e-mail address tsanchez@smwlaw.com to the persons at the e-mail addresses listed in the Service List. I did not receive, within a reasonable time after the transmission, any electronic message or other indication that the transmission was unsuccessful.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on January 20, 2026, at San Francisco, California.

Tuloa Sanchez

PROOF OF SERVICE

Cleveland National Forest Foundation, et al. v. County of San Diego, et al.
Case No. 37-2024-00000536-CU-WM-CTL
San Diego Superior Court

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NOTICE OF ENTRY OF AMENDED JUDGMENT GRANTING PEREMPTORY WRIT OF MANDATE

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Michael P. Masterson, Senior Deputy
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Attorneys for Respondents:
COUNTY OF SAN DIEGO; SAN DIEGO COUNTY BOARD OF SUPERVISORS; and SAN DIEGO COUNTY DEPARTMENT OF PARKS AND RECREATION

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on February 5, 2026, at San Francisco, California.



Tuloa Sanchez

2023235.1

FILED
San Diego Superior Court
Central Division

JAN 23 2026

Clerk of the Superior Court
By: A. Yim, Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN DIEGO – CENTRAL DIVISION

CLEVELAND NATIONAL FOREST FOUNDATION and CALIFORNIA NATIVE PLANT SOCIETY

Petitioners,

v.

COUNTY OF SAN DIEGO; SAN DIEGO COUNTY BOARD OF SUPERVISORS; and DOES 1 through 20 inclusive,

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SAN DIEGO COUNTY DEPARTMENT OF PARKS AND RECREATION; and DOES 21 through 40, inclusive,

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Case No. 37-2024-00000536-CU-WM-CTL
Hon. Katherine A. Bacal, Dept. 63

(California Environmental Quality Act)

~~[PROPOSED]~~ PEREMPTORY WRIT OF MANDATE

[Code Civ. Proc. § 1094.5 (alternatively, § 1085; California Environmental Quality Act, Pub. Resources Code, §§ 21000 et seq.]

Action Filed: January 5, 2024
Trial Dates: May 16, 2025; August 1, 2025

TO RESPONDENT COUNTY OF SAN DIEGO, ITS BOARD OF SUPERVISORS, AND DEPARTMENT OF PARKS AND RECREATION:

Judgment having been entered in this proceeding, ordering that a peremptory writ of mandate be issued from this Court,

YOU ARE SO ORDERED, upon receiving service of this writ, to:

1. Set aside the San Diego County Board of Supervisors' December 6, 2023 certification of the Environmental Impact Report ("EIR") for the Alpine County Park Project ("Project") (State Clearinghouse No. 2021030196) and rescind all Project approvals, including but not limited to the County's adoption of Environmental Findings and Mitigation Monitoring and Reporting Program.

2. File and serve an initial return to the writ no later than 75 days after service of the writ. The return shall specify the actions taken to comply with the terms of the peremptory writ of mandate.

3. Any objections to the return to the writ shall be filed with the Court and served on Respondent no later than 30 days after service of the applicable return to the writ. Any reply to those objections shall be filed with the Court and served on the objecting party no later than 20 days after service of the objections.

4. Under Public Resources Code section 21168.9, subdivision (b), this Court reserves jurisdiction over Respondent's proceedings by way of a return to this peremptory writ of mandate until the Court has determined that Respondent has complied with the provisions of this writ of mandate.

5. To the extent that Respondent revises the EIR for the Project, the revised environmental analysis must address only the CEQA deficiencies identified in the Court's June 9, 2025 Minute Order (ROA 68). Having found in Respondent's favor on the issues raised in the petition, except for those matters described below, the Court finds that the following action is necessary under Public Resources Code section 21168.9(b) to comply with the provisions of CEQA:

a. Western Spadefoot Toad. Respondent shall address, providing reasoned analysis supported by substantial evidence in the record, comments submitted by Petitioners' expert stating that the Spadefoot can travel up to 600 meters from their breeding pools and noting that the USGS recommended an undeveloped buffer of 300 to 400 meters around breeding pools.

b. Pallid Bat. Prior to making any finding that the 200-foot avoidance buffer from potential pallid bat roost sites, as set forth in mitigation measure MM-BIO-8, will avoid or substantially reduce a significant impact, Respondent shall support such a finding with substantial evidence in the record.

c. Wildfire Impacts. Respondent shall separately analyze the significant impacts of the fire risk and its baseline existing conditions before proposing mitigation measures, and shall provide information on *how* it analyzed the effectiveness of the proposed measures.

d. Vehicle Traffic Public Safety. Respondent shall analyze and disclose the traffic hazard impacts concerning South Grade Road, in particular, whether the Project will substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections). In doing so, Respondent shall not delay reasonably feasible analysis and potential impacts of the Project's driveway, the driveway's traffic control device, and sight distance analysis on traffic collisions, including as to pedestrians and bicyclists.

6. Respondent is further ordered to suspend all ministerial approvals in furtherance of the Project that could result in any change or alteration to the physical environment and Respondent may not make any physical changes to the environment in furtherance of the Project, pending discharge of the writ in accordance with the terms of this writ.

7. Under Public Resources Code section 21168.9 subdivision (c), this Court does not direct Respondent to exercise their lawful discretion in any particular way.

Let the foregoing peremptory writ of mandate issue.

DATED: 01/23, 2025

CLERK OF THE SUPERIOR COURT

2015270.1

PROOF OF SERVICE

Cleveland National Forest Foundation, et al. v. County of San Diego, et al.
Case No. 37-2024-00000536-CU-WM-CTL
San Diego Superior Court

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

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Tuloa Sanchez