California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program

Draft
Environmental Impact Report

SCH No. 2023020424

January 2026

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CARNEGIE SVRA RESOURCE MANAGEMENT AREA PROGRAM
DRAFT ENVIRONMENTAL IMPACT REPORT

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

Acronym/Symbol	Full Phrase or Description
4WD or 4x4	Four-wheel drive vehicle
µg/m^3	Micrograms per cubic meter
AB	Assembly Bill
ATV	All-terrain vehicle
BAAQMD	Bay Area Air Quality Management District
BMP	Best management practice
CAAQS	California Ambient Air Quality Standards
CalEEMOD	California Emissions Estimator Model
Cal Fire	California Department of Forestry and Fire Prevention
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Fully Protected Species
CFR	Code of Federal Regulations
CH_4	Methane
CHL	California Historical Landmark
CHRIS	California Historical Resources Information System
CHS	Campground host site
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon monoxide
CO_2	Carbon dioxide
CR	Cultural resources
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Ranked
CSSC	California Species of Special Concern
CTR	California Toxics Rule
CWA	Clean Water Act
DBH	Diameter-at-breast-height

Acronym/Symbol	Full Phrase or Description
DGS	Department of General Services
DPR	California Department of Parks and Recreation
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FC	Federal Candidate (for listing under FESA)
FE	Federal Endangered (under FESA)
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
FT	Federal Threatened (under FESA)
G	Global Rank (for natural communities)
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
Geo	Geology
GHG	Greenhouse gas
GVWR	Gross Vehicle Weight Rating
GWP	Global Warming Potential
H_2S	Hydrogen sulfide
HCP	Habitat Conservation Plan
HFC	Hydrofluorocarbons
HMS	Habitat Monitoring System
IPaC	Information for Planning and Consultation
IPC	California Invasive Plant Council
LCFS	Low Carbon Fuel Standard
LEV	Low Emission Vehicle
LLNL	Lawrence Livermore National Laboratory
LSAA	Lake or Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MS4	Municipal Separate Storm Sewer System
MTCO2e	Million Metric Tons of CO_2 Equivalents
MU	Management Unit
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan

Acronym/Symbol	Full Phrase or Description
N_2O	Nitrous oxide
NOAA Fisheries	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NOP	Notice of Preparation
NPDES Permit	National Pollutant Discharge Elimination System Permit
NPPA	Native Plant Protection Act
NRHP	National Register of Historic Places
NRM	Natural Resources Management
O_3	Ozone
OHMVR	Off-Highway Motor Vehicle Recreation
OHP	Office of Historic Preservation
OHV	Off-highway vehicle
OHV BMP Manuel	OHV BMP Manual for Erosion and Sediment Control
OM	Park Operations and Maintenance
ROV	Recreational off-highway vehicle, also known as side-by-side
PG&E	Pacific Gas & Electric Company
PM	Particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPM	Parts per million
PRC	Public Resources Code
ROG	Reactive organic gases
RMA	Resource Management Area
RTMP	Roads and Trails Management Plan
RWQCB	Regional Water Quality Control Board
S	State Rank (for natural communities)
SB	Senate Bill
SC	State Candidate (for listing under CESA)
SE	State Endangered (under CESA)
SF_6	Sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

Acronym/Symbol	Full Phrase or Description
SJMSCP	San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	Sulfur dioxide
SO_x	Oxides of sulfur
SPPO	State Park Peace Officer
SPR	Standard Project Requirement
ST	State Threatened (under CESA)
SVP	Society of Vertebrate Paleontology
SVRA	State Vehicular Recreation Area
SWMP	Storm Water Management Plan for Carnegie SVRA
SWRCB	State Water Resources Control Board
TAC	Toxic air contaminants
USC	United States Code
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VegCAMP	Vegetation Classification and Mapping Program
VEO	Visitor Experience and Operations
VMT	Vehicle Miles Traveled
VOC	Volatile organic compounds
WDRs	Waste Discharge Requirements
WHPP	Wildlife Habitat Protection Plan
ZEV	Zero Emission Vehicle

SUMMARY

S.1 PROJECT DESCRIPTION

Carnegie State Vehicular Recreation Area (SVRA) is a 1,533-acre off-highway vehicle (OHV) park in eastern Alameda and western San Joaquin counties (Figure 2-1 Regional Location) overseen by the Off-Highway Motor Vehicle Recreation (OHMVR) Division and operated by the Diablo Range District of California Department of Parks and Recreation (DPR or State Parks). The Carnegie property had been operated as an OHV park prior to purchase by DPR in 1979. DPR purchased the property using OHV Trust Funds, thus continuing OHV use, and Carnegie SVRA became a unit of the State Parks System in July 1980. The park offers numerous off-road opportunities for motorcycles, all-terrain vehicles (ATVs), 4x4s, and recreational off-highway vehicles (ROVs or side-by-sides). Carnegie SVRA has more than 1,300 acres available for OHV recreation, including approximately 45 miles of existing trails.

The SVRA is divided into Management Units to provide a structure for implementing natural resource management activities. Some of these Management Units have been further subdivided into smaller resource management zones (Resource Management Areas; RMAs) to actively manage the road and trail system in the hillside riding area through recontouring, erosion control, revegetation, and use control in order to meet the Soil Conservation Standard and regulatory requirements of stormwater runoff. Currently, the SVRA has 14 RMAs. The Diablo Range District proposes to 1) establish new RMAs throughout the hillside riding areas of the park and 2) undertake new specialized maintenance projects within established RMAs as part of its ongoing effort to manage soil erosion and the water quality of storm water runoff. These RMA Program new activities comprise the proposed project and would provide ongoing sustainable OHV recreation management through reducing trail density, increasing vegetation cover, creating sustainable trails, enforcing trails-only riding, rehabilitating damaged soil surfaces, and implementing soil loss and erosion control measures that disperse storm water runoff to prevent accelerated erosion.

S.2 PROJECT IMPACTS AND MITIGATION

Consistent with the California Environmental Quality Act (CEQA) and the CEQA Guidelines, this Environmental Impact Report (EIR) focuses on the potentially significant direct and indirect impacts that could result from implementation of the proposed project. The EIR impact analysis evaluates in detail potential impacts on land use, aesthetics, air quality, biological resources, cultural resources and tribal cultural resources, geology and soils, hydrology and water quality, and recreation.

Other resources were determined to not be impacted or to have a negligible and therefore not significant impact due to absence of the evaluated resource in the project area or the nature of the proposed activity. Impacts on these resources were dismissed from detailed analysis in the EIR. These resource areas include agricultural and forest resources, energy, greenhouse gas emissions, hazards and hazardous materials, mineral resources, noise, population and housing, public services, transportation, utilities and service systems, and wildfire (see Impact Analysis Methodology section 3.2). These impacts are briefly discussed in Other CEQA Considerations (see Effects Found to be Not Significant section 13.3).

Less than Significant Impacts

Land use, aesthetics, air quality, cultural and tribal cultural resources, hydrology and water quality, and recreation impacts associated with establishing new RMAs and implementing specialized maintenance projects as part of the Carnegie SVRA RMA Program are determined to be less than significant as summarized below; no mitigation is required impacts to these resources.

Land Use: The proposed project would establish new RMAs on 773 acres of unfenced distributed (non-route specific open riding) and trails-only riding areas and implement specialized maintenance projects in established RMAs. DPR would manage OHV use within the new RMAs consistent with land use designations for visitor use established in the 1981 General Plan and the 2024 General Plan Update. The new RMAs would result in a net conversion of 169 acres of distributed riding area to trails-only riding area, which would change the way that portion of the SVRA is currently managed. No change is proposed to the total park acreage available for OHV access. The project is consistent with the land use zones and policies of the 1981 General Plan and the visitor experience area designations and goals and guidelines of the 2024 General Plan Update.

Aesthetics: State scenic highways or scenic vistas do not occur within the area and would not be impacted. Implementation of the project would result in temporary soil disturbance at project work sites. Some work sites may be visible from recreational trails within the park, SRI Road (an internal State Parks road subject to an easement for an adjacent landowner), and portions of county-designated scenic routes Tesla Road and Corral Hollow Road fronting the SVRA. Views into the SVRA where project activities would occur would largely be obscured from views along designated county scenic routes by intervening topography. Rehabilitation projects would address landform and vegetative cover, reduce visible hillside scarring, and increase the natural appearance of SVRA hills, all of which would benefit affected views. As a result, the project would not result in significant impacts on public views or designated scenic views or vistas.

Air Quality: Annual and average daily emissions associated with the proposed RMA activities are anticipated to be similar to existing conditions. Project activities would generate exhaust and fugitive dust emissions from vehicle and equipment fuel combustion and ground disturbance and related earth moving activities. Best Management Practices (BMPs) as required by the local air districts and DPR Standard Project Requirements (SPRs) to control construction dust and equipment emissions would be implemented. The short-term project emissions would not significantly contribute toward cumulative impacts in the air basin or expose sensitive receptors to substantial concentrations of pollutants. In the long-term, the SVRA as a whole should become less emissive of fugitive dust emissions through reduction of trail density and increased vegetative cover.

Cultural/Tribal Cultural Resources: Cultural and tribal cultural resource sites are present at Carnegie SVRA. Proposed project activities would avoid disturbance of known resources. Potential disturbance of unknown precontact or historic cultural resources, including human remains, could occur during individual project construction activities. District standard practices and SPRs for cultural resources would be implemented to provide for protection of resources during project activity and address inadvertent discovery of archaeological resources and human remains.

Hydrology and Water Quality: Proposed project activities such as gully erosion repair or constructing trail crossings over drainages could expose disturbed soils in construction areas to

storm water runoff and cause sedimentation of downstream drainages. Permanent and temporary BMPs from the OHV BMP Manual would be incorporated into the project design. Projects would implement storm water control measures where applicable to control construction runoff through BMPs and SPRs for hydrology.

Recreation: Proposed project activities include constructing new and re-routed trail segments to improve sustainability and trail system connectivity. Unsustainable trails would be closed and rehabilitated. Less than 100 acres of the 1,227-acres of hills open to riding would be temporarily closed at any given time during implementation of project activities. For these reasons, the project changes to recreational trail facilities are not expected to have adverse direct or indirect impacts that would cause adverse environmental effects.

Potentially Significant Impacts

Potentially significant impacts on biological resources and geology and soils can be reduced to less-than-significant levels with mitigation. A summary of potentially significant project impacts and the mitigation reducing the impact to a less-than-significant level is presented in Table S-1.

There are no significant unavoidable impacts resulting from the proposed project activities.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures

Impact	Mitigation Measure
Biological Resources[1]	
Impact BIO-1: Project activities could disturb individual elderberry shrubs and potentially impact valley elderberry longhorn beetle. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-1: Valley Elderberry Longhorn Beetle Protection.** Consistent with the USFWS Valley Elderberry Longhorn Beetle Framework (USFWS 2017), a biologist who can identify elderberry shrubs shall survey proposed work sites plus a 165-foot (50 meter) buffer for elderberry shrubs prior to the start of any ground disturbing activities in the project sites (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading). The results of the surveys shall be documented in writing, and the location of any occupied elderberry shrubs shall be recorded by GPS. Any elderberry shrubs found during the survey shall be fenced or flagged and avoided with a minimum 20-foot (6 meter) buffer from the dripline. Activities that may damage or kill an elderberry shrub (e.g., use of heavy equipment, etc.) shall have an avoidance area of at least 20 feet (6 meter) from the dripline, depending on the type of activity. All construction activities that could occur within 165 feet of an elderberry shrub will be conducted outside of the flight season of the valley elderberry longhorn beetle (March - July). If trimming of an elderberry shrub is required, trimming will occur between November and February and will avoid the removal of any branches or stems that are ≥ 1 inch in diameter to prevent impacts on valley elderberry longhorn beetles.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
Impact BIO-2: Project activities could disturb Crotch's bumble bee if present within the project activity site. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-2a: Pre-construction Survey for Crotch's Bumble Bee.** Within one year prior to vegetation removal or ground disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading), a qualified biologist shall conduct pre-construction surveys for Crotch's bumble bee nests. Pre-construction surveys shall be consistent with CDFW's Survey Considerations for CESA Candidate Bumble Bees (CDFW 2023). These surveys shall include a habitat assessment as well as focused surveys for foraging and nesting bumble bees. Surveys shall be conducted during the height of the active flight season (April - August), when the probability of detection is highest, and in the same year that project activities are planned to start. These surveys shall be spaced 2 - 4 weeks apart to account for variability in resource use and availability. Surveys shall be conducted during dry conditions (i.e., when it is not raining, foggy, or drizzling), when temperatures are above 70° Fahrenheit, and during low wind speeds (i.e., less than 8 miles per hour). If the pre-construction surveys do not identify Crotch's bumble bee nests, no additional surveys and mitigation are required. If Crotch's bumble bee nests are observed, then Measure 2b shall be implemented. The results of the surveys shall be documented in writing, and the location of any Crotch's bumblebee nests shall be recorded by GPS. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; knowledge of the life history and ecology of Crotch's bumble bee and locally common bumble bees and their identification; and has a minimum of two field seasons of experience conducting focused surveys with positive identification of Crotch's bumble bee and other common bumble bee species.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures

Impact	Mitigation Measure
(Impact BIO-2 continued)	**Mitigation Measure BIO-2b: Prepare a Crotch's Bumble Bee Protection and Habitat Enhancement Plan**. If Crotch's bumble bee nests are found on a work site, the qualified biologist shall prepare a plan to protect active nests and surrounding foraging areas, protect potential overwintering habitat, and enhance foraging habitat within the site. The plan shall be implemented as part of the project. The plan shall include, but not be limited to, the following measures: • Specification of timing and sequencing requirements to avoid impacts on nesting and hibernating bumble bees. • Pre-construction surveys within 30 days of ground disturbance consistent with CDFW survey considerations (CDFW 2023). • Fencing or flagging to delineate no-disturbance buffers around active nest sites. The buffer area shall be 50 feet or as determined by a qualified biologist. • Construction monitoring during initial ground disturbance activities in conjunction with SPRs. • Avoidance of initial ground disturbance between November and January to protect potential overwintering queen Crotch's bumble bees. • Retaining existing woody debris, if present, to support overwintering queen bumble bees. Where erosion control and/or slope stabilization are required, prescription of seed mix composed of locally native flower species, known to be visited by Crotch's bumble bee, that bloom from March through September.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures

Impact	Mitigation Measure
Impact BIO-3: Project activities could result in the temporary loss of listed/proposed amphibian and reptile dispersal habitat or harm special-status amphibians and reptiles (i.e., California tiger salamander, California red-legged frog, foothill yellow-legged frog – central coast DPS, western spadefoot, pond turtle, Alameda whipsnake, California glossy snake, Northern California legless lizard, Blainville's horned lizard, and San Joaquin coachwhip) if present in the work site and during construction. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-3a: Protection of Suitable Habitat for Listed/Proposed Amphibians and Reptiles.** No new facilities (i.e., new or re-routed OHV trails, trail improvements, or managed hillclimbs) in the RMA Program area shall be sited within 150 feet of aquatic habitat currently known or later identified to support California red-legged frog, California tiger salamander, western spadefoot, or pond turtle. No new facilities in the new or existing RMAs shall be sited within 150 feet of preferred Alameda whipsnake habitat, particularly scrub vegetation types. **Mitigation Measure BIO-3b: Evaluation and Avoidance of Suitable Special-Status Amphibian and Reptile Habitat**. Within 14 days prior to the commencement of all ground-disturbing project activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading), a qualified biologist shall conduct a habitat assessment of the project site and a minimum 500-foot radius surrounding the site for the following special-status amphibian and reptile species: California tiger salamander, California red-legged frog, foothill yellow-legged frog-central coast DPS, western spadefoot, pond turtle, Alameda whipsnake, California glossy snake, Northern California legless lizard, coast horned lizard, and San Joaquin coachwhip. The biologist shall look for habitat features, including aquatic habitat such as ponds, streams or drainages, and terrestrial habitat such as outcrops or burrows, with the results of the assessment documented in a written report prior to starting project activities. Habitat features shall be flagged for avoidance. Work in such habitat areas may only occur as provided by Mitigation Measure BIO-3c. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; knowledge in the life history and ecology of the special-status amphibian and reptile species listed in this measure and locally common amphibians and reptiles and their identification; and a minimum of two field seasons of experience conducting focused surveys with positive identification of special-status and common amphibian and reptile species in the project region.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
(Impact BIO-3 continued)	**Mitigation Measure BIO-3c: Protection of Special-Status Amphibians and Reptiles.** If suitable habitat is identified for any of the special-status amphibians or reptiles in the habitat assessment or the work site is within the dispersal distance of known occurrences of any of these species, a preconstruction survey for these special-status amphibian and reptile species shall be conducted by a qualified biologist prior to the start of ground-disturbing project activities per SPRs. The results of the survey shall be documented in writing with GPS locations of any species found recorded for internal tracking. If any of these species are encountered in or near the work site during the habitat assessment or survey, a qualified biologist shall monitor all ground-disturbing work in the work site. If an individual of these species is found during such work, and the qualified biologist determines that the project activities may disturb or harm the individual, the work shall be adjusted or postponed until the animal has been allowed to leave the work site on its own or the qualified biologist determines the work can proceed with no risk to the safety of the individual. The project may also employ protective fencing, rescheduled work times or locations, or other measures determined by the qualified biologist to avoid harm to the individual. Work shall be conducted in a manner that avoids all forms of take of amphibian or reptile species that are listed or proposed for listing under CESA or FESA or candidates under CESA. The qualified biologist may relocate an amphibian or reptile that is not listed or proposed for listing or a CESA candidate species to suitable similar habitat outside of the work site.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
Impact BIO-4: Project activities could have short-term impacts on burrowing owls during construction, either directly by removing burrows resulting in injury or mortality, or indirectly by disturbing wintering burrowing owls. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-4: Burrowing Owl Protection.** Prior to the start of work in a new or existing RMA, an Environmental Scientist shall conduct an initial assessment for burrowing owl habitat consistent with CDFG (2012)) to evaluate if habitat is present. If burrowing owl habitat is determined to be present, a qualified biologist shall follow the California Department of Fish and Game (now CDFW) 2012 Staff Report on Burrowing Owl Mitigation (CDFG 2012) habitat assessment and survey methodology or subsequent CDFW guidance prior to implementation of project activities. Because burrowing owls can be present throughout the year, this survey methodology can be implemented in suitable burrowing owl habitat regardless of the time period for initiation of construction. The habitat assessment and surveys shall encompass a sufficient buffer zone to detect owls nearby that may be impacted, which shall be a minimum of 492 feet (150 meters) in accordance with the CDFW 2012 Staff Report or in accordance with subsequent CDFW guidance. Time lapses between surveys or project activities shall trigger subsequent surveys, as determined by a qualified biologist, including, but not limited to, a final survey within 24 hours prior to ground disturbance and before construction equipment mobilizes to the project area. The results of the surveys shall be documented in writing, and the location of any occupied burrows found shall be recorded by GPS for internal tracking. Occupied burrowing owl burrows shall be avoided pursuant to the buffer zone prescribed in the CDFW 2012 Staff Report or subsequent CDFW guidance. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; and has a minimum of two years of experience implementing the CDFW 2012 Staff Report survey methodology or subsequent CDFW guidance resulting in detections.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures

Impact	Mitigation Measure
Impact BIO-5: Project activities could impact special-status and roosting bats. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-5: Special-Status and Roosting Bat Protection.** Not more than 30 days before the start of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in a new or existing RMA, an Environmental Scientist shall survey the work site and a 50-foot buffer for bat roosting habitat (large trees with cavities, rock outcrops, caves, mines). If no roosting bat habitat and/or signs of bats are present, no additional surveys are required. If bat roosting habitat and/or signs of bats (e.g., guano pellets or urine staining) are identified in the survey, a follow-up dusk emergence survey shall be conducted by a qualified biologist prior to the start of construction activities. A dusk survey will determine the number of bats present and shall also include the use of acoustic equipment to determine species of bats present. If roosting bats are detected, they shall be avoided with roost avoidance buffers, seasonal activity restrictions, or monitoring of roost locations as determined by a qualified biologist. The results of the surveys shall be documented with GPS coordinates of any occupied bat roosts recorded for internal tracking. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has at least two years of experience conducting bat surveys that resulted in detections for the relevant species; and is familiar with the types of equipment used to conduct surveys.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures

Impact	Mitigation Measure
Impact BIO-6: Project activities could harm mountain lions if active mountain lion nursery dens are present in the project work sites. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-6a: Evaluate Potential for Mountain Lion Nursery Sites.** No more than 14 days prior to the beginning of ground-disturbing or other noise generating activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in a new or existing RMA, an Environmental Scientist will evaluate the project site plus a 500-foot buffer for suitable mountain lion nursery habitat. Nursery habitat suitable for the species will be determined through field surveys and knowledge of site conditions, including the results of any ongoing mountain lion studies or monitoring in vicinity of the project work area. Potential mountain lion nursery dens could include large natural cavities within rocky areas or thickets deemed appropriate for use by mountain lions based on size and other characteristics (e.g., proximity to heavily disturbed areas, surrounding habitat). If suitable nursery habitat is present, a qualified biologist will survey for signs of mountain lion (e.g., tracks, scat, prey items, signs of recent kills) in the vicinity of potential nursery habitat to help determine whether an area may contain a mountain lion nursery. If a mountain lion nursery is suspected to be present, Mitigation Measure 6b will be implemented. In the event that a DPR Environmental Scientist does not have experience to survey for or identify potential mountain lion nursery habitat, a qualified biologist may be hired to conduct mountain lion nursery surveys. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for mountain lions, can identify suitable dens for this species, and is familiar with identification and habitat requirements of this species. **Mitigation Measure BIO-6b: Determine Presence of Mountain Lion Nursery**. If signs of a mountain lion nursery are found during the initial evaluation, further investigation will be required to determine if a mountain lion nursery is present. No ground disturbance or other noise generating RMA Program activities will occur within 2,000 feet (Wilmers, et al. 2013) of the potential nursery site while the investigation is being conducted. Survey methods will include the use of trail cameras, hair snares, and/or other noninvasive methods, as well as coordination with other local experts tracking the species (if available). Surveys using these noninvasive methods will be conducted for 3 days and 3 nights to determine whether a nursery may be present. If a mountain lion den is detected or assumed to be present, Mitigation Measure 6c will be implemented.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
(Impact BIO-6 continued)	**Mitigation Measure BIO-6c: Avoid Disturbing Mountain Lion Nursery.** If a nursery is known in the activity area or further signs of a nursery are detected based on the surveys described in Mitigation Measure BIO-6b (e.g., lactating adult female or cubs on camera, repeated detections of an adult female in the area, growls or calls from cubs), DPR will implement a no-disturbance buffer of at least 2,000 feet (Wilmers, et al. 2013) for a minimum of 10 weeks. Project activities will not occur within this buffer during this time to avoid disturbance, injury, or mortality of the mountain lion nursery.
Impact BIO-7: Project activities could harm American badgers if active badger burrows are present in the project work sites. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-7: American Badger Protection.** An Environmental Scientist shall conduct a preconstruction survey for American badger no more than 14 days prior to the beginning of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in the new or existing RMAs. The qualified biologist shall search the work site plus a 500-foot buffer for potential American badger dens. If there are no potential American badger dens in the work site or buffer area, no further mitigation is necessary. If potential American badger dens are located within the work site and cannot be avoided, a qualified biologist shall determine if the dens are occupied. If unoccupied, a den can be collapsed in on itself by the qualified biologist if it cannot be avoided by project activities. If occupied, the den shall be avoided with a minimum 100-foot buffer. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for American badger, can identify suitable dens for this species, and is familiar with identification and habitat requirements of this species.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
Impact BIO-8: Project activities could harm San Joaquin kit fox if active kit fox dens are present in the project work sites. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-8: San Joaquin Kit Fox Protection.** An Environmental Scientist shall conduct a preconstruction survey for San Joaquin kit fox no more than 14 days prior to the beginning of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in the new or existing RMAs. The Environmental Scientist shall search the work site plus a 500-foot buffer for potential kit fox dens. If there are no potential San Joaquin kit fox dens in the work site or buffer area, no further mitigation is necessary. If potential San Joaquin kit fox dens are located within the work site and cannot be avoided, a qualified biologist shall determine if the dens are occupied. If unoccupied, a den can be collapsed in on itself by the qualified biologist if it cannot be avoided by project activities. If occupied, the den shall be avoided with a minimum 500-foot buffer. The biologist shall notify the USFWS and CDFW if an occupied San Joaquin kit fox den is found. The results of the survey shall be documented. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for San Joaquin kit fox, can identify suitable dens for these species, and is familiar with identification and habitat requirements of these species. In addition, the biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount.
Impact BIO-9: Project activities could result in the removal of sensitive natural communities if they are within project work areas and cannot be avoided. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-9: Replacement of Sensitive Natural Communities.** If sensitive natural communities cannot be avoided, they shall be replaced at a minimum 1:1 ratio outside of the work site in an area that will not be disturbed in the future. A Habitat Mitigation and Monitoring Plan (HMMP) shall be prepared specifying the planting palette, the monitoring period, minimum survival criteria, invasive species control, and irrigation (if needed) following replanting. The planting palette shall consist of locally native species the same or similar as those removed during construction and consistent with the sensitive natural community being replaced.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
Impact BIO-10: Project activities such as gully erosion repair or trail crossings over drainages could occur in ephemeral drainages and potentially impact non-wetland jurisdictional waters of the U.S. under the Clean Water Act, the waters of the state under the Porter-Cologne Water Quality Control Act, or drainages subject to state regulation under the California Fish and Game Code section 1600. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-10: Protection of Jurisdictional Waters and Habitats.** If jurisdictional waters and habitats cannot be avoided, the OHMVR Division shall obtain permits from the agencies with jurisdiction over the waters and/or habitats, which may include the USACE, RWQCB, and/or CDFW. Required permits may include a CWA Section 404 Permit from the USACE and a CWA Section 401 Water Quality Certification from the RWQCB, or compliance with Porter-Cologne Waste Discharge Requirements (WDRs) under the RWQCB, and/or a Lake or Streambed Alteration Agreement with CDFW. Work within jurisdictional waters and/or habitats shall follow all measures and compensatory mitigation requirements (if applicable) in the required permits.
Impact BIO-11: Project activities such as new trail construction, trail reroutes, or gully erosion repairs could result in loss of native trees and associated habitat values. **Less-than-Significant Impact with Mitigation**	**Mitigation Measure BIO-11: Tree Replacement.** Individual native trees removed by project construction shall be replaced, with the specific number of trees to be replaced determined during project-level planning. Locally native species, such as blue oaks, shall be used as replacement trees. Seed shall be collected and grown to saplings on site or saplings shall be purchased from a nursery with seed collected within a 100-mile radius of Carnegie SVRA. Locally collected acorns can be planted directly. All replacement trees used shall be healthy and sourced from a reputable nursery, guaranteed to be pathogen free. A Tree Mitigation and Monitoring Plan shall be prepared specifying the species, replanting ratio, the monitoring period, minimum survival criteria, and irrigation (if needed) following replanting. Removed native trees will be replaced with native trees at a ratio that maintains the natural plant community composition and structure based on the habitat functions affected by tree removal. Tree replacement ratios will be determined based on the value of habitat affected by tree removal and may include strategic planting to account for variations in soil, space, or climate. The Tree Mitigation and Monitoring Plan will document considerations made for tree removal in the construction area based on habitat loss, soil erosion, carbon sequestration, and air quality. If irrigation is required for plant establishment, temporary irrigation methods that allow a gradual tapering off of watering over a 3- to 5-year period shall be used.

Table S-1. Summary of Potentially Significant Impacts and Mitigation Measures	
Impact	**Mitigation Measure**
Geology/ Soils	
Impact GEO-1: Project activities are located on geologic formations with moderate and high paleontological sensitivity. Project construction activities could uncover buried paleontological resources. **Less than Significant Impact with Mitigation**	**Mitigation Measure GEO-1: Protection of Paleontological Resources**. The Project Manager shall determine if the project activity is located in a geological formation with paleontological sensitivity during the project planning process. As needed, prior to the start of each project activity, SVRA field staff such as maintenance and trails team members shall be educated on what to do if paleontological resources are inadvertently discovered during a project. All SVRA staff members shall be educated on what to do if they find a paleontological object. If paleontological resources are discovered inadvertently during project activities, all work shall cease within and in the immediate vicinity of the fossil and an OHMVR Division archaeologist or other qualified paleontological resource professional shall be consulted to determine the potential significance of the find. If the fossil is determined to be a unique paleontological resource, a recovery plan consistent with Society of Vertebrate Paleontology (SVP 2025) criteria shall be developed and implemented. The recovery plan may include but is not limited to a field survey, construction monitoring, sampling and data recovery procedures, curation for any specimen recovered, and a report of findings.
[1]For all Biological Resources mitigation, an Environmental Scientist meeting the specified qualified biologist requirements would be appropriate to conduct the mitigation.	

S.3 CUMULATIVE PROJECT IMPACTS

CEQA requires an EIR to evaluate a project's cumulative impacts. Cumulative impacts are the project's impacts combined with the impacts of other related past, present, and reasonably foreseeable future projects. The approach taken in this EIR to address the cumulative impact analysis is presented in Impact Analysis Methodology section 3.3. The EIR determined that the proposed new activities of the Carnegie SVRA RMA Program would not result in incremental effects that are cumulatively significant when combined with other past, present, or future projects that are reasonably foreseeable.

S.4 PROJECT ALTERNATIVES

CEQA Guidelines section 15126.6 states that an EIR shall describe a range of reasonable alternatives to a 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. As described in Chapters 3 through 13 of this EIR, the project does not have the potential to result in significant unavoidable effects during implementation of the proposed new activities of the RMA Program. All impacts would be reduced to a less-than-significant impact level through identified mitigation measures.

This EIR considers two alternatives to the proposed project: 1) No Project Alternative; and 2) Trails-Only Riding Alternative. These alternatives are discussed in detail in the Alternatives section. Trails-Only Riding is considered the environmentally superior alternative as described in section 12.3.

No Project Alternative. Under this alternative, the 773-acre hillside riding area proposed as new RMAs would continue to operate the same as under existing conditions and the proposed new specialized maintenance projects in established RMAs would not occur. Existing distributed riding areas would remain and would not be converted to trails-only riding areas. Many of the RMA Program management activities proposed for implementation in the new RMAs would not occur, including perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation. Routine trail inspections, maintenance, and restoration of illegal trails would continue to occur as it does under existing conditions. Because the No Project Alternative does not meet the project objectives and has reduced beneficial effects and/or increased impacts compared to the proposed project, the No Project Alternative is not a viable option and is rejected by DPR.

Trails-Only Riding Alternative. Under the Trails-Only Riding Alternative, all 773 acres of the proposed new RMAs would be converted to trails-only riding; no part of the project area would remain a distributed riding area. This would eliminate the open riding areas within the SVRA hills except for the Hillclimb Event Area. The project activities proposed in the new RMAs (e.g., perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation) would still occur under the Trails-Only Riding Alternative. This alternative meets the project objectives of providing sustainable OHV recreation; however, the elimination of distributed (open) riding is inconsistent with the General Plan Update provision for quality OHV recreation by designating a Distributed Riding Area visitor experience area. Because the Trails-Only Alternative eliminates a category of sought after OHV recreation experience and does not adequately balance the needs of OHV recreationists against the other objectives of the proposed project, it was rejected by DPR.

Environmentally Superior Alternative. The Trails-Only Riding Alternative is considered the environmentally superior alternative. This alternative would allow DPR to obtain most of the project objectives and has beneficial effects of reduced erosion and sedimentation and reduced potential impacts to aesthetics, biological resources, and cultural and tribal resources that are slightly greater than the proposed project. The alternative would not fully achieve the project objective of providing for quality OHV recreation experience due to elimination of distributed riding, which is a valued OHV riding experience. Because the proposed project activities would have beneficial effects, the potentially significant impacts are temporary and would be minimized or avoided with BMPs and mitigation incorporated into the project, and the project would meet all project objectives, DPR has rejected the Trails-Only Riding Area Alternative in favor of the proposed project.

S.5. AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

There are no known areas of controversy specific to the proposed project.

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CHAPTER 1. INTRODUCTION

1.1 PROJECT OVERVIEW

California Department of Parks and Recreation (DPR or State Parks) owns the Carnegie State Vehicular Recreation Area (SVRA), which is managed by DPR's Diablo Range District. The SVRA is located in the foothills of the Diablo Range and has served as an unofficial OHV-recreation area since the 1940's. The site was operated as a private motorcycle park from 1970 before being purchased by the DPR using OHV Trust Funds and becoming a SVRA. DPR manages SVRA operations with the mandate of providing sustainable access to OHV recreation while protecting natural and cultural resources. In furtherance of this mandate, the Diablo Range District proposes to expand its existing implementation of Resource Management Areas (RMAs) within the SVRA hillside riding area and undertake specialized maintenance actions within established RMAs in order to further reduce soil displacement associated with recreational use.

1.2 LEAD AGENCY CONTACT INFORMATION

The California Environmental Quality Act (CEQA; PRC § 21000 *et seq.*) and the CEQA Guidelines (14 California Code of Regulations [CCR] § 15000 *et seq.*) establish DPR as the lead agency for the project. The lead agency is defined in CEQA Guidelines section 15367 as "the public agency which has the principal responsibility for carrying out or approving a project." The lead agency is responsible for preparing the appropriate environmental review documentation. As described below, DPR has determined that an Environmental Impact Report (EIR) is the appropriate CEQA document for the project and has prepared this Draft EIR in accordance with CEQA and the CEQA Guidelines.

The contact person for the Diablo Range District is:

Mr. Clint Elsholz, District Superintendent
California Department of Parks and Recreation
Diablo Range District
15751 Tesla Road
Livermore, CA 94550

1.3 INTENDED USES AND TYPE OF EIR

An EIR is an objective, informational document that informs government agency decision makers and the public of the potential for significant project effects, including possible ways to minimize those effects, and describes reasonable alternatives to the project (CEQA Guidelines § 15121[a]). An EIR must be prepared with a sufficient degree of analysis to provide decision makers with information enabling them to make a decision that intelligently considers the project's potential direct and indirect environmental consequences. The evaluation of the environmental effects of the proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible (CEQA Guidelines § 15151).

This EIR will be used by DPR to evaluate the environmental effects of the proposed project when considering its approval. Since implementation of the proposed project activities does not involve impacts on other resources managed by regulatory agencies, the proposed project does not require any agency permits or other approvals, and no state or local agencies are responsible agencies. Trustee agencies, defined by CEQA Guidelines section 15386 as "a state agency

having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California," may review this EIR for potential impacts related to natural resources under their governance. Trustee agencies with jurisdiction over the resources potentially affected by the proposed RMA Program include the California Department of Fish and Wildlife (CDFW) and DPR.

The Carnegie SVRA RMA Program EIR is a Project EIR intended to cover the direct and indirect environmental effects associated with implementing new RMA Program activities described in EIR Chapter 2 Project Description. It is not the role of this EIR to evaluate existing authorized uses, the parameters of park operations, or regulatory permit conditions. The EIR impact analysis is limited to the environmental assessment of new RMA Program activities that would result in a physical change to the environment.

1.4 SCOPING OF ENVIRONMENTAL ISSUES

DPR published a Notice of Preparation (NOP) for the EIR on February 17, 2023, to invite comment on the scope and content of the environmental review of the Carnegie RMA Program; the comment period closed on March 20, 2023.

Four comment letters or emails were received in response to the NOP including letters from the Native American Heritage Commission (NAHC), Central Valley Regional Water Quality Control Board (RWQCB), and two individuals. The NOP and comment letters are presented in Appendix A. As listed below, the comments focused on cultural resources, water quality/hydrology, recreation opportunity, and project consistency with current planning efforts to update the General Plan. The EIR section that addresses the comments is also noted.

- A Program EIR invites piecemealing environmental analysis. (See Chapter 1, Introduction)
- RMA Project is part of the larger SVRA General Plan, which was set aside by a Judgment and Order Granting Petition for Writ of Mandate. Implementation of RMA Program prior to completion of the updated General Plan would violate the Writ. (See Chapter 1, Introduction and Chapter 2, Project Description)
- General information provided on Senate Bill (SB) 18 and Assembly Bill (AB) 52 tribal consultation requirements. (See Chapter 8, Cultural Resources)
- General information provided on the Basin Plan and permits administered by the RWQCB. (See Chapter 10, Hydrology and Water Quality)
- Slow flow of water needed to reduce damage and preserve access to key areas of park (See Chapter 10, Hydrology and Water Quality)

CHAPTER 2. PROJECT DESCRIPTION

2.1 LOCATION AND SITE DESCRIPTION

Carnegie SVRA is located within the Diablo Range mountains of unincorporated eastern Alameda and western San Joaquin counties, approximately 15 miles east of Livermore and 12 miles west of Tracy (Figure 2-1). To the north is the Lawrence Livermore National Laboratory (LLNL) property. Open space and rural residential areas (i.e., ranchland) are located to the east, west, and south. The SVRA's entrance is off Corral Hollow Road, which becomes Tesla Road in Alameda County.

Carnegie SVRA comprises 1,529 acres, largely managed for OHV recreation, situated on the south side of Corral Hollow Road (Tesla Road) and an additional 4 acres on the north side of Corral Hollow Road containing administrative offices, employee residences, and the SVRA water treatment plant. The SVRA is characterized by northeast-trending ridges with rugged canyons and drainages. Corral Hollow Creek flows from west to east through the SVRA and empties into the San Joaquin Valley. The hills rise abruptly from the floodplain with very steep slopes (Figure 2-2 Views of Carnegie SVRA). A narrow, flat floodplain corridor characterized by riparian habitat parallels Corral Hollow Creek on the south side of Corral Hollow Road/Tesla Road, and the surrounding hills support grasslands, scrub, and oak woodlands. The property has more than 1,300 acres of riding area and approximately 45 miles of maintained trails plus improved and unimproved access/maintenance roads in association with the recreational uses of the area.

Carnegie SVRA draws between 50,000 and 70,000 visitors per year for motorized vehicle recreation. The SVRA offers wide-ranging riding experiences for beginner to advanced motorcycle, all-terrain vehicle (ATV), 4x4, and recreational off-highway vehicle (ROV or side-by-side) riders, including OHV tracks, a 4x4 area, managed trails and hillclimbs, and distributed or non-route specific open riding areas. 4x4 vehicles and ROVs are limited to the valley floor, including the 4x4 area. Most of the developed facilities, including buildings and infrastructure supporting visitor-serving recreation uses and maintenance operations, are located on the valley floor along the SVRA main road. The trail system is primarily located in the steep hills to the south of the creek (Figure 2-3 Carnegie SVRA Facilities Map).

2.2 PROJECT PURPOSE AND OBJECTIVES

2.2.1 Purpose of Resource Management Area (RMA) Program

The purpose of the RMA Program is to support responsible stewardship of the land by managing OHV use while maintaining quality OHV recreational opportunities for visitors of Carnegie SVRA. Specifically, in managing the trails within Carnegie SVRA, the RMA Program adheres to the mandates of the Off-Highway Motor Vehicle Recreation (OHMVR) Division's 2020 Soil Conservation Standard and Guidelines:

> *Off-highway vehicle recreation facilities shall be managed for sustainable long-term prescribed use without generating soil loss that exceeds restorability, and without causing erosion or sedimentation which significantly affects resource values beyond the facilities.*

By establishing, rehabilitating, and maintaining RMAs within the Management Units, the RMA Program allows DPR to effectively control sediment loss and erosion by reducing trail density,

increasing cover of vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated.

2.2.2 Project Objectives

DPR proposes to progressively establish RMAs throughout the hillside riding areas of the SVRA and perform subsequent storm water, wildlife habitat, and soil protection management activities. DPR has the following project goals and objectives:

- Operate Carnegie SVRA consistent with PRC 5006.48
- Formalize the evolution of the SVRA's trail management program that has developed over time
- Manage riding areas in a sustainable manner consistent with existing laws and regulations, the general plan, superintendent orders, agency permits and agreements, and court orders
- Meet water quality objectives, including reducing sedimentation of drainages and discharge of sediment into Corral Hollow Creek
- Reduce trail density
- Prevent accelerated erosion by dispersing storm water runoff and maintaining trails
- Provide for quality OHV recreation opportunities[1] consistent with the declared purpose for the SVRA, including making the fullest appropriate public use of the vehicular recreational opportunities present while ensuring cultural resources conservation and conservation and improvement of natural resources (PRC §5090.43[a]).

2.3 EXISTING TRAILS AND RESOURCE MANAGEMENT

2.3.1 Management Units

The SVRA is administratively divided into Management Units typically based on natural drainage basin boundaries with some influence from emergency access trails and/or type of recreational uses offered. Management Units are discrete zones established to better plan and implement management activities within areas that share common characteristics. There are 10 Management Units at Carnegie SVRA divided by sub-watersheds. Management Units are divided into smaller areas known as Resource Management Areas (RMAs) that allow DPR staff to make more refined management decisions based on known resources, topography, soil type, and other factors.

A description of SVRA facilities and visitor uses within each Management Unit is presented in Table 2-1. Existing recreational facilities are described in more detail in Recreation (section 11.2). Management Unit locations are shown in Figure 2-4 Carnegie SVRA Management Units.

[1] Although the PRC does not define "quality recreational opportunities" for OHVs, for purposes of this EIR, "quality recreational opportunities" is interpreted to mean areas providing OHV opportunity that is of challenge and interest to the targeted recreationist, of adequate quantity in mileage and/or acreage, and well maintained in conjunction with other site amenities suitable to the site, e.g., day use and often camping facilities, interpretation, non-motorized trails, etc.

Table 2-1. SVRA Management Units

Management Unit	Unit Size (acres)	SVRA Facilities and Existing OHV Use Management
--	4.6	Park administration, staff residence, water treatment plant
Corral Hollow	191.8	Visitor entrance, ranger station, park store, restrooms, access road, parking, campground area, day use areas, trail riding, all-terrain vehicle (ATV) track, MX track, 4x4 area, trials bike area, 110 cc and 70 cc tracks, maintenance yard, San Francisco Public Utility Commission (SFPUC) 115kv electrical power transmission line, resource closure areas[1]
Waterfall Canyon	94.5	Resource closure area
Trans Am	184.1	One RMA established with fenced trails-only riding; unfenced distributed riding and trails-only riding areas; fenced water storage tank; resource closure areas[1]
Franciscan	130.1	One RMA established and closed as a resource closure area[1]; unfenced trails-only riding area
Dead Cow	192.2	Unfenced distributed riding and trails-only riding areas with hillclimbs; resource closure areas[1]
Carrol Canyon	182.6	One RMA fenced hillclimb event area; unfenced distributed riding and trails-only riding areas
Los Osos	190.4	Three RMAs established with fenced trails-only riding and a hillclimb area; unfenced distributed riding and trails-only riding areas
Kiln West	201.2	Seven RMAs established with fenced trails-only riding; one unfenced trails-only riding area
Kiln East	119.3	Three RMAs established with fenced trails-only riding; resource closure area
SRI Loop	42.7	Two RMAs established with fenced trails-only riding
Total SVRA Acreage	**1,533.5**	

[1]Resource closure areas are closed to OHV recreation to protect sensitive natural or cultural resources.

2.3.2 Resource Management Areas

Management of OHV use within the SVRA has evolved over time since DPR purchased the park property in 1979. Prior to state ownership, the entire park area was operated as an OHV open (i.e., distributed) riding area[2]. The State Park and Recreation Commission classified the park unit as a SVRA in July 1980, and the 1981 Carnegie SVRA General Plan designated the recreational land use areas as either open, trails-only, or closed to OHVs based on soil classifications and presence of sensitive resources (see Land Use section 4.1.5) (DPR 1981). The 2024 General Plan

[2] Distributed riding areas are defined as non-route specific open riding areas where OHV use is not confined to existing trails. In these open areas riders may create their own travel routes and as a result OHV riding and new volunteer trail formation may be distributed throughout the open area. In trails-only riding areas, OHV use is restricted to a designated trail system established and maintained by DPR, and off-trail riding is prohibited.

Update designates the hillside riding areas as distributed, advanced trails, or limited recreation (see Land Use section 4.1.6; Table 4-1) (DPR 2024a).

OHV riding areas within the SVRA include unfenced areas managed as either distributed riding (non-route specific open riding area) or trails-only riding, dependent upon the soil classification, and fenced areas managed as trails-only riding areas through the RMA model of trail management. Portions of the SVRA are permanently fenced off and closed to OHV use to maintain vegetation cover and limit erosion to improve storm water quality or to protect natural and cultural resources. The north facing slopes adjacent to Corral Hollow Creek are managed to limit OHV access to minimize sediment loss impacting Corral Hollow Creek and to protect the Corral Hollow Canyon viewshed. Currently, roughly half of the SVRA is unfenced riding area, and roughly one quarter of the SVRA is fenced trails-only riding (Table 2-2). The remaining SVRA acreage is managed for a combination of uses including park administration, multi-use visitor recreation, and resource protection. The distributed riding areas typically consist of grassland habitat with durable clay soils. The trails-only areas consist mostly of coastal scrub, oak woodlands, and more friable sandy/loam soils. Compliance with trails-only riding is supported through visitor education, fencing, signage, and law enforcement actions.

Table 2-2 Existing SVRA Use Management

SVRA Use Management	Acres	Percent of SVRA Total Acreage
Park Administration	4.6	0.3%
Corral Hollow Multi-Use Area	179.7	11.7%
Resource Closure Area	138.5	9.0%
Hillclimb Special Event Area (fenced in RMA)	22.8	1.5%
Distributed (open) Riding Area (unfenced)	354.6	23.1%
Trails-only Riding (unfenced)	406.0	26.5%
Trails-Only Riding (fenced in RMAs)	427.3.	27.9%
Total	**1,533.5**	**100%**

In 2009, DPR began establishing RMAs that limit OHV use to trails-only riding on a designated network of sustainable trails as a means of reducing the acreage of soil disturbance and subsequent soil erosion and sedimentation of storm water drainage. RMAs are completely enclosed by fencing and have a series of gate systems to allow park staff to shut off access to these areas when instances of off-trail riding occur and rehabilitation is needed.

Thirteen RMAs have been established and one RMA partially established in the eastern portion of the SVRA, and two RMAs have been established at the western park boundary (Figure 2-5 Resource Management Areas). A history of RMA implementation at Carnegie SVRA is shown in Table 2-3.

Table 2-3. Existing RMAs Implemented at Carnegie SVRA

Year Completed	Name of RMA	Acreage
2010	SRI Loop	23.43
2011	Roadrunner	19.26
2011	Raven	6.87
2011	Kiln East (including Barn Owl)	112.43
2014	Seven Trails	25.3
2014	The Knoll	2.46
2015	Burned Pottery[1]	32.9
2016	Harrison Hill	26.69
2017	Los Osos Climb	34.6
2019	Black Bear East	17.8
2019	Black Bear West	9.57
2019	Phase 3	7.83
2020	West Franciscan (south)[2]	15
2020	Bunkhouse	85.1
2021	Hillclimb Facility[3]	22.8
2022	Kiln West (north)[4]	27.7
	Total Acres	469.7

[1]Includes 4.1 acres of resource closure area closed to public use.

[2]West Franciscan (south) was rehabilitated as a RMA but is a resource closure area and remains closed to public use.

[3]Hillclimb Facility is used for special events only; it is not open for regular public use.

[4]The northern half of Kiln West was rehabilitated starting in 2021; the area is open for public use but the southern area requires rehabilitation before Kiln West is fully established as an RMA.

2.3.3 OHV Trails Management

Carnegie SVRA has roughly 45 miles of designated maintained trails throughout the SVRA (Figure 2-3). The trails are categorized by one of four designations based on recreational use and maintenance requirements: primary, secondary, tertiary, and volunteer. Primary trails are accessible by all sizes of vehicles including full-size trucks and emergency vehicles. These trails accommodate full-size staff trucks and utility vehicles but are not open to public use of full-size vehicles. Secondary trails are smaller and can accommodate ATVs and motorcycles. Tertiary trails are the narrowest sanctioned trails and tend to be impassable to all vehicles other than motorcycles. Volunteer trails are not formally designated and have been established through visitor use and will likely be closed when appropriate. Within the RMA Program, off-trail riding is unauthorized and creation of volunteer trails is prohibited. Creation of volunteer trails is allowed within designated distributed-riding areas (see footnote in section 2.3.2).

Trail maintenance occurs in all RMAs and non-RMAs throughout the SVRA. This includes trail repairs, off-trail (volunteer trail) rehabilitation or closure, off-trail exclusions, and trail reroutes. Trail maintenance is dependent on the conditions of the trail and the use type. The primary trails are usually maintained with a motor grader. The secondary trails are maintained by smaller trail

dozers. The tertiary trails are maintained using hand tools. Volunteer trails created by unauthorized use or off-trail riding within RMAs are repaired and blocked off to prevent recurrence; within distributed riding areas, volunteer trails are evaluated on a case-by-case basis depending on impacts on resources and are repaired or closed as needed.

Trail inspections, evaluations, and maintenance practices currently implemented at the SVRA would be utilized in the proposed RMA Program as described in Project Description section 2.4.2.

2.3.4 Regulatory Context

General operations at Carnegie SVRA are established by the enabling state legislation under the Off-Highway Motor Vehicle Recreation Act, regulated by applicable federal and state requirements, and guided by the General Plan adopted for the SVRA. DPR manages natural and cultural resources at Carnegie SVRA in a complex regulatory environment involving multiple resource management plans and programs.

DPR is mandated to ensure that SVRAs are managed for long-term environmental sustainability and to comply with applicable environmental laws, guidelines, and regulations. SVRAs are managed in accordance with management standards established for the OHMVR Program (including PRC sections 5090.02 and 5090.35). These management standards include soil conservation and resource conservation and improvement measures. Ongoing operations include various soil protection management actions to facilitate compliance with the state Soil Conservation Standard and Guidelines and federal Clean Water Act (CWA) standards. These management actions are utilized to implement the SVRA's Soil Conservation Plan (SCP) (DPR 2025), Storm Water Management Plan (SWMP) (DPR 2012), and the Wildlife Habitat Protection Plan (WHPP; update in progress) (Cull 2001). To varying degrees, these resource management plans and programs include resource management strategies, best management practices (BMPs), resource monitoring, and reporting requirements to minimize vegetation and wildlife habitat loss, soil erosion, sedimentation, and water quality. Although the plans and programs utilize common management actions, they are implemented to achieve separate regulatory compliance goals. The overlapping nature of these plans and programs and the cross-purposes of their management actions are shown in Table 2-4. Limited access, rider education/signage, and trail elimination for reduced trail density included in the SWMP are implemented through the RMA Program and help facilitate the effectiveness of the SCP, SWMP, and WHPP. The other management actions (e.g., trail maintenance, drainage controls, gully repairs, etc.) subsequently occur throughout the SVRA as ongoing management actions under the SCP, SWMP, and WHPP.

The resource management plans and programs as well as relevant policies of the Carnegie SVRA General Plan governing SVRA operations are further described in the regulatory setting section of the relevant environmental chapter (Biology, Geology/Soils, Hydrology/Water Quality, and Recreation).

Table 2-4. Key Features of Existing Resource Management Programs

Key Feature Target Category	Storm Water Management Plan	Soil Conservation Plan	RMA Program	Wildlife Habitat Protection Plan
OHV Use Management	• limited vehicle access (trails-only areas, perimeter fencing with gated access) • implement RMA • vehicle exclosures / fencing • enforcement actions • rider education and signage • wet weather closures	• wet weather closures • vehicle exclosures / fencing • weekly to biweekly surveys and monitoring for off-trail riding occurrences and resource damage • off-trail rehabilitation	• limited vehicle access (trails-only areas with perimeter fencing and gated access) • vehicle exclosures / fencing • enforcement actions • rider education and signage • weekly to biweekly surveys and monitoring for off-trail riding occurrences and resource damage • off-trail rehabilitation • quality OHV recreation opportunities	• vehicle exclosures / fencing • enforcement actions
Sediment and Drainage Controls	• drainage control on trails, slopes, gullies; hydrological connections • storm water infrastructure maintenance (e.g., sediment basin and culvert cleaning) • erosion and sediment control BMPs	• drainage control on trails, slopes, gullies; hydrological connections • storm water infrastructure maintenance (e.g., sediment basin and culvert cleaning) • erosion and sediment control BMPs		
Trail Design and Maintenance	• trail tread and width maintenance • trail elimination and reduced trail density • trail redesign for sustainability	• trail tread and width maintenance • trail elimination and reduced trail density • trail redesign for sustainability • annual surveys and monitoring for trail conditions	• trail elimination and reduced trail density • trail redesign for sustainability	

Table 2-4. Key Features of Existing Resource Management Programs

Key Feature Target Category	Storm Water Management Plan	Soil Conservation Plan	RMA Program	Wildlife Habitat Protection Plan
Vegetation and Wildlife Habitat	• increase of vegetation cover[1] • vegetation rehabilitation[2]	• increase vegetation cover[1]	• increase vegetation cover[1] • vegetation rehabilitation[2]	• increase vegetation cover[1] • vegetation rehabilitation[2] • habitat enhancements • surveys and monitoring for plant and wildlife species and habitat quality

[1]Increasing vegetation cover refers to encouraging vegetation to grow in areas where vegetation grew previously but growth has been inhibited. This activity is performed as a component of the Soil Conservation Plan. As an example, controlling OHV trail width is a method to achieve increasing vegetation cover.

[2]Vegetation rehabilitation refers to direct revegetation of a site utilizing methods including but not limited to application of hydroseed, planting of native shrubs or trees, and/or removal of exotic vegetation. Vegetation rehabilitation aims to increase the habitat value of an area by considering ecologically appropriate options that encourage re-emergence of native vegetation.

2.4 PROJECT CHARACTERISTICS

DPR proposes establishing new RMAs on the remaining 773 acres of unfenced distributed riding and trails-only riding areas in the SVRA hills and provide the necessary ongoing maintenance activities for both the new and existing RMAs as described below. The new RMAs are shown in Figure 2-5. Illustrated boundary locations are approximate and may be adjusted based on site conditions as individual RMAs are planned and implemented. Current use designations largely reflect the 1981 General Plan. The newly created RMAs would comprise 167 acres of fenced distributed riding area and 606 acres of trails-only riding area (Table 2-5) consistent with the 2024 General Plan Update Visitor Experience Area designations of Distributed Riding (open riding), Advanced Trails, (trails-only riding) and Limited Recreation (minimal trails-only riding). The RMA would implement these designations, resulting in a net change of 200 acres of distributed riding area being converted to trails-only riding area. With the proposed RMA Program project, the entirety of the 1,227-acre hillside riding area would be managed as RMAs. DPR actions required to establish the RMA boundaries and subsequent actions for rehabilitation and maintenance are described below.

Table 2-5 Proposed RMA Program Changes to OHV Use Area Designations[1]

Trail Management Designation (1981 General Plan/2024 General Plan)	Existing (acres)	Proposed (acres)
Open Use / Distributed Riding	367	167[2]
Trails Use / Advanced Trails and Limited Recreation	406	606[2]
Total area added to RMAs		773
SVRA area managed in existing RMAs		454[3]
Total SVRA area managed in RMAs		1,227[4]

Notes:

[1] Existing conditions reflect the 1981 General Plan. The RMA Program would manage OHV use opportunity consistent with the 2024 General Plan Visitor Experience Area designations (see Figure 4-2 and Table 4-1).

[2] Distributed Riding (open riding) areas would be limited to portions of the new Training Hill, Sand Hill, Carrol West, and Carrol East RMAs. See Table 2-7.

[3] Excludes West Franciscan (south), which was rehabilitated as a RMA but remains closed to public use as a resource closure area.

[4] Acreage excludes Park Administration and Corral Hollow management units and the Waterfall Canyon and West Franciscan (south) resource closure areas.

2.4.1 New RMA Planning

Establishing a new RMA in the SVRA starts with an initial assessment of a watershed or sub-watershed to identify areas where accelerated erosion is occurring. Area rehabilitation is an approximately 2-year-long process involving isolating the area with fencing, assessing the existing trail routes for trail sustainability, closing routes, developing replacement trail segments where needed, and rehabilitating non-designated trails or damaged resource areas.

The trail network planning process takes into consideration several items including trail layout and location, connectivity, sustainability, emergency access, user interest, enforcement strategy, education methods, buffer zones, and a timeline for completion of the project. Environmental factors are also considered when routing trails to avoid locations of known sensitive natural and cultural resources. Resource surveys of prospective work areas may be performed during the

planning phase to identify sensitive resources in the project area needing marking for protection. Construction worker awareness training occurs prior to the start of project activity to alert workers to the potential presence of resources and protocols if resources are encountered.

Trails that have proven to be sustainable and that do not convey high concentrations of storm water elsewhere are usually incorporated into the RMA trail network. Trails that have been identified as erosive per the SCP dataset or redundant (i.e., high trail density) are eliminated from the trails network and the area rehabilitated. Special attention is given to developing buffer zones near drainages by limiting trail density and soil disturbance within these areas to provide adequate bio-filtration (sediment control).

Table 2-6. RMA Establishment, Rehabilitation, and Maintenance Actions

RMA Actions		Methods	Activity Duration
1	Perimeter Fencing and Gates	Install and maintain metal H fencing to establish RMA boundary and isolate treatment area from public access. Field fencing type has broad spacing and is off the ground. H fences allow wildlife passage.	Boundary fencing added as new RMAs are created. 1-3 new RMAs per year.
2	Signage and Public Outreach	Posters for public messages explaining why area is closed and how to get involved including QR code and telephone call number.	1-3 new RMAs per year.
3	Trail Removal and Hillside Rehabilitation	Grade area to restore natural slope gradient of impacted areas. Replacement soils applied as needed to achieve grade and prevent erosion.	1-3 projects per year.
4	New or Redesigned Trail Construction	Construct new sustainable trails including reroute or replacement of existing trail alignments in stable, resilient soils. Create managed hillclimbs including rotational hillclimbs where hillside sections are temporarily closed for rehabilitation.	As new RMAs are created or in established RMAs as assessed through ongoing monitoring.
5	Erosion Control and Repair	Install erosion control on bare slopes (e.g., hydromulch, hydroseeding, wattles); hard water crossing pavers on trail sections where drainage sheet flows across a trail.	1-3 projects per year.
6	Revegetation	Establish native vegetation on impacted areas through hydroseeding and/or hand planting.	Hydroseeding and hand planting occurs with the larger rehab projects. 1 project per year.
7	Trail Inspections and Evaluations	Conduct visual inspections looking for signs of off-trail riding, damaged areas needing repair. Evaluate trail surface conditions using Trail Evaluation Form	Weekly to biweekly inspections. Annual trail evaluations
8	Distributed Riding Area Monitoring	Conduct tiered monitoring for impacts on adjacent trail riding only areas. Monitor for impacts related to concentrated OHV use (e.g., hillclimbs).	Weekly to biweekly
9	Trail Maintenance	Maintain trail surface, width, grade, and drainage features (e.g., water bars). Includes short trail reroutes (<300 feet)	Ongoing where needed

Table 2-6. RMA Establishment, Rehabilitation, and Maintenance Actions			
RMA Actions		**Methods**	**Activity Duration**
10	Off-Trail Rehabilitation	Cover disturbed area and install barriers. Place straw on new disturbance areas where a rider has gone off a designated trail. Install drift fencing with H braces across non-designated trails to block access and stop use.	As needed

Once RMAs are established, OHV use is restricted to trail riding only unless off-trail riding is specifically authorized in designated distributed riding areas. Management of OHV use within each RMA would be planned based upon designations in the 2024 General Plan Update. North facing hills fronting Corral Hollow Creek would be designated as trails-only area consistent with management goals to limit viewshed impacts and sediment impacts on Corral Hollow Creek.

2.4.2 RMA Implementation

A description of proposed RMA establishment and subsequent maintenance actions is presented below and summarized in Table 2-6. Actions items 1 through 6 would occur as new activity during initial phases of establishing the RMA with its designated trail system and rehabilitating damaged areas. Inspection and maintenance activities presently occurring in existing RMAs (Action items 7 through 11) would begin in the proposed new RMAs once these areas are open to OHV use. Inspection and maintenance of established designated trails occur routinely in the SVRA under the SCP.

New RMAs and associated rehabilitation projects would be gradually implemented over an approximately 10-year period. One to three RMAs are expected to be implemented each year dependent upon the size of the RMA and scale and nature of the rehabilitation required. Areas with the highest contributions of sediment to storm water runoff would be prioritized. As discussed below in sections 2.4.3 and 2.4.4, 47 individual rehabilitation projects in new RMAs and 11 individual maintenance projects in existing RMAs are identified potentially affecting approximately 175 acres and 23 acres respectively. Based on the known scale of projects and the 10-year implementation period, it is estimated that rehabilitation projects would not disturb more than 20 acres in any given year.

2.4.2.1 Perimeter Fencing and Gates

The first step in establishing a new RMA is to install boundary fencing with gates at entry points to provide controlled public access. Trail riding in the new RMA is temporarily closed to the public until trail reconstruction and site rehabilitation is completed. Perimeter fencing allows for an area's temporary closure to help control off-trail riding that may occur in the future.

Wire field fencing with a no-climb, 2-inch mesh is used to establish the RMA boundary and isolate treatment areas from public access. Field fencing is placed off the ground, and H braces are used at corners or approximately every 500 feet to allow wildlife passage. See Figure 2-6 RMA Fencing and Gates for examples of fencing used in RMAs.

The fence would be installed using hand tools and a mechanical T-post pounder; no excavation is anticipated. T-posts would be spaced approximately every 10 feet. Gates would also be installed requiring excavation of two post holes (4-inch diameter, 2-feet depth) per gate. This would require soil excavation for gate posts of less than 2 cubic feet total. The soil would be placed back into the hole around the gate post with any remainder spread onto the trail.

2.4.2.2 Signage and Public Outreach

DPR uses signage, patrols, social media, websites, and route maps to communicate to SVRA visitors which areas are open for riding and applicable riding restrictions. Stay on trail signage is posted in trails-only riding areas and managed hillclimbs. Signage is posted at entrances to closed routes to notify the public of the riding area closure. See Black Bear Rehabilitation Project poster in Figure 2-7 RMA Signage Examples as an example of signage message.

The public education and outreach component of establishing a new RMA includes working with the public through the Carnegie Advisory Team, handing out brochures, posting on social media and webpages, and drafting interpretive panels and videos. The Carnegie Advisory Team assists with trail design and communicating to the public the need to stay-on-trail.

2.4.2.3 Trail Removal and Hillside Rehabilitation

Landform grading is conducted to remove volunteer (unauthorized) or unsustainable riding trails and restore the natural slope gradient of impacted areas. Rehabilitation efforts may include adding soils to bring the incised trails or eroded slope contours up to grade with the surrounding hills. Most graded work sites would involve fill with minimal cutting. Cutting would be limited to allow temporary access roads during construction and prepping the site for fill material (i.e., replacement soil). Fill material would be clean and free of contaminants.

Imported soil is spread over the area as needed to replace soil loss and restore site topography as close to grade as practical to prevent erosion and support habitat rehabilitation efforts. Some areas may need to be prepped before soil can be put in place. Prepped activities may include discing, grading, or ripping the site. Soil is typically spread over the erosive area with equipment such as a bulldozer, excavator, or grader.

Replacement soils for rehabilitation projects are typically sourced from stockpiles of soil dredged from SVRA sediment basins. The soil is stockpiled at Juniper Trail above Tyson Pond near the Maintenance Yard or at the 4x4 area (Figure 2-3). Replacement soil may also be cut from an adjacent side slope in the project area or, in more rare cases, brought in from an off-site quarry located a few miles down Corral Hollow Road. If imported soil is required for a rehabilitation project, imported soil would be obtained from a supplier who meets IPC guidelines for land managers and is certified weed-free, then initially stockpiled at one of these locations and then transferred by park equipment to the project site. If imported soil is needed for a project, volumes are estimated at 2,000 tons per project (50 truck trips from quarry at 40 tons/truck). A 10-yard dump truck would be used when needed to haul material to the project site. The stockpiled soil is transported to the individual project work sites using the fire roads and the Main Park Road. A dump truck, bulldozer, and small haul carts would be used to transport material from the work site staging area onto the slopes. Eliminating trails from the network often involves using heavy equipment such as a bulldozer to place soil back on the hillside and bring the hillside back to grade. Other equipment that may be required includes an excavator, hydroseeder, and water truck for dust control and compaction.

Existing roads are used to move heavy equipment and materials (e.g., fencing, replacement soils, and erosion control supplies) to locations to receive rehabilitation treatments. New temporary roads may be cut to provide access for heavy equipment (e.g., bulldozers, excavators, dump trucks, utility vehicles) for bringing in soil, work crews, wattles, tree trimming etc. Temporary roads would be removed and rehabilitated as the equipment is withdrawn from work areas.

Split rail fencing or a combination of ropes and T-posts may be used to block off retired trail segments. Wire fencing may be considered if split rail or rope and T-post fencing proves ineffective and off-trail riding recurs.

Examples of completed rehabilitation projects in existing RMAs (SRI Loop and Harrison Hill) are shown in Figure 2-8 Example of Previous RMA Rehabilitation Projects.

2.4.2.4 New or Redesigned Trail Construction

Once the landform grading is complete, constructing the trail network occurs. The designated trail network can utilize existing trails and/or may build new trails and trail connections. Typically, a combination of the existing and new trails is used to establish the designated trail system in a new RMA. Adjustments may be made to existing trails such as reworked or rerouted segments for sustainability. Hillclimb areas may be designed for use with rotating closures. An area of the hillclimb would remain active on a rotating basis allowing other hillclimb routes to be sectioned off and temporarily closed for rehabilitation.

Many factors go into the overall trail design including soils, hydrology, habitat, use type, trail access, trail connectivity, user interest and/or trail difficulty. Trails range from 18 inches to 60 inches wide depending on use type. The vertical clearance on the trails is up to 10 feet. The trail density of an area is typically less than 10 percent of the overall area.

To build trails, aerials are reviewed, the potential trails are walked and flagged by knowledgeable staff, and a map is produced for specialist review. Specialists such as Environmental Scientists review preliminary trail route alignments for potential resource impacts and adjustments are made as needed. Depending on the type of trail, trail construction can involve the use of hand tools, a trail dozer, excavator, and bulldozer. Trail construction typically occurs when soil moisture is present. If the conditions are dry, a water truck is used to increase moisture. Once the trail is constructed, signage and some focused fencing is installed. The area is then reopened to the public as a trails-only area.

Over the past several years, SVRA personnel have received classroom and field training from the State Parks trails training program on proper trail design and construction to achieve minimal impact on the soil and habitat. This is achieved primarily by preventing accumulation of storm water using a trail design BMP called breaks-in-grade. By changing the elevation to a positive grade at regular intervals, storm water volume is divided into lower concentrations. Most of these methods have been used in the SVRA for several years, exhibiting high levels of success (DPR 2022a).

2.4.2.5 Erosion Control and Repair

Exposed and freshly placed soils are stabilized with a combination of moisture, compaction, hydromulch, vegetation, and/or straw wattles. Hydromulch is a process that involves mixing a bonded fiber matrix, paper, or wood with a tackifier to create a slurry. When seed is added to this slurry, it is referred to as hydroseeding. This slurry, mixed and stored in a mobile tank, is then pumped through a hose or cannon to be spread on non-vegetated soils approximately 0.75 inches thick. The mobile tank is operated from access roads. Covering the soil protects the soil from potential erosive forces such as precipitation or wind. The existing seedbank or added seed will eventually germinate, and the slurry biodegrades within approximately one year. The vegetation then holds the soil in place. Hydromulch is typically applied if it is late in the spring season and seed will burn in the hot sun rather than germinate. Hydromulch with seed (hydroseeding) is

applied before the rainy season when conditions favor seed germination or if an area lacks a good seed bank in the soil and needs additional seeding to encourage grass growth.

In addition to hydromulch, biodegradable burlap rice-straw wattles are used to interrupt potential concentrated flows. Straw wattles are installed to follow the contour of the slope and are spaced between 10 to 30 feet apart. The straw wattle is installed by trenching a shallow trench and placing wattle inside the trench. The wattle is secured with wooden stakes. See photos in Figure 2-8 for example of erosion control treatments using wattles. DPR constantly re-evaluates the success of its erosion control and repair methods using adaptive management.

Erosion control projects would also be implemented in areas apart from slope remediation where drainages have created gullies. Gully repair methods involve filling the gully channel with soil to restore grade and dispersing and dissipating storm water runoff to reduce the concentrated drainage causing the erosion. The disturbed area is replanted with perennial native grasses to increase the soil's infiltration rates, permeability, and water holding capacity. Soil for gully repair could be imported or scraped from adjacent side slopes of the gully as needed. Equipment used in gully repair includes haul trucks and dozers as needed for soil import and an excavator or mini excavator.

2.4.2.6 Revegetation

Revegetation is accomplished through hydroseeding as part of erosion control and through hand planting of specific plant species to provide habitat value. Revegetation is typically proposed in rehabilitating hillside slopes, removing trails, narrowing trail widths, and spot treatments. Locally occurring California native plant species are used in all revegetation efforts. Plant seeds, cuttings, or rooted container plants are usually planted in combination with protective surface hydromulch. Mulch is a layer of organic material that is applied to the soil surface and may include blankets of woodchips or straw, or hydromulch. Mulch provides a protective cover against soil erosion and loss of small plants and seed, prevents rapid drying of soil and roots, and discourages growth of weeds that compete for light, growing space, and nutrients. For hydroseeding, Carnegie SVRA uses a custom seed mix made for the park that is currently comprised of *Bromus carinatus*, *Festuca microstachys*, and *Stipa pulchra*.

Revegetation at individual project sites would occur consistent with DPRs' genetic integrity policy (DOM 310.4.1). Sources of materials for revegetation will be, in preferred order:

1. Seeds, plants, and cuttings salvaged from the site prior to disturbance;
2. Materials from similar vegetation and sites within the unit;
3. Materials collected offsite, but from within the same ecological region, elevation, and site characteristics as the site to be revegetated.

DPR ensures that the origin of seeds or plants acquired from commercial sources complies with requirement 3, above.

2.4.2.7 Trail Inspections and Evaluations

After the rehabilitation work is completed and the area is open to the public, the RMA is visually inspected by SVRA staff regularly – weekly to biweekly, depending on the time of year and level of use. SVRA staff conduct this monitoring looking for signs of off-trail riding and damaged areas needing repair. Off-trail violations may result in temporary closure of the RMA and citation(s) are given to the offender(s) when possible. The violations that resulted in the closure are publicized, so the users understand the consequences of riding off-trail (DPR 2022a).

2.4.2.7.1 Annual BMP Evaluations

The RMA rehabilitation projects would utilize several BMPs as part of the erosion and sediment control strategy. The selection of these BMPs would rely on assessments guided by experience and the OHV BMP Manual along with the physical characteristics of the landscape. Anticipated BMPs for rehabilitation projects are listed in Table 2-10. Annual evaluations would be used to verify that assumptions made during the planning phase are correct and the BMPs are effective and functioning properly. There is also the potential for these BMPs to deteriorate over time or become damaged due to OHV activity. For these reasons, regular inspection is warranted. Each rehabilitation project would be visually inspected annually for vegetation cover, signs of erosion, and BMP conditions and effectiveness.

The BMP evaluations would be annually reviewed by the SVRA Environmental Scientist and trails supervisor. During this review, if deficiencies are detected, then corrective measures to address them would be drafted and implemented. It is anticipated that the evaluations along with the corrective measures would be summarized in future SCP annual reports or SWMP plan annual reports. As such, BMP prescriptions, locations, and evaluations would be identified as each RMA rehabilitation is undertaken.

2.4.2.7.2 Hydrological Connections Inventory

Prior to rehabilitating an RMA, the current hydrological connections would be inventoried using GIS software to mark all points where trails and roads intersect watercourses. This creates a watercourse and trail node map that illustrates where acute erosion may be occurring and enables other empirical analyses to focus on trouble spots, such as establishing photo points or increased field observations. OHV roads and trails should be designed using principles of hydrologic invisibility and hydrologic disconnection. Hydrologic invisibility refers to design principles that allow stormwater runoff to flow in a natural pattern down a slope and across – not along – the trail or road tread surface. Hydrologically disconnected trails avoid unnatural concentrations of water flow and disperse concentrated runoff before it can accumulate to volumes and flow velocities that can cause erosion. The ultimate motivation for designing hydrologically invisible roads and trails is to incorporate design elements on a network-wide level to ensure that water in a watershed or sub-watershed exit the watershed basin naturally, at the lowest point of the basin. Design features such as outsloping, rolling tread profiles, and employing BMPs such as rolling dips, promote the concept of hydrologic invisibility. The design features and BMPs associated with the RMA's rehabilitation activities would be cataloged as they are implemented, and a measure of the hydrological connections would be made after the project is complete. A pre- and post-project description can then be made regarding the hydrological connections, and the general design considerations and employed BMPs can be evaluated to ensure the hydrological connections remain broken.

2.4.2.7.3 Annual Trail Evaluations (Soil Conservation Standard)

Annual trail condition evaluations provide a continual inventory and assessment of trail conditions and BMPs, which assist in determining the effectiveness of the chosen tactics. These evaluations are performed on-site using a modified version of the 2020 Soil Conservation Standard and Guidelines protocol. Per this protocol, the trails are assigned a green, yellow, or red rating based on the condition of the following: water control, accelerated erosion off of the trail, sediment traps, tread wear, tread width, off-trail travel, watercourse approach, channel width, and stabilization of outboard fill. A green rating indicates the trail is in good condition and the erosion control features are functioning properly. A yellow rating is assigned when the erosion

control features or trail tread is beginning to show signs of deterioration. A red rating indicates the trail is experiencing soil loss at an unsustainable rate and repairs or closure is needed. This rating information is then used to schedule and prioritize trail work and rehabilitation projects. In addition to the color rating, a coded system is used to better describe the condition and problems of the trail.

The color rating is then stored in the GIS database to help analyze and guide remediation efforts. The database provides a robust platform and allows managers to overlay rehabilitation projects on top of the trail inventory and rating data. From here, a direct relationship can be drawn between activities and soil conditions. It is anticipated that the annual trail evaluations including descriptive statistics and maps of the ratings and trail types would be summarized in future SCP annual reports or SWMP plan annual reports.

2.4.2.7.4 Vegetation/Trail Density Surveys (Soil Conservation Standard)

Vegetation cover along with bare soil and signs of erosion throughout the SVRA are measured using aerial photography and on-the-ground visual surveys as part of the SCP and used to help inform trail evaluations conducted for the RMA Program. An increase in vegetation cover and a decrease in erosion features would be a positive sign that the erosion control tactics are effectively working. Several of the erosion tactics identified can be evaluated using this monitoring methodology.

2.4.2.7.5 Sediment Yield

Each year, SVRA staff removes sediment from the basins. This activity is conducted as long as environmental permitting is in place. This is completed using heavy equipment such as an excavator and dump trucks. The process provides a method for estimating sediment yield quantities within the SVRA's basins annually. Each year, the sediment removed is measured along with the capacity of the basin. As RMAs are established and trails-only riding is practiced, then an annual reduction in sediment yield should follow (as controlled by precipitation). Baseline data would be collected to establish trends.

2.4.2.8 Distributed Riding Area Monitoring

Portions of the proposed RMAs may remain designated as distributed riding areas where riders are not limited to specific routes. The following tiered monitoring approach is proposed to allow for identification of adverse impacts in and adjacent to the distributed riding areas from excessive OHV traffic.

- Tier 1: Regularly monitor the distributed riding area, focus monitoring on the interaction of distributed riding area and its surrounding non-open riding areas.
- Tier 2: Monitor areas of concentrated OHV use and focus on specific OHV recreation features such as hillclimbs.
- Tier 3: Monitor specific features; focus monitoring effort on specific common riding sections with potential erosion problems and watercourse crossings. Fence off environmentally sensitive areas, such as habitat for special-status species, sensitive natural communities, and cultural resources, and regularly monitor these areas to ensure fencing is secure and resources remain protected.

2.4.2.9 Trail Maintenance

The trails maintenance treatment occurs in all RMAs and non-RMAs throughout the SVRA. This includes trail repairs, off-trail rehabilitation, off-trail exclusions, and short-segment (<300 feet) trail reroutes. Trail maintenance is dependent on the conditions of the trail and the use type.

As discussed in section 2.3.3 above, SVRA trails designations, which are based on recreational use and maintenance requirements, fall into four categories: primary, secondary, tertiary, and volunteer. Primary trails are usually maintained with a motor grader, and secondary trails are maintained by smaller trail dozers. Given their narrow width, tertiary trails are maintained using hand tools. Except as allowable in designated distributed riding areas, volunteer trails in RMAs are removed, rehabilitated, and blocked off to prevent recurrence as described in section 2.4.2.10 below.

The primary and secondary trails receive annual maintenance as needed, which includes grading, outsloping, installing and reconditioning of BMP features, removing outside berms, and pruning vegetation. Tertiary trails are maintained as needed or as determined by annual trail evaluations and are maintained by hand tool only as equipment cannot access these trails.

- Trail Surface. The surface of the trail is smoothed to remove ruts, and any drainage features are maintained. Drainage features include hardened wet crossings, water bars, rolling dips, outsloping, and insloping. This typically occurs at least once per year on primary and secondary trails.
- Trail Width. For trails that are between 48 inches to 60 inches wide, mechanized equipment is used such as a mini dozer or ATV with an implement attached. Narrower trails are maintained with hand tools such as rakes, shovels, viberplates, and jumping jacks. The goals are the same as the wider trails and involve rehabbing the drainage features and ensuring a smooth trail. This work occurs as needed on all trails per annual trail evaluations.
- Trail Reroutes. Trail reroutes occur when a trail has proven to be problematic either due to technical riding difficulty, accelerated erosion, or impacts on habitat. The reroute will be implemented to eliminate these issues and will match the same use previously identified. Reroutes are typically relatively short (20 to 300 feet). Longer trail reroutes are planned as new or redesigned trail construction discussed in section 2.4.2.4 above.

2.4.2.10 Off-Trail Rehabilitation

Each RMA has perimeter fencing with access gates at the entry points. When volunteer trails are created, the access gates are closed for a predetermined amount of time to allow staff to make repairs and to reinforce the trails-only riding message. On average one to two of the existing RMAs are closed per week due to off-trail riding or for trail maintenance to allow for rehabilitation. At the first sign of disturbance from a vehicle riding off a designated trail, straw is laid to cover the vehicle track. If off-trail riding continues at that location, safety snow fence, split-rail fencing, or H braces would be installed to block unauthorized trail access and use.

Off-trail rehabilitation actions include spreading rice straw, raking, fencing, and signage. These activities are implemented when off-trail riding is caught early before any soil displacement has occurred. DPR may install snow fencing, split-rail fencing, and/or metal H braces across non-designated trails to block access and stop use. Existing wood H braces in all RMAs would be slowly replaced with metal as needed.

2.4.3 New RMA Rehabilitation Projects

RMA implementation and rehabilitation project activities anticipated within each new RMA are summarized in Table 2-7. DPR has made a preliminary assessment identifying 47 sites covering approximately 175 acres needing rehabilitation. These areas require trail removal, new or redesigned trail construction, hillside rehabilitation through landform grading, erosion control, gully repair, and/or revegetation. The approximate rehabilitation site locations are shown in Figure 2-9 Preliminary Rehabilitation and Maintenance Project Sites. All areas included within the marked location may not require disturbance. Work site boundaries and disturbance areas would be determined once rehabilitation activities are planned for that location. In addition to the known preliminary project activity locations, rehabilitation activities may occur at other locations within the SVRA under the RMA Program as the need arises. DPR recognizes that site conditions at the SVRA can change from year to year in response to weather events resulting in the need for future rehabilitation work not yet identified.

Table 2-7. Proposed New RMAs and Preliminary Rehabilitation Project Activities

Mgmt. Unit	New RMA	RMA Size (acres)	Approximate Rehabilitation Project Site Area (acres)	Rehabilitation Project Sites (see Figure 2-9 site numbers)	OHV Riding Opportunity	Perimeter Fencing and Gated Access	Signage and Public Outreach	Trail Removal and Hillside Rehabilitation	New or Redesigned Trail Construction	Erosion Control and Repair	Revegetation
Trans Am	The Edge	5.9	<2	1, 2	Trails	X	X	X	X	X	
	Training Hill Area	93.7	<50	3, 4	Trails/Distributed	X	X	X	X	X	X
	Sand Hill Area	51.6	<2	5, 19	Trails/Distributed	X	X	X	X	X	X
Franciscan	West Franciscan (north)	28.9	<2	6	Trails	X	X		X	X	X
	East Franciscan	86.2	<10	7, 11	Trails	X	X	X	X	X	X
Dead Cow	Stockpile	25	<10	21	Trails	X	X	X	X		X
	Clear Pond	32.9	<5	17, 18, 19, 20, 26	Trails	X	X	X	X		
	Confidence Hill	43.5	<20	24, 25, 30	Trails	X	X	X	X	X	
	Baby Cow	24.5	<2	30	Trails	X	X	X	X	X	
	Top of the World	36.6	<5	8, 9, 10, 12, 13, 14, 15, 17	Trails	X	X	X		X	X
	Death Canyon	29.7	<20	16, 25, 26, 27, 28, 30	Trails	X	X	X	X		X
Carrol Canyon	Snake Farm	40.0	<5	22, 23	Trails/Hillclimb Event Area	X	X		X	X	X
	Hillclimb Facility	32.4	--	--	Trails/Hillclimb Event Area	X	X	X			X
	Carrol West	42.3	<2	31, 32, 33, 35, 36	Trails/Distributed	X	X	X		X	
	Lower Juniper	45.2	<10	29, 36, 37, 38, 39	Trails	X	X	X	X	X	X
Los Osos	Carrol East	45.4	<10	34	Distributed	X	X				
	Happiness Valley	77.3	<20	35, 36, 40, 41, 42, 43, 44, 45, 46, 47	Trails	X	X	X		X	X
Kiln West	Kiln West (south)	31.9	--	--	Trails	X	X				
Kiln East	Barn Owl[1]	8.7	--	--	Trails	X	X				
TOTAL		773	<175								

[1] The Barn Owl RMA acreage is presently part of the existing Kiln East RMA and would be separated from Kiln East with new fencing and access gates. Creating this RMA does not add to the RMA acreage total.

2.4.4 Future Specialized Maintenance Projects in Existing RMAs

Existing RMAs previously established in the Los Osos, Kiln West, Kiln East, and SRI Loop management units receive ongoing maintenance of trails, roads, drainages, and fencing. Through its routine operations, DPR identifies maintenance needs to improve compliance with the Soil Conservation Standard (DPR 2020) and the SWMP (DPR 2012) and address changed site conditions as they arise (e.g., storm events, gully repair, public safety concern, etc.). Conditions that need attention get identified through ongoing monitoring, staff observations, and visitor reporting of field conditions. Once problem conditions are identified in the field, Carnegie staff begin the process of talking to management and subject matter experts to resolve issues. If specialized maintenance projects are identified (i.e., involving measures beyond standard BMPs and other routine maintenance), DPR begins the process to design, plan, permit (if necessary), and implement the new project. DPR has presently identified several specialized maintenance projects to be implemented in existing RMAs in addition to the regularly occurring maintenance as part of park operations. These maintenance projects are listed in Table 2-8 and shown in Figure 2-9. If any additional specialized maintenance projects are identified in these existing or new RMAs in the future they will be subject to separate CEQA review and are not addressed within the scope of this EIR.

Table 2-8. Proposed New Specialized Maintenance Operations in Existing RMAs

Mgmt. Unit	RMA	Maintenance Project Site		Maintenance Type / Activity
		Size (acres)	Site Number (see Figure 2-9)	
Los Osos	Los Osos Climb	<10	48	Trail Redesign of the Pink hillclimb and Artichoke trail to create a more sinuous trail system similar to Whipsnake trail in Seven Trails RMA Trail design reroute being considered. No future work anticipated beyond regular maintenance.
Los Osos	Seven Trails	<1	49, 50	Trail Redesign of some of the tight turns on Whipsnake and Paradise trails. Trail redesign is being considered in some areas due to recurring off-trail riding. Work would be minimal, involving split rail to block off unsustainable trails and possibly use of a SWECO to cut the trail redesign, mini-ex to install BMPs, Cannycom cart to deliver materials if needed.
Kiln West	Kiln West	<10	51, 52, 53, 54, 55	Trail Redesign/Rehabilitation Install approximately 3,000 feet of wire fencing with t-posts every 10 feet; excavate post holes and install gates. Improvements are needed to make the area entirely trails-only, including exclusion from the drainage area, revegetation efforts, potential gully repair, potential soil import, and closure of existing unsustainable trails. If necessary, a new sustainable trail design will be chosen and installed, which may require the use of a SWECO, mini-ex, Cannycom carts, and depending on the size/scale of rehab needed, a dozer and 18,000 LB excavator.

Table 2-8. Proposed New Specialized Maintenance Operations in Existing RMAs				
Mgmt. Unit	**RMA**	**Maintenance Project Site**		**Maintenance Type / Activity**
		Size (acres)	**Site Number (see Figure 2-9)**	
Kiln West	Bunkhouse	<1	56, 57	Trail Redesign/ Rehabilitation Install approximately 3,600 feet of perimeter fencing. Trail redesign may be needed. Riders are creating a hillclimb in an area that is not in a trail system, which may require rehab efforts if not controlled in a timely manner.
Kiln East	Kiln East	-<1	58	Drainage Exclosure Install approximately 2,500 feet of wire fencing with t-posts every 10 feet to enclose the drainage and exclude OHV riding. Improvements could be made here, especially by excluding riders from the drainage that traverses this canyon

2.5 Environmental Protection Measures and Standard Project Requirements Incorporated Into the Project

DPR incorporates BMP requirements from regulatory agencies, BMPs from the OHV BMP Manual, and DPR Standard Project Requirements (SPRs) into the planning, design, construction, operation, and maintenance of its projects to minimize the potential adverse effects of the project on the environment. The BMPs listed in Table 2-9 and Table 2-10 are incorporated into the RMA Program project and are considered part of the project and not mitigation measures. Table 2-9 identifies standard measures implemented by the SVRA as required by other resource agencies (i.e., air quality control district, and regional water control district). DPR maintains a list of SPRs that are included in project design to reduce impacts to resources. SPRs are identified in each environmental chapter of the EIR where relevant and fully presented in Appendix B.

Table 2-9. Carnegie SVRA Standard BMPs and Policies Incorporated into RMA Projects	
Subject	**Best Management Practice**
Air Quality	Control of fugitive dust is required by Bay Area Air Quality Management District (BAAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD). DPR and/or its contractor shall implement the BAAQMD Basic BMPs for Construction-Related Fugitive Dust Emissions contained in Table 5-2 and Table 5-3 of the BAAQMD CEQA Air Quality Guidelines (BAAQMD 2023b) and the SJVAPCD Regulation VIII control measures during all construction activities associated with the proposed project to control construction related fugitive dust emissions, respirable particulate matter less than 10 microns in diameter (PM_{10}), and greenhouse gas (GHG) emissions. These BMPs are also included in the Carnegie General Plan Operations and Maintenance (OM) Guideline 6.1 through Guideline 6.5 in Air Quality section 6.1.7 and Appendix C.

Table 2-9. Carnegie SVRA Standard BMPs and Policies Incorporated into RMA Projects

Subject	Best Management Practice
Invasive Species	All project activities that could spread invasive species to a new location will be subject to prevention BMPs for land managers developed by the California Invasive Plant Council (IPC), which are available from Environmental Scientists or online at https://www.cal-ipc.org/resources/library/publications/landmanagers/
Storm Water and Drainage Control	DPR and/or its contractor shall prepare and implement a storm water runoff management plan in compliance with the MS4 Permit requirements. The plan shall specify BMPs for the control and prevention of storm water pollution. The plan shall include site design, source control, and treatment BMPs to control potential erosion, sedimentation, and other pollutants from construction sites consistent with the BMP requirements in the most recent version of the California Storm water Quality Association (CASQA) Storm water Best Management Handbook – Construction.

2.5.1 OHV BMP Manual for Erosion and Sediment Control

DPR uses standard construction practices and BMPs prescribed in the OHV BMP Manual for Erosion and Sediment Control (Salix Applied Earthcare and Geosyntec Consultants 2007b). These BMPs consist of the use of a variety of methods: placement of erosion control blankets, seed, mulch, and straw wattles (fiber rolls); gully rehabilitation; application of dust suppressants; removal of accumulated sediment from sediment basins and culverts; and construction of low-water crossings and bridges. DPR selects BMPs with effort to match the natural aesthetic of the landscape. Ideally DPR takes a bio-engineering design approach to rehabilitation projects to minimize the use of more hardened materials. DPR uses adaptive management to constantly re-evaluate methods and their successes. A list of BMPs applicable to the anticipated project activities are listed in Table 2-10. A description of each of these BMPs is presented in Appendix B.

Once work site projects are completed, the soil is protected using BMPs from the OHV BMP Manual. Typically, the BMPs used for protecting disturbed soils from erosion are a combination of straw wattles, which prevent the concentration of water, and hydro mulch, which protects the soil from precipitation. If the hydro mulch machine is unable to access the area, then straw is used to cover the bare soil. SVRA staff are trained in proper implementation techniques, and the work is supervised by experienced rehabilitation specialists.

Table 2-10. Sediment and Erosion Control BMPs Incorporated into RMA Projects, OHV BMP Manual

Best Management Practice	Perimeter Fencing and Gated Access	Signage and Public Outreach	Trail Removal and Hillside	New or Redesigned Trail Construction	Erosion Control and Repair	Revegetation	Trail Maintenance	Off Trail Rehabilitation
EP-1 Scheduling and Phasing			X	X	X	X	X	
EP-2 Wet Weather Closure		X	X	X	X	X	X	X
EP-3 Minimize Disturbance and Buffer Strip		X		X	X	X		

Table 2-10. Sediment and Erosion Control BMPs Incorporated into RMA Projects, OHV BMP Manual

Best Management Practice	Perimeter Fencing and Gated Access	Signage and Public Outreach	Trail Removal and Hillside	New or Redesigned Trail Construction	Erosion Control and Repair	Revegetation	Trail Maintenance	Off Trail Rehabilitation
EP-4 Land and Road Grading to Minimize Erosion			X	X	X	X	X	
EP-5 Identify Underlying Geologic Soil Conditions				X	X	X		
SS-1 Surface Roughening			X	X	X	X	X	
SS-2 Topsoiling			X	X				
SS-4 Seeding			X	X	X	X		
SS-5 Straw Mulching			X	X	X	X		X
SS-6 Hydromulching			X	X	X	X		
SS-7 Compost Blankets			X	X	X	X		
SS-8 Erosion Control Blankets			X	X	X	X		
SS-11 Dust Control and Tackifiers			X	X	X			
TC-1 Stabilized Construction Entrance			X	X	X	X	X	X
TC-2 Temporary Stabilized Construction Roadway			X	X	X	X	X	X
TC-3 Temporary Equipment Crossings			X	X	X	X	X	X
RC-1 Energy Dissipator					X			
RC-2 Rock-lined Channel					X			
RC-3 Riprap				X	X			
RC-4 Turf Reinforcement Mats/Grass-lined Channels				X	X			
RC-5 Diversion Dikes and Diversion Swales					X			
SC-2 Sediment Traps			X	X	X			
SC-3 Bioretention and Bioswales			X	X	X	X		
SC-4 Silt Fence			X	X	X			
SC-5 Fiber Rolls			X	X	X			
SC-6 Straw Bale Dike			X	X	X			
SC-7 Compost Berms and Compost Socks				X				
RT-1 Crown				X			X	
RT-2 Outslope				X			X	
RT-3 Inslope				X			X	
RT-4 Road Surface				X			X	
RT-5 Rolling Dip				X			X	
RT-6 Terrain Dip				X			X	
RT-7 Climbing Turn				X			X	
RT-8 Culvert Crossing				X			X	

Table 2-10. Sediment and Erosion Control BMPs Incorporated into RMA Projects, OHV BMP Manual

Best Management Practice	Perimeter Fencing and Gated Access	Signage and Public Outreach	Trail Removal and Hillside	New or Redesigned Trail Construction	Erosion Control and Repair	Revegetation	Trail Maintenance	Off Trail Rehabilitation
RT-9 Slope Drain or Overside Drain				X			X	
RT-10 Low Water Crossings				X			X	
RR-1 Revegetation			X	X	X	X	X	X
RR-7 Gully Repair			X		X			
PO-1 Trail and Service Road Inspection and Maintenance							X	
PO-4 Vehicle Maintenance and Fueling			X	X	X			
PO-5 Stockpile Management			X	X	X			
PO-7 Hazardous Materials and Waste Management			X	X	X	X	X	X
PO-8 Hazardous Spill Response			X	X	X		X	X

Notes:
EP = Erosion Prevention; SS = Surface Stabilization; TC = Tracking Control; RC = Runoff Control; SC = Sediment Control; RT = Road and Trail Drainage; RR = Restoration and Rehabilitation; PO=Park Operations and Maintenance

2.6 REQUIRED PERMITS AND APPROVALS

The following approvals and regulatory permits may be required for implementation of the proposed Resource Management Area Program project:

DPR: EIR certification pursuant to CEQA

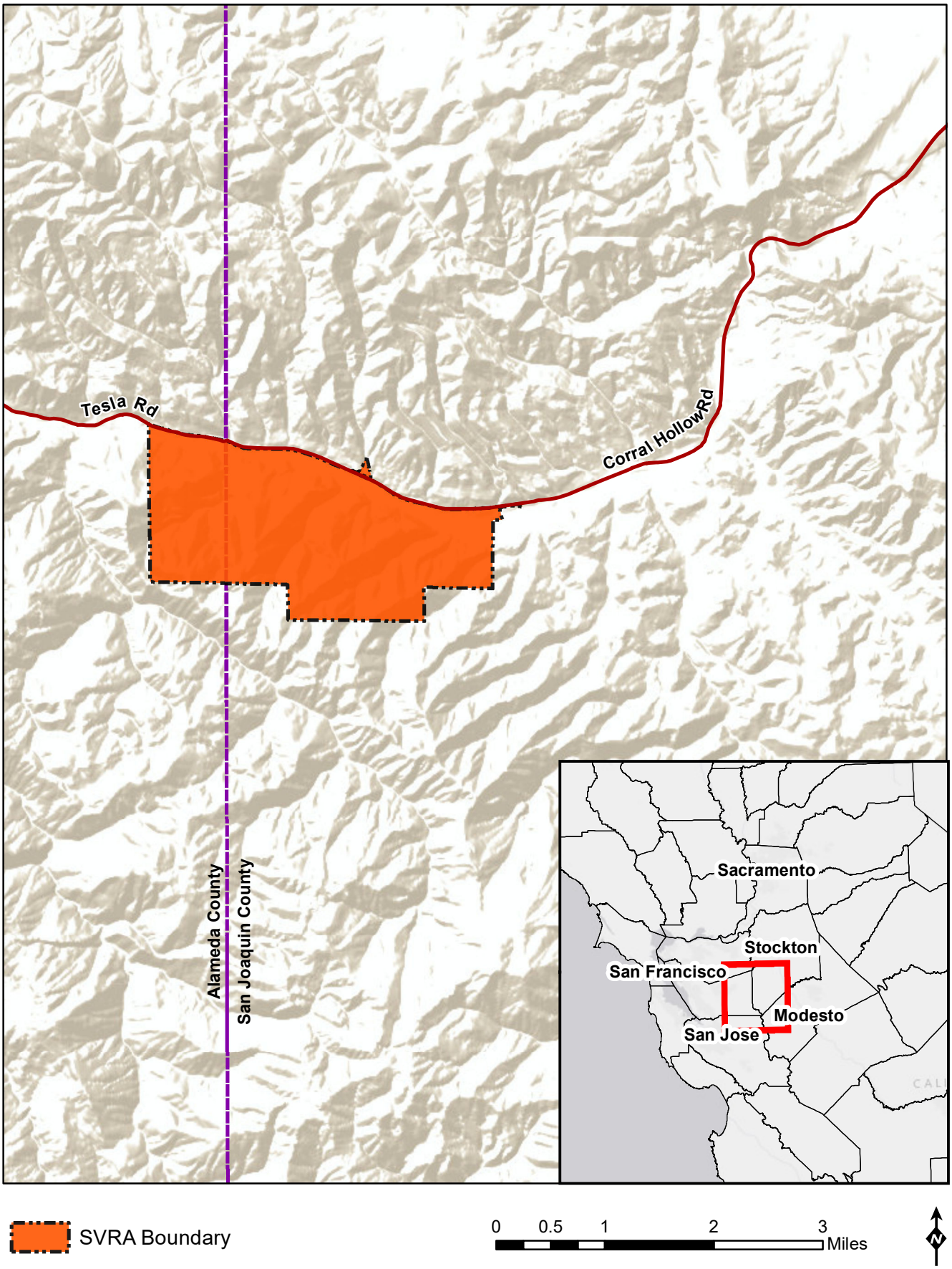


Figure 2-1 Project Location

Carnegie State Vehicular Recreation Area RMA Program EIR

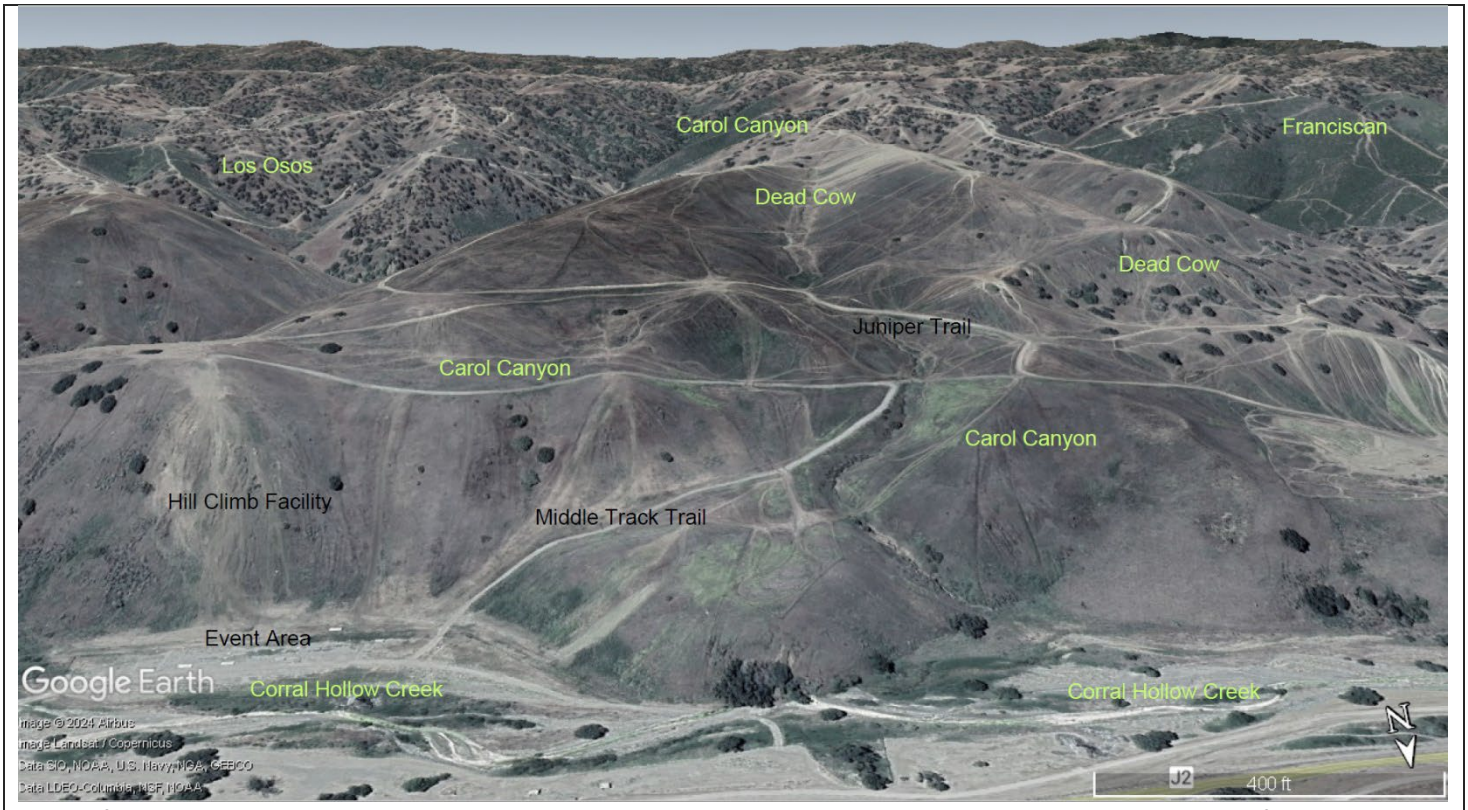


View of hills in the SRI Loop, Kiln East, and Kiln West management units at the eastern end of Carnegie SVRA looking south. The creek floodplain and valley floor in the foreground are within the Corral Hollow Creek management unit. Developed park areas occur on the valley floor.

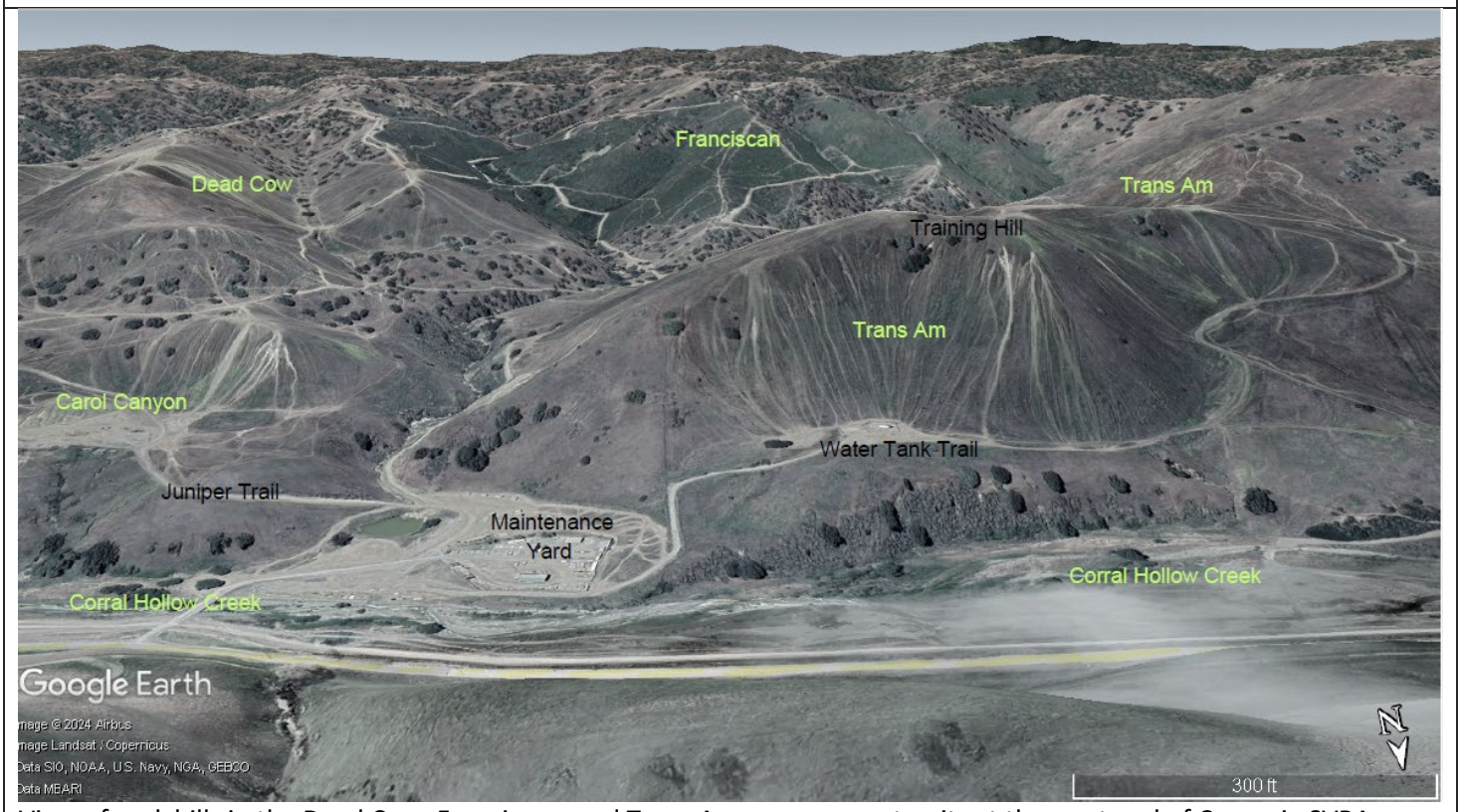


View of hills in the Kiln West, Los Osos, and Carol Canyon management units at the eastern central portion of Carnegie SVRA looking south. Park development areas including campground, park store, and visitor entrance are on the valley floor in the Corral Hollow Creek management unit adjacent to Corral Hollow Road in the foreground.

Figure 2-2 Views of Carnegie SVRA Landform

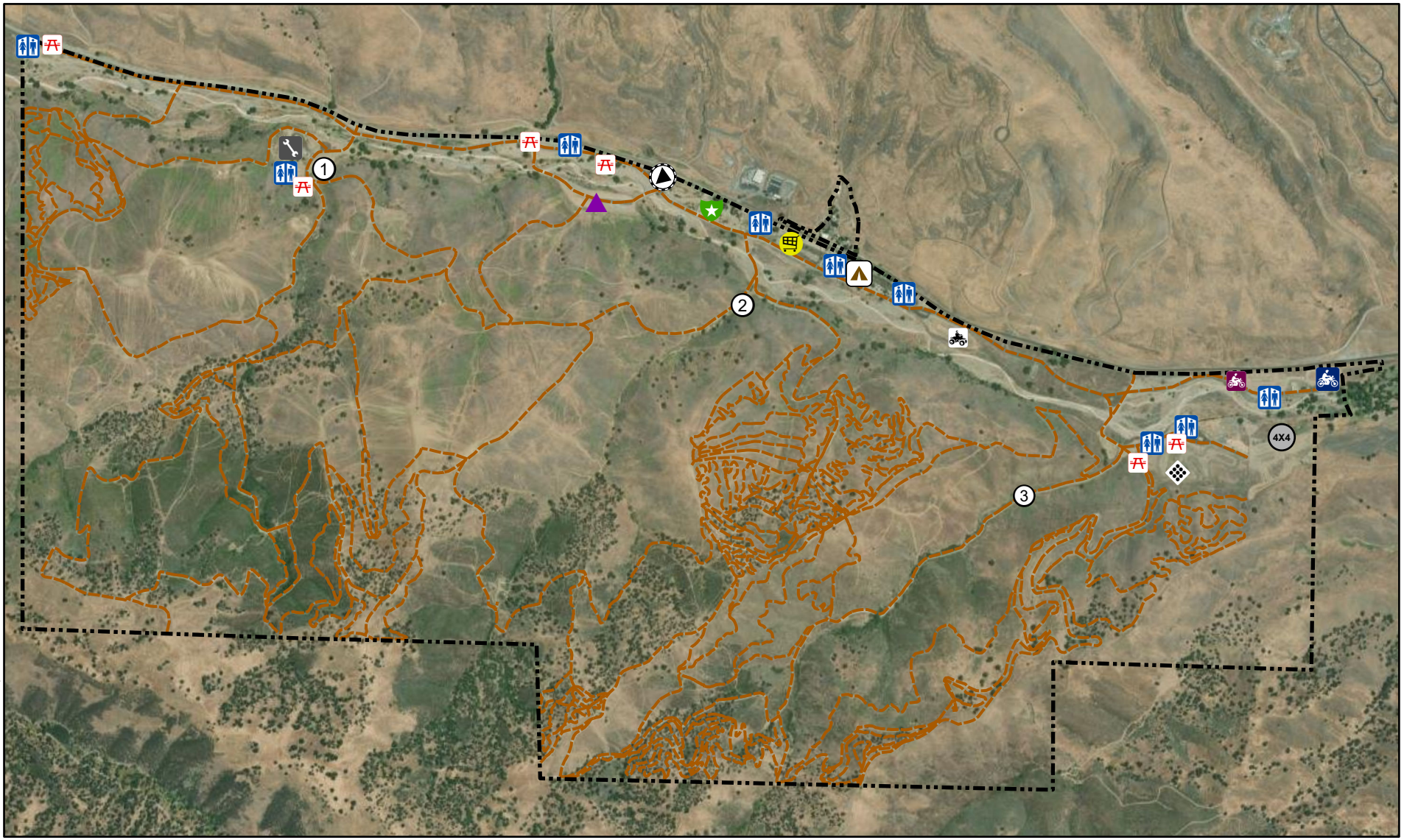


View of park hills in the Carol Canyon and Dead Cow management units at the western central portion of Carnegie SVRA looking south. Corral Hollow Creek in the Corral Hollow Creek management unit is visible in the foreground.



View of park hills in the Dead Cow, Franciscan, and Trans Am management units at the west end of Carnegie SVRA looking south. The park maintenance yard is in the Corral Hollow Creek management unit in the foreground.

Figure 2-2 Views of Carnegie SVRA Landform



Source: State Parks 2025, Esri 2024

Note: New RMA boundaries are approximate and may not represent exact location

0 0.1 0.2 0.4 0.6 0.8 Miles

N

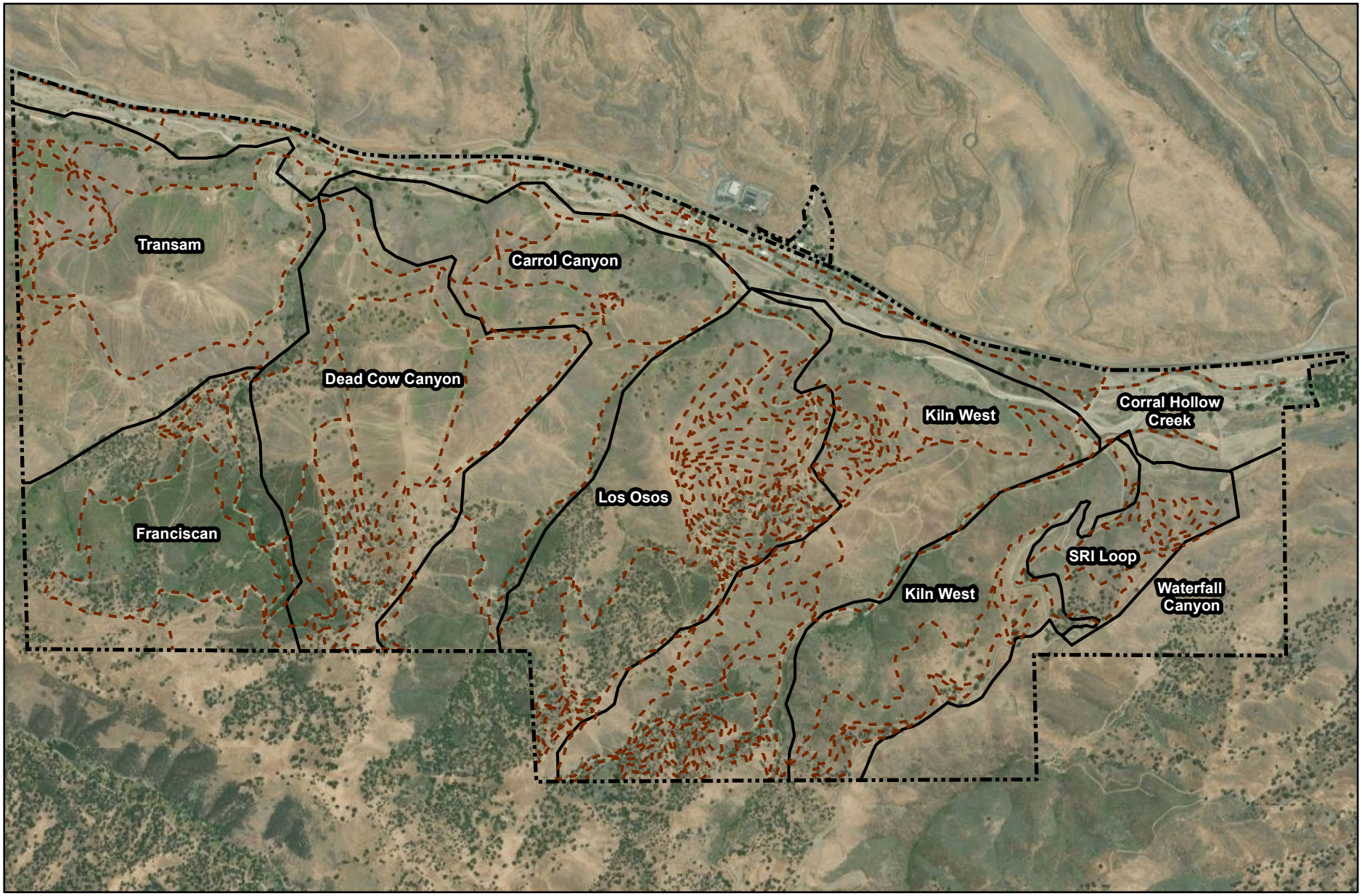
Legend

- SVRA Boundary
- Trails
- Main Visitor Entrance
- Day Use Area
- Restroom
- Maintenance
- Ranger Station
- Hillclimb Event Area
- Park Store
- Campground
- 1 Tyson's Basin
- 2 Carrol Basin
- 3 Kiln Basin
- 70cc Track
- 110cc Track
- ATV Track
- MX Track
- 4X4 4X4 Area

Figure 2-3 Park Facilities Map

Carnegie State Vehicular Recreation Area RMA Program EIR

MIG



Source: State Parks 2025, CDPR 2023

0 0.15 0.3 0.6 0.9 Miles

N

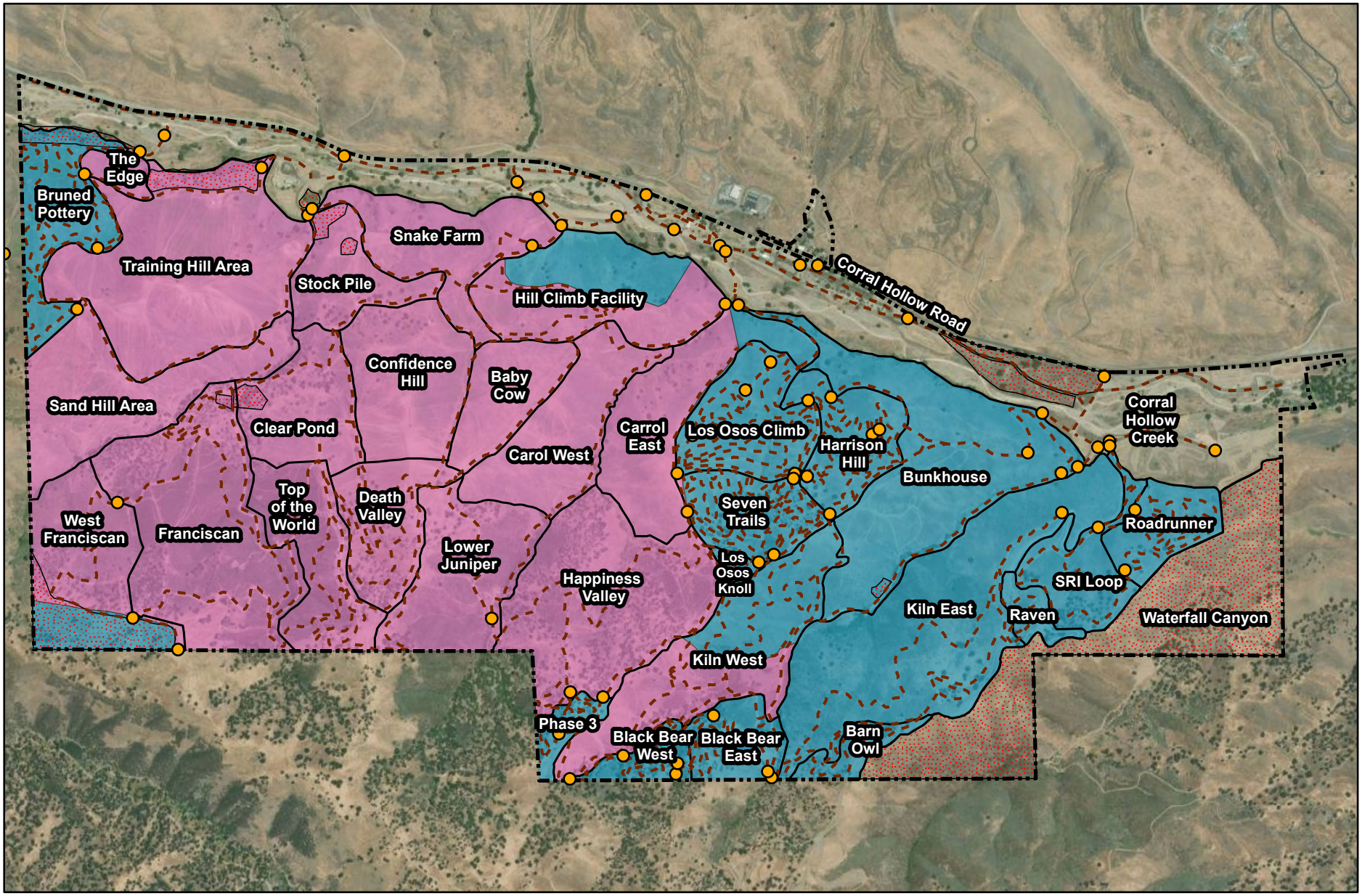
Legend

- SVRA Boundary
- Management Unit
- Trails

Figure 2-4 Carnegie SVRA Management Units

Carnegie SVRA Resource Management Area Program EIR

MIG



Source: State Parks 2025, CDPR 2023

0 0.15 0.3 0.6 0.9 Miles

N

Legend

- SVRA Boundary
- Resource Management Area
- Resource Closure Area
- Existing RMAs
- Trails
- Gates

Figure 2-5 Resource Management Areas

Carnegie SVRA Resource Management Area Program EIR

MIG



Photo 1. Field fencing with reflectors to enhance visibility of the fence.



Photo 2. H brace used in fencing sections to allow wildlife passage.



Photo 3. Split rail fencing used to restrict OHV access to closed riding area.



Photo 4. Hay bales placed on a hill climb to restrict OHV trail route with Trails Only Riding Area signage.



Photo 5. RMA boundary gate with Trails Only Riding Area signage.



Photo 6. RMA boundary gate with trail width limiter for single track areas and Stay on Trail signage.

Figure 2-6 RMA Fencing and Gates



Photo 1. Area Closed Due to Off-Trail Riding signage on RMA boundary gate.



Photo 2. Fragile Area Stay on Trails signage used in trails-only designated areas.



Photo 3. Stay on Trail signage at RMA boundary gate.



Photo 4. Trails only Riding Area signage at RMA gate.



Photo 5. Stay on Trail signage at managed hill climb area.



Photo 6. Designated Riding Area Please Stay on Established Trails signage.

Figure 2-7 RMA Signage Examples

Carnegie SVRA Resource Management Area Program EIR



Photo 1. SRI Loop Resource Management Area prior to rehabilitation.



Photo 2. SRI Loop Resource Management Area after rehabilitation. Number of trails are reduced and vegetative cover is re-established.



Photo 3. View of hillside erosion control in SRI Loop RMA from SRI Road.



Photo 4. View of completed hillside rehabilitation in SRI Loop RMA from SRI Road.



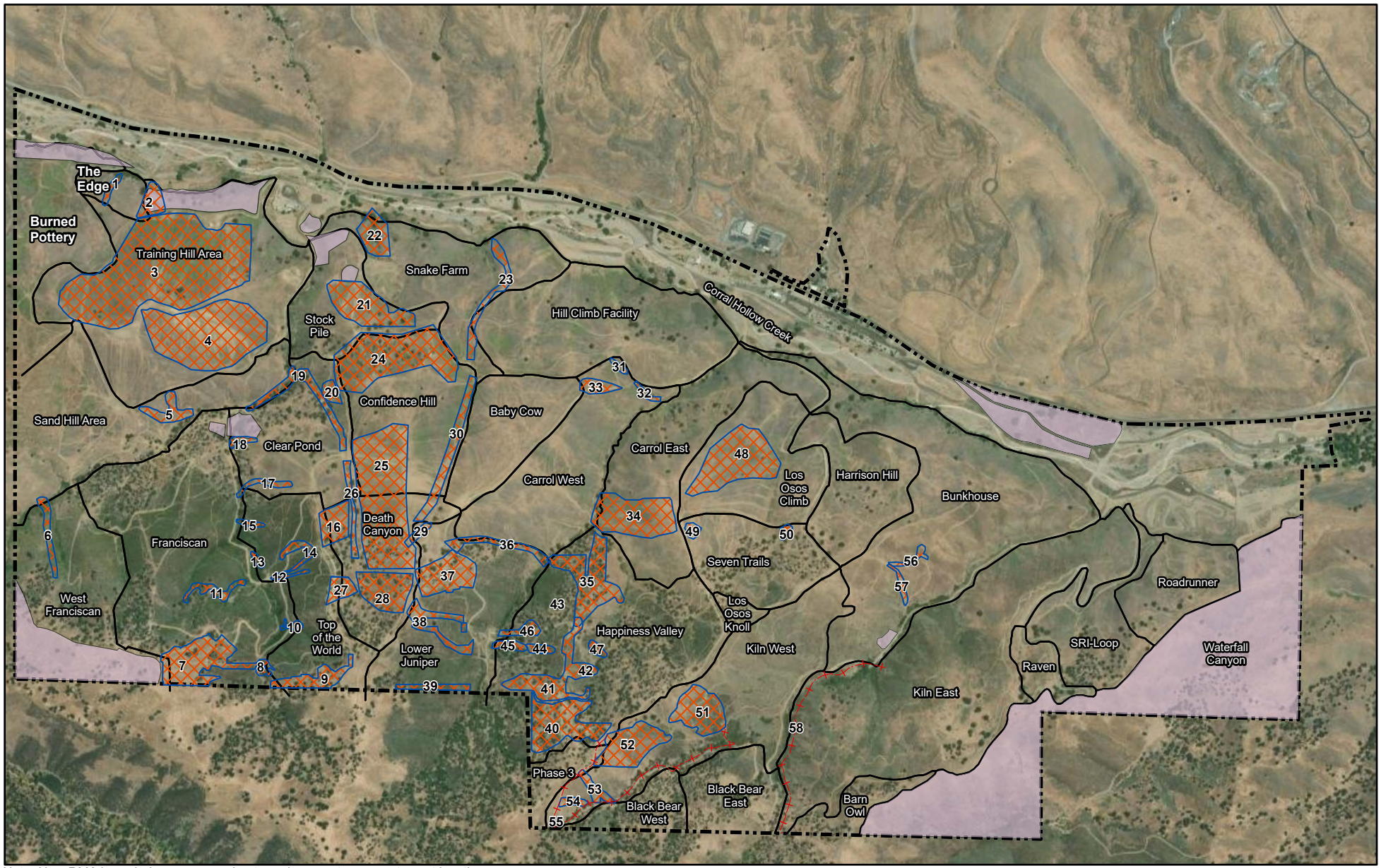
Photo 5. View of hillside erosion in Harrison Hill RMA prior to rehabilitation.



Photo 6. View of Harrison Hill RMA after rehabilitation

Figure 2-8 Example of Previous Rehabilitation Projects

Carnegie SVRA Resource Management Area Program EIR



Source: CDPR 2023

Note: New RMA boundaries are approximate and may not represent exact location.

0 0.1 0.2 0.4 0.6 Miles

N

Legend

- SVRA Boundary
- Work Areas
- Resource Management Area
- Resource Closure Area
- Fencing

Figure 2-9 Preliminary Rehabilitation Project Sites

Carnegie SVRA Resource Management Area Program EIR

MIG

CHAPTER 3. IMPACT ANALYSIS METHODOLOGY

3.1 ANALYTICAL METHODOLOGY

In evaluating the proposed Carnegie SVRA RMA Program's potential impacts, DPR employed the following analytical methodology:

Step 1: Incorporation of Standard Project Requirements (SPRs) and Best Management Practices (BMPs). The EIR incorporates SPRs and BMPs identified in the project description as project components that are designed to minimize impacts on the existing environmental setting. The application of SPRs and BMPs is presumed and therefore they are not considered mitigation measures but rather resource protection measures that are part of the proposed project. Thus, the application of these measures is considered prior to making a finding of significance for project impacts.

Step 2: Compliance with Applicable Laws, Ordinances, Statutes, and Regulations. The EIR presumes, unless specifically noted, that the RMA projects implemented through the Carnegie SVRA RMA Program would be designed, constructed, operated, and maintained in accordance with the applicable requirements described in the regulatory setting discussion. The regulatory setting is not intended to be exhaustive; rather, it is intended to provide a summary of key regulatory requirements that materially affect the relationship between the project's design, construction, operation, and maintenance and potential environmental impacts. In addition, the regulatory setting does not summarize regulations that do not apply to the proposed project.

Step 3: Identification of Existing Physical Conditions. The EIR identifies the existing physical environmental conditions that exist in Carnegie SVRA that could change as a result of the RMA Program activities and components. The environmental setting generally reflects the physical environmental conditions of Carnegie SVRA as they currently exist. Existing SVRA operations are part of the environmental setting, including visitor use, visitor services, SVRA operations and maintenance, and natural and cultural resource management. Any environmental impacts that may be associated with current SVRA operations are part of the environmental setting. This setting constitutes the baseline physical conditions by which DPR is determining whether the physical change that occurs to the environment as a result of the proposed project is significant. In accordance with CEQA Guidelines section 15125(a), the environmental setting describes only those physical environmental conditions necessary to understand the significant effects of the proposed project and its alternatives.

Step 4: Collection and Use of Scientific Data. The EIR analysis is based on the best available science and field survey data. DPR has annually collected data on SVRA resources and performed individual specialized studies, assisted by qualified professionals both in the public and private sector. The data has been used for the environmental review contained in this EIR.

Step 5: Analysis of Project Impacts. The EIR evaluates the significance of the RMA Program's potential impacts (the change to the physical environmental conditions that could result from implementation of the Program) on the full range of resources identified in Appendix G to the CEQA guidelines. Pursuant to CEQA Guidelines section 15126, this EIR analyzes the potential environmental impacts stemming from all phases of the proposed RMA Program. This examination is based on the incremental change to the existing physical conditions that would result from the implementation of the RMA Program and considers the public comments submitted by agencies and interested individuals during the 30-day public review period for the 2023 NOP. The EIR's impact analyses consider the direct and indirect impacts of the proposed

RMA Program, as well as the short-term and long-term impacts of the Program, and enable DPR to determine if the Program would have a beneficial impact, no impact, a less-than-significant impact, a potentially significant impact, or a significant and unavoidable impact on the environment.

Step 6: Inclusion of Mitigation Measures. The EIR describes the feasible mitigation measures proposed to avoid or minimize the RMA Program's significant impacts. Project mitigation measures are in addition to the standard resource protection measures incorporated into the RMA Program, and generally require DPR to avoid, prevent, or minimize impacts on resources, or—if impacts do occur—to rehabilitate, restore, or compensate for the impact in a manner that is proportional to the project impact.

3.2 PROJECT IMPACTS FOUND NOT TO BE SIGNIFICANT

DPR has determined, using the Environmental Checklist Form contained in CEQA Guidelines Appendix G as a guide, that implementation of the proposed Carnegie SVRA RMA Program would clearly result in no impact or a less-than-significant impact on the following resources due to absence of the resource or the nature of the project as proposed; impacts on these resources were therefore dismissed from further detailed analysis. A discussion of these resource impacts is presented in Chapter 13.

- Agricultural and Forest Resources
- Energy
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Transportation
- Utilities and Service Systems
- Wildfire

In addition, where applicable, Chapters 4–12 identify impacts that would not occur or would be clearly less than significant and dismissed from further evaluation. These impacts are also based on Appendix G thresholds identified under the "Thresholds of Significance" subheading of each impact analysis chapter.

3.3 CUMULATIVE IMPACTS

3.3.1 Introduction

CEQA Guidelines section 15130 requires that an EIR evaluate a project's cumulative impacts to determine if the project's incremental effect is cumulatively considerable. As defined in section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and

reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (14 CCR § 15355).

As set forth in the CEQA Guidelines, the discussion of cumulative impacts must reflect the severity of the impacts, as well as the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone (14 CCR § 15130(b)). As stated in CEQA, "a project may have a significant effect on the environment if the possible effects of a project are individually limited but cumulatively considerable" (PRC § 21083(b)). An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR (14 CCR § 15130(a)(1)). The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable (14 CCR § 15064(h)(4)). The discussion should be guided by the standards of practicality and reasonableness and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects that do not contribute to the cumulative impact (14 CCR § 15130(b)).

3.3.2 Geographic Scope

Potential impacts related to the proposed Carnegie SVRA RMA Program are generally expected to be localized within the SVRA and small-scale and are unlikely to combine with distant and/or dissimilar projects and result in cumulative impacts. The overall long-term effects of the project are expected to be beneficial, though construction-related impacts could combine with other local projects in the short term. Therefore, projects considered in this analysis were limited to projects proposed within the Carnegie SVRA in the Preliminary General Plan Update (DPR 2024a), projects on lands adjacent to the Carnegie SVRA such as the Alameda-Tesla Property, and any other projects within a two-mile radius of the Carnegie SVRA boundaries (although there were none such projects).

The geographic area that could be affected by the project varies depending upon the environmental resource being evaluated. Some resources, such as land use, air quality, greenhouse gas emissions, and recreation have a regional geographic scope. Other resources, such as aesthetics, and cultural/tribal resources, have a localized geographic scope. Biological resources, geology/soils, and hydrology/water quality have both site-specific and regional geographic scopes, dependent upon the individual resource being evaluated. The geographic scope of each resource is identified in the environmental and regulatory setting of each EIR chapter.

3.3.3 Cumulative Project List

CEQA Guidelines (§ 15130(b)(1)(A)) allow for the use of a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency for the cumulative impact analysis. The cumulative analysis includes projects that would result in similar impacts as the proposed project due to their potential to contribute collectively to significant cumulative impacts. Sources of information on past, present, and probable future projects include the Carnegie SVRA Preliminary General Plan Update (DPR 2024a), OHMVR Division staff, and the planning or community development departments of Alameda County and San Joaquin County. There are no county projects within two miles of Carnegie SVRA (Alameda County 2023, San Joaquin County 2024). The projects considered for the cumulative impact analysis are identified in Table 3-1 below. The 2024 General Plan Update potential projects are located as shown in Figure 3-1 Carnegie SVRA

General Plan Projects. The Alameda-Tesla Property, in active planning by State Parks, is located contiguous with the western boundary of Carnegie SVRA as shown in Figure 4-3.

Table 3-1. Projects Included in the Cumulative Impact Analysis

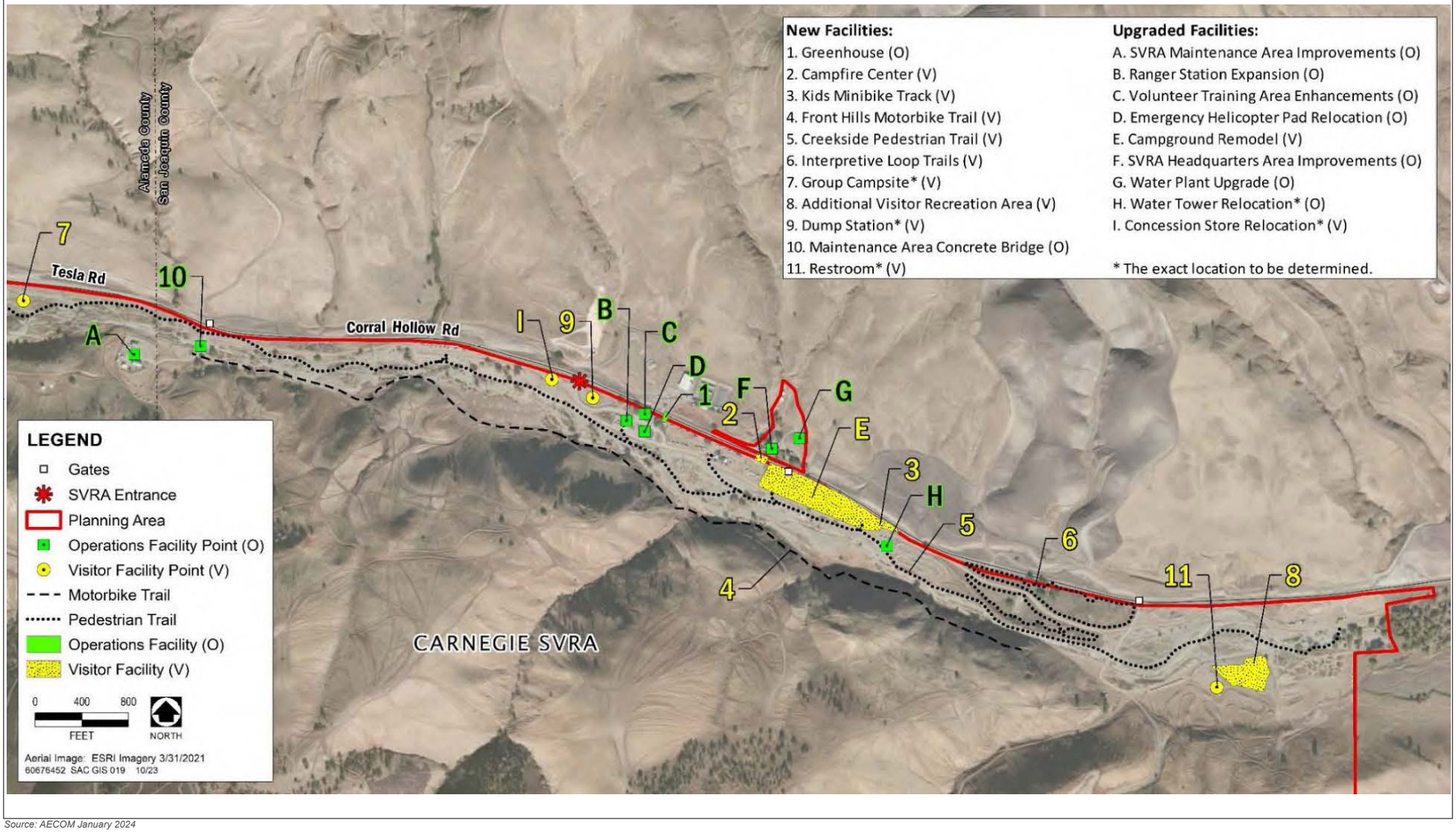
Project	Location	Brief Description
Carnegie General Plan Update Proposed Projects		
Campground Remodel	Carnegie SVRA campground	Peeler core fencing to delineate and separate each campsite; numbering each campsite; approximately 45 feet long and 30 feet wide parking spurs for larger recreational vehicles (RVs); "camping area" behind the parking spur with a picnic table, shade ramada, fire ring, a space for visitor tent(s), and electricity hookups; and possible removal of campsites 1 through 9 for a buffer between the Corral Hollow Road and the campground.
New Group Campsite	Carnegie SVRA visitor experience area	The campsite will likely hold up to approximately 30 people and may include parking spurs and spaces, electricity hookups, potable water, picnic tables, shade ramadas, a fire ring, space for visitor's tents, and restrooms.
New RV Dump Station	Carnegie SVRA near campground or main exit	The SVRA currently does not have an RV dump station for campers. State Parks will construct a dump station on previously disturbed land.
New Campfire Center	Carnegie SVRA west end of campground	The campfire center, with seating for 50 to 75 people, will have a small and partially covered stage, lockable/ removeable audio and visual equipment and screen, lighting, electrical outlets, firepit, and other associated infrastructure.
Concession Store Upgrade & Relocation	Carnegie SVRA near day use area or west side of entrance	The existing leased concession store, MotoMart, is located next to the SVRA day use and campground area. The store may be replaced and potentially relocated to the west side of the SVRA entrance. The new modular concession building will be ADA compliant, and utilities will be brought up to current codes.
New Kid's Minibike Track	Carnegie SVRA east end of campground	A kid's minibike riding area with a simple flat oval dirt track will be installed on a small portion of the camping area at the east end of the campground and the loading/parking area to the east of the peeler core fence.
New Pedestrian Interpretive Loop Trails	Carnegie SVRA east of campground & ATV track	State Parks will construct two new interpretive loop trails east of the campground and existing ATV track. The loop trails will be on the north and south sides of the main SVRA road.
New Creekside Pedestrian Trail	Carnegie SVRA north side of Corral Hollow Creek	This new native surface/dirt trail will run along the north side of Corral Hollow Creek. The trail may have interpretive signage and some focused fencing to keep people on the trail and avoid sensitive resources.

Table 3-1. Projects Included in the Cumulative Impact Analysis

Project	Location	Brief Description
New Front Hills Single Motorbike Trail	Carnegie SVRA south side of Corral Hollow Creek & main road	This new two-way native surface/dirt trail will run along the hillside to the south of and parallel to Corral Hollow Creek and the SVRA's main road, with turnouts for motorbikes.
Additional Visitor Recreation Area	Carnegie SVRA special event/day use area	State Parks may redevelop the special event/day use area into one or more new visitor facilities, such as a remote-control car track area; a trials motorbike area; and an additional ATV track.
Reopening the Waterfall Canyon Area to Non-Motorized Trail Use	Carnegie SVRA Waterfall Canyon Area	State Parks is considering the rehabilitation of existing trails in the southeast corner of the SVRA for non-motorized use, such as hiking and mountain biking.
Franciscan Riding Area Rehabilitation	Carnegie SVRA south of Franciscan Loop Trail	State Parks will finish rehabilitating the area (the area south of the Franciscan loop trail damaged in the 2015 Tesla Fire) into a sustainable trail network for advanced riders.
Miscellaneous	Carnegie SVRA near MX Track & 4x4 area	Another restroom may be added near the existing MX track. Potential additions to the existing 4x4 area include driving obstacles, such as a teeter totter or pyramid, as feasible.
SVRA Maintenance Area Improvements	Carnegie SVRA maintenance yard	Maintenance yard improvements may include expansion of the existing footprint to install two new prefabricated buildings, auto shop remodeling/addition, fuel system upgrade, carport roof and siding repair/reconstruction, solar PV installation on carport, power maintenance shop upgrade, new fencing, paving/concrete surfacing for parking, and shade structures. The auto shop garage/warehouse layout may be redesigned to include the shop space, office space, and a break room. The maintenance yard bridge may be replaced.
Ranger Station Expansion	Carnegie SVRA ranger station	State Parks will expand and redesign the layout of the existing ranger station building and yard. The building will include features such as new staff work areas/stations and offices, a breakout room, meeting/tactical training room, storage rooms, a break room, a locker room with shower, and redesigned medical facility. The operations yard west of the station building will be expanded further west and redesigned to include an approximately 50-foot x 70-foot shop building, vehicle and trailer parking areas, monitoring well, drainage basin, fencing, and security gate.
Emergency Helicopter Pad Relocation	Carnegie SVRA east of ranger station	Currently, the emergency helicopter pad is near the SVRA maintenance area. The pad will be relocated to an area just east of the existing ranger station to improve emergency medical response.

Table 3-1. Projects Included in the Cumulative Impact Analysis

Project	Location	Brief Description
Volunteer Training Area Enhancements	Carnegie SVRA volunteer training area	The volunteer training area will be expanded further east (potentially up to the location of the proposed greenhouse) to include facilities and features such as a classroom for safety trainings/meetings and additional picnic tables.
Campground Host Sites	Carnegie SVRA near volunteer training area	State Parks will develop up to four campground host sites, potentially near the volunteer training area. These sites will provide features such as parking spur, electricity hook-up, water, picnic table, shade ramada, and fire ring.
New Greenhouse	Carnegie SVRA west of day-use area	A greenhouse will be constructed just west of the existing visitor day-use area. State Parks will also install picnic tables for plant cuttings and educational programs.
SVRA Headquarters Area Improvements	Carnegie SVRA headquarters area	Improvements may include filling an existing drained pond for additional developable space, upgrading or expanding the existing office space and other operations facilities and staff housing, such as a new wood shop, a new resource work/storage building, additional storage sheds/space, a new double-wide modular home for SVRA staff, additional staff trailer pads, and/or expanding the parking area.
Water Treatment Facility Upgrade	Carnegie SVRA headquarters area	Upgrades to increase water treatment capacity and provide a backup system to generate power to produce water during outages. The project will also include a new water treatment facility building, new water monitoring equipment with a chlorine injection system, and other modern efficiency and safety features.
Miscellaneous	Carnegie SVRA any use areas except limited recreation areas	May include new or improved low-water creek crossing(s), maintenance of creek crossings, SVRA staff and public electric vehicle charging infrastructure, and an ATV and/or MX track sprinkler system. Facilities for communication or technology support could be in any of the SVRA use areas, except for limited recreation areas. May also include shade ramada replacement, as needed, and tree planting.
Other Projects		
Alameda-Tesla Property Planning	West of Carnegie SVRA	The Alameda-Tesla Property is in the planning phase to determine the future use of the property, which could be as a nature preserve and/or for nonmotorized recreation.



Source: AECOM January 2024

Figure 3-1 Carnegie SVRA General Plan Projects

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CHAPTER 4. LAND USE PLANS AND POLICIES

The information in Land Use Plans and Policies sections 4.1and 4.2 below is derived from the Carnegie SVRA Preliminary General Plan Update (DPR 2024a) and references therein.

4.1 REGULATORY SETTING

4.1.1 Off-Highway Motor Vehicle Recreation Division Mission Statement

The mission of State Parks' OHMVR Division is to provide leadership statewide in the area of OHV recreation; to acquire, develop, and operate state-owned vehicular recreation areas; and to otherwise provide for a statewide system of managed OHV recreational opportunities through providing funding to other public agencies. The OHMVR Division also aims to ensure that quality recreational opportunities remain available for future generations by providing for education, conservation, and enforcement efforts that balance OHV recreation impacts with programs that conserve and protect cultural and natural resources.

4.1.2 Off-Highway Motor Vehicle Recreation Act

The OHMVR Act requires the OHMVR Division to implement and administer the OHMVR Program, which provides and supports sustainable, ecologically based opportunities for OHV recreation at specified areas throughout the state (PRC section 5090 et seq.). The OHMVR Act states that ecologically balanced recreation requires effectively managed areas and adequate facilities for the use of OHVs, conservation, and enforcement.

California Public Resources Code (PRC) sections 5019.50 through 5019.80, "Classification of the State Parks System," provide guidelines for the designation of State Parks and guiding principles for park improvements. The PRC classifies different types of State Parks units and provides guidelines for the upkeep and improvements of parks. It is also used as a general guide to plan appropriate improvements.

In PRC sections 5090.01 through 5090.70, the Off-Highway Motor Vehicle Recreation Act of 2003 provides more detailed planning guidance specific to SVRAs. PRC section 5090.35(a) states:

> The protection of public safety, the appropriate utilization of lands, and the conservation of land resources are of the highest priority in the management of the state vehicular recreation areas; and, accordingly, the division shall promptly repair and continuously maintain areas and trails, anticipate and prevent accelerated and unnatural erosion, and restore lands damaged by erosion to the extent possible.

PRC section 5090.43(a) states:

> State vehicular recreation areas shall be established on lands where there are quality recreational opportunities for off-highway motor vehicles and in accordance with the requirements of Section 5090.35. Areas shall be developed, managed, and operated for the purpose of making the fullest public use of the outdoor recreational opportunities present. The natural and cultural elements of the environment may be managed or modified to enhance the recreational experience consistent with the requirements of Section 5090.35.

4.1.3 Declaration of Purpose

The Declaration of Purpose describes the purpose of Carnegie SVRA and is the broadest statement of management goals designed to fulfill the vision of the SVRA. A Declaration of Purpose is required by California PRC section 5002.2(b). The previous Declaration of Purpose for Carnegie SVRA, adopted in December 1981, was updated during for the Preliminary General Plan Update (DPR 2024a):

> The purpose of Carnegie SVRA is to provide effectively managed, responsible off-highway vehicle and related recreational opportunities while protecting and interpreting the SVRA's valued cultural and natural resources.

4.1.4 Carnegie SVRA Vision

The vision for Carnegie SVRA describes the SVRA in future years when State Parks' OHMVR Division has achieved its General Plan objectives. The following vision was developed for Carnegie SVRA during the General Plan planning process:

> Carnegie SVRA will be a regional destination where children and adults of all skill levels can ride, play, and learn in an outdoor recreational setting. Carnegie SVRA will continue to be an affordable location where visitors can enjoy a wide variety of OHV recreation. Carnegie SVRA will be a model of exciting and well-managed OHV recreation as well as excellent environmental stewardship. Visitors will be able to learn about and contribute to the long-term sustainability of diverse cultural and natural resources present within the SVRA.

4.1.5 Carnegie SVRA General Plan

State Parks adopted the first general plan for Carnegie SVRA in December 1981. This plan established land use designations or use zones to manage recreational uses and intensity of uses as shown in the General Plan land use map (Figure 4-1 1981 Carnegie SVRA General Plan Land Use and Intensity). These zones are described in the Resource Element of the 1981 General Plan and presented below. Though the 1981 General Plan is superseded by the 2024 General Plan Update, the portion of the SVRA not presently managed through established RMAs is managed according to these 1981 General Plan land use designations (see Project Description section 2.3.2); thus, uses and management identified by the 1981 General Plan remain part of existing conditions. The 1981 General Plan describes these land use designations as follows:

> **Zone 1 (Open)** – 813 acres. This zone includes the hills fronting on Corral Hollow and the flood plain. The soils of these hills will withstand intensive use; therefore open, unrestricted riding and hill climbing will be allowed. Use of the stream zone will include circulation, beginners' riding, day use, camping, competition, special events, and operations. Careful consideration will be given to facilities placement in the flood plain due to potential inundation, as well as sediment and debris movement downstream.
>
> Although the zone designated for open riding has a soil type that has historically proven to be relatively stable under OHV use, it is expected that areas of accelerated erosion may occur. Therefore, soil movement will be monitored, and locations showing accelerated soil movement will receive mitigation measures and potential temporary closure until they can be rehabilitated.
>
> **Zone 2 (Trails-Only)** – 630 acres. This zone covers the southern portion of the unit. The soils of this zone are more fragile and thinner than those of Zone 1. Here, riding is restricted to trails; however, there are many miles of challenging trail, and more are

envisioned. This zone contains the higher elevations of the unit, and several steep canyons.

Zone 3 (Closed) – 95 acres. This zone is closed to OHV use, and the plan proposes that the zone remain closed. The reasons for this closure classification are watershed slopes in which sediment cannot be contained onsite and sensitive resource sites, such as the lime kiln and several caves, identified as hazards.

4.1.6 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update (DPR 2024a) was adopted by the DPR Off-Highway Motor Vehicle Recreation Commission in October 2024 to supersede the 1981 General Plan. Approval of the 2024 General Plan Update has been legally challenged; however, the plan remains in effect pending legal resolution.

The General Plan Update presents a new broad-based policy document that establishes an updated long-range vision for the SVRA and provides goals and guidelines to direct future improvements, services, and programs. The General Plan Update defines the broadest possible management framework for program development, ongoing management, and public use of Carnegie SVRA. This framework is intended to guide day-to-day decision-making and serve as the basis for developing focused feasibility and management plans, project plans, and other management actions necessary to implement General Plan goals.

The allowable uses in various parts of Carnegie SVRA as designated by the 2024 General Plan Update are described in Table 4-1 below and shown in Figure 4-2 Carnegie SVRA General Plan Land Use Concept Map and Visitor Experience Areas.

Table 4-1. Carnegie SVRA General Plan Update Visitor Experience Areas

Area Designation	Definition	Allowable Uses
Limited Recreation Area (146 acres)	An area with a higher-than-average concentration of sensitive natural and/or cultural resources.	Roads or trails may cross these areas to facilitate public egress/ingress and connectivity between other visitor experience areas; however, their footprint should be limited to the minimum necessary to serve their intended purpose, and they should be designed and managed to avoid or minimize impacts on the surrounding resources. No other facilities will be allowed. These areas could be available for nonmotorized recreational opportunities.
Limited Recreation Overlay - Waterfall Canyon (98 acres)	An area that, because of water quality management restrictions, needs to be managed like a limited recreation area.	Hiking and mountain biking may be allowed on trails. This area could accommodate OHV facilities if certain guidelines are met. For instance, this area could be changed to an intermediate or advanced trail area in the future if there is an additional acquisition that would allow State Parks to provide adequate water quality management measures for the watershed consistent with the *Corral Hollow Watershed Assessment* and the *Storm Water Management Plan for Carnegie SVRA*.

Table 4-1. Carnegie SVRA General Plan Update Visitor Experience Areas

Area Designation	Definition	Allowable Uses
Advanced Trails Area (989 acres)	An area that provides more challenging OHV trails.	This area will allow OHV trails and challenge areas. Trails for skills development and technical riding will be allowed. These trails could be adaptively modified over time to improve the visitor experience and provide new experiences. Examples of trails and experiences that could be found in these areas include minor hillclimbs/descents; rocky trail sections; tight turns; roll and flow; and skills practice trails for off-highway motorcycles and ATVs. Trails should be designed and constructed to be narrow and to limit soil erosion in more advanced trail areas and to be wider with gradual turns and moderate trail slopes in moderate trail areas.
Gathering / Services Area (75 acres)	An area that provides places for visitors to gather and access services.	Campgrounds, restrooms, picnic areas, parking areas, concessions, ranger station, entrance kiosk, staging, remote-control car track, etc.
Distributed Riding Area (168 acres)	An area in which OHV recreation is not limited to specific trails.	Trails and experiences that could be found in these areas include hillclimbs/descents; tight turns, roll and flow; and skills practice trails for off-highway motorcycles and ATVs. There may be small, concentrated riding areas within distributed riding areas to provide opportunities such as hillclimbing or high banking.
Practice Area (29 acres)	An area that provides specialized opportunities for visitors of different age groups and experience levels to develop riding/ driving skills.	Uses in these areas may include tracks, trails, challenge courses, technical challenge areas, or other facilities for all types of OHVs that allow riders and drivers to practice and/or challenge themselves. Facilities need to be carefully designed, constructed, and managed to create safe and enjoyable experiences.
Special Event Area (28 acres)	An area that provides a space for competitive hillclimbing events.	Hillclimbs, space for spectators, vendors, staging, and other related activities. The area needs to be secured during hillclimb events for the safety of competitors and other visitors.
Corral Hollow Creek Buffer	Same as allowable uses.	An area restricted to only limited pedestrian activities and designated low-water crossings of motorized vehicles to preserve the water quality of the seasonal creek.

Source: 2024 General Plan Update (DPR 2024a)

Area designation acreages are estimated based General Plan Land Use Concept Map, which is conceptual in nature and does not present precise use boundary locations.

The General Plan Update includes Goals and Guidelines governing visitor uses and park operations. The Goals and Guidelines relevant to the RMA Program are presented in Appendix C. Consistency of the RMA Program with the relevant Goals and Guidelines is presented below in section 4.3.3.

4.2 ENVIRONMENTAL SETTING

Carnegie SVRA was added to the State Park system as an SVRA in July 1980. The site, which had been used by OHVs since the 1940s, was operated as a private motorcycle park from 1970 until 1979, before State Parks purchased it using OHV Trust Funds. Legislative action (PRC section 5006.48) authorized State Parks to plan, acquire, and develop the site for OHV use.

4.2.1 Regional and Surrounding Land Use

Carnegie SVRA is located in unincorporated Alameda and San Joaquin counties, approximately 12 miles east of downtown Livermore, and 12 miles southwest of Tracy, south of Corral Hollow Road. The SVRA is managed by the Diablo Range District of State Parks. To the north is the LLNL Experimental Test Site (Site 300) property. The Alameda-Tesla Property, owned by State Parks and not currently open to the public, is located to the west, and additional State Parks owned properties are to the north of Tesla Road. The former SRI International once operated an explosives-testing facility southeast of Carnegie SVRA. Open space, ranches, and rural residences are located to the east and south. Surrounding land uses are described in more detail below and shown in Figure 4-3 Carnegie SVRA Existing Facilities and Surrounding Land Uses.

Lawrence Livermore National Laboratory. LLNL Site 300 straddles the Alameda/San Joaquin County line and forms the northeastern border of Carnegie SVRA (north of Corral Hollow Road). LLNL is a full-service research laboratory that focuses on science and technology associated with national security. The laboratory is operated and managed by the University of California for the U.S. Department of Energy and is largely self-sustaining. LLNL Site 300's 200 employees work in the facility's engineering, maintenance, security, environmental protection, fire, and administrative and facility support.

State Park Tesla Property. To the west of Carnegie SVRA is the 3,100-acre Tesla property. The Tesla property was once the site of a coal mining town named after electrical inventor Nikola Tesla that turned into a ghost town when the mines shut down in 1911. The property was later used for cattle grazing. In 1998, the state purchased the property. The property is undergoing a park unit classification process.

Corral Hollow Ecological Reserve. Northwest of Corral Hollow Road near Castle Rock is the 99.2-acre Corral Hollow Ecological Reserve, operated by CDFW. The purpose of the reserve is to preserve key habitat for an array of reptile and amphibian species and to preserve riparian habitat for wildlife.

SRI International. SRI International, which originally was part of the Stanford Research Institute, once operated an explosives-testing facility southeast of Carnegie SVRA. This facility is no longer in operation and now belongs to a private landowner. The facility is accessed via SRI Road, a paved road on an easement that runs through the active riding areas of the SVRA. The road starts at the entrance to Kiln Canyon Trail and runs along the eastern boundary of the Kiln Canyon sub-watershed, terminating at the testing facility. Although the road traverses an active riding area, it is gated and fenced off and is not accessible to riders.

Ranches. Large ranches are located to the north, south, and east of Carnegie SVRA. Because of the ephemeral nature of Corral Hollow Creek, the neighboring ranchers have constructed stock ponds throughout the watershed to supplement the water supply during the summer months. Ranchers also have constructed a single spring-fed trough west of the Tesla Coal Mine Site. Cattle graze on private ranches within the headwaters of the Corral Hollow watershed. Within

Baker's Ravine, a tributary of Corral Hollow Creek, private ranchers graze cattle along with goats and horses.

Residences. State Parks owns several single-family residential dwellings located along Corral Hollow Creek and west of Carnegie SVRA. One of these residences serves as a Diablo Range District office. A small private residential area containing single-family dwellings is also located along Corral Hollow Creek near Mitchell Ravine. A few houses that are located east of the SVRA are in the upper portion of the Corral Hollow watershed and belong to private ranches.

Hetch-Hetchy Project Tunnel. A tunnel used by the Hetch Hetchy Project passes beneath the upper reaches of Mitchell Ravine, a southern tributary to Corral Hollow Creek. The Hetch Hetchy Project was undertaken to provide water to San Francisco and the surrounding Bay Area. The project involved damming the Hetch Hetchy Valley, building a canal to convey the water across the San Joaquin Valley, and constructing the Coast Range Tunnel. The Mitchell shaft, located south of Carnegie SVRA in Mitchell Ravine, serves as an access point for the primary tunnel. Hetch Hetchy Water and Power, a department of the San Francisco Public Utilities Commission, owns and manages the shaft and properties within Mitchell Ravine.

4.2.2 Existing Carnegie SVRA Land Use and Facilities

Carnegie SVRA contains approximately 1,533 acres. The SVRA offers more than 1,300 acres of OHV recreation on rolling hills and in steep, rugged canyons. Recreation uses within the SVRA include hillclimbs, challenge areas, camping, tracks, and OHV trails. There are day-use areas and a concession store (MotoMart). Some areas are closed to use for natural and cultural resource protection, including the Waterfall Canyon area and portions of the floodplain of Corral Hollow Creek (Figure 2-5). Visitor facilities include the following:

- *OHV Trails*—Available for a range of skill levels; main trails are marked by the level of difficulty. Off-highway motorcycles are allowed on all trails. Most trails are multi-use, but some trails are not wide enough for ATVs.
- *Motocross Track*—Open to off-highway motorcycles only. Formalized competitive events are held on some weekends, causing the track to be closed to the public periodically.
- *ATV/Motocross Track*—Open to both ATVs and off-highway motorcycles.
- *70cc Children's Track*—Available for off-highway motorcycles and ATVs with small engines up to 70cc displacement. This track offers young riders an opportunity to practice and improve their riding skills.
- *110cc Beginner Track*—Available for off-highway motorcycles and ATVs with small engines up to 110cc displacement.
- *4x4 Challenge Area*—Open to four-wheel-drive (4WD) vehicles only, including ROVs. The area is not currently available to trials bikes.
- *Hillclimb Special Event Area*—Open to off-highway motorcycles. This area is closed to the public except during formal hillclimb events several weekends a year.
- *Campsites*—Provided for those looking to camp with or without a trailer (26 sites). Most sites have a shade structure, fire ring, and picnic table.

- *Park Concession*—Provides SVRA visitors access to purchase off-highway motorcycles and ATV parts, safety gear, and OHV accessories. Food service and minor OHV repair service are also available.

Existing administration and maintenance facilities include an entrance station, the maintenance yard, and the Carnegie SVRA office. The entrance station contains a small entry kiosk; the ranger station, which includes a small locker room and office area; and a staff-only restroom. The maintenance yard occupies approximately 1.5 acres and includes a repair shop, material utility sheds, a butler storage shed, and a shelter. Maintenance staff members use a small office area in the shop as their primary work location and work breakroom/lunchroom. The Carnegie SVRA office is located north of Corral Hollow Road, across from the campground, and contains a team meeting space, shared kitchen, and offices for Carnegie SVRA staff.

4.3 PROJECT IMPACTS

4.3.1 Thresholds of Significance

Consistent with CEQA Guidelines Appendix G, the project would have a significant impact on land use if it would:

- Physically divide an established community; or
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

4.3.2 Impacts Dismissed from Further Consideration

Physical Divisions to an Established Community. The nearest established community is a small private residential area containing single-family dwellings and a small rodeo arena located along Corral Hollow Creek near Mitchell Ravine. The proposed project involves the establishment and maintenance of RMAs for managing OHV use within the SVRA. The project would not result in the construction of any physical barriers such as new roads or walls or create new utility systems or service districts that could potentially impact communities near Carnegie SVRA. Therefore, the project would not physically divide an established community, and this issue is not discussed further in this EIR.

4.3.3 Conformance with Applicable Land Use Plans, Policies, and Regulations

The Carnegie SVRA general plan document in effect for the park is the only land use plan applicable to the proposed RMA Program. The proposed RMA Program could potentially cause a significant environmental impact if it conflicted with the general plan. The following discussion addresses project consistency with land use plans, policies, and regulations adopted for the purpose of or avoiding or mitigating an environmental effect (section 4.3.1 above) and consistency with the general plan per CEQA Guidelines section 15125(d). Consistency with other applicable federal, state, or regional plans, such as air quality management plans or special-status species regulations, is discussed in the relevant EIR chapters. As discussed below, RMA Program activities would not conflict with the SVRA 1981 General Plan policies or the 2024 General Plan Update goals and guidelines and would thus have ***no impact*** on land use.

4.3.3.1 1981 General Plan

The RMA Program would establish new RMAs and manage OHV riding opportunities in distributed and trails-only riding areas similar to the Use Zones established in the 1981 General

Plan. The proposed RMA Program would result in a net change of 169 acres of distributed riding area converted to trails-only riding area as shown in Project Description Table 2-5. Given that the redesignated acres would still provide OHV riding access and substantial acreage (167 acres) would remain available for open riding use, the conversion of acreage from distributed riding to trail riding consistent with the 2024 General Plan Update would not result in a significant loss of OHV riding opportunity (see Recreation section 11.3.2). Further, the change in use designation is designed specifically to benefit the watershed and natural resources by restoring vegetation cover, reducing soil erosion, and protect water quality. As a result, the proposed change from the 1981 General Plan land use designation would not create a significant environmental impact. The effect is less than significant.

The 1981 General Plan identifies multiple resource management policies relevant to OHV management. The proposed RMA Program's consistency with these policies is discussed below in Table 4-2.

Table 4-2. RMA Program Consistency with Relevant 1981 General Plan Policies

General Plan Policies	Consistency of Proposed RMA Program
Soils policy: Hillclimbing activities shall be restricted to the hills adjacent to Corral Hollow. In this area, soils mapped as Altamont clay (0-65 percent slope) and Saurin loam and clay loam (0-65 percent slope) shall be preferred for intensive hillclimbing. The severely eroded area in the Dead Cow Canyon watershed, which is partially mapped as Altamont clay, shall be temporarily closed to hillclimbing until rehabilitation is accomplished.	**Project Consistency:** The RMA Program would restrict hillclimb areas to specific locations within the northern RMAs closest to Corral Hollow management unit. Hillclimb areas would be situated on slopes with appropriate soils capable of supporting intensive hillclimbing use. Hillclimbs would be managed to control route selection, trail width, and soil erosion. Gated access would allow temporary closure for rehabilitation of soils if needed. The proposed RMA Program would manage Dead Cow Canyon as a trails-only riding area. Rehabilitation of known erosion areas in this watershed is planned as shown in Figure 2-9 and listed in Table 2-7. Therefore, the RMA Program would be ***consistent*** with this policy.
Soils policy: Monitoring programs shall be established to evaluate changing soil conditions. These programs may include installation of "soil bridge" transects along selected trail segments (a soil bridge measures the vertical loss of soil resulting from pluvial and mechanical erosion), and continued monitoring of soil loss from established erosion plots.	**Project Consistency:** DPR monitors soil conditions under multiple resource management programs as discussed in Project Description section 2.3.4 and Table 2-4. The objectives of the proposed RMA Program include soil protection while providing for sustainable, quality recreation (section 2.2.2). RMA Program activities specifically include trail evaluation and distributed riding area monitoring to evaluate changing soil conditions and provide for rehabilitation where needed (section 2.4.2). Therefore, the RMA Program would be ***consistent*** with this policy.
Biotic Resources policy: Before the loss of 50 percent of the vegetative cover in a given watershed management area, that area shall be closed for rehabilitation that shall include revegetation. Species native to the plant communities of the specific area shall be preferred for revegetation.	**Project Consistency:** The proposed RMA Program would implement trail density reduction, erosion repair, and revegetation to address loss of vegetative cover. Preliminary rehabilitation action areas have been identified (Figure 2-9) and would occur prior to loss of 50% of the vegetative cover in a given watershed. Therefore, the RMA Program would be ***consistent*** with this policy.

Table 4-2. RMA Program Consistency with Relevant 1981 General Plan Policies

General Plan Policies	Consistency of Proposed RMA Program
Biotic Resources policy: Major springs and other recognized important riparian areas in the unit shall be managed to protect and perpetuate their natural values.	**Project Consistency:** No major springs occur in the proposed RMAs or would be impacted by implementing RMA Program activities. Riparian areas may occur along the drainages shown in Figure 7-3 and Figure 7-4. The RMA Program may include gully erosion repair activities in riparian drainages if needed. Repair work would incorporate BMPs and comply with applicable regulatory requirements from CDFW and RWQCB (see Biological Resources section 7.3.3 and section 7.3.4). Implementation of the RMA Program includes avoidance of sensitive natural communities such as riparian areas in its trail and distributed riding area planning (Project Description section 2.4.1) and provides for the installation of fencing or other protective barriers needed to prevent recreational access to these areas. Therefore, the RMA Program would be ***consistent*** with this policy.
Aesthetic Resources policy: Noise levels shall not exceed applicable OSHA noise standards for 24-hour exposure at or beyond the boundary line of the SVRA. In the SVRA, similar limits shall be met in areas of permanent human habitation (e.g., residences). All vehicles operating in the SVRA shall meet applicable noise limits set in the State Vehicle Code.	**Project Consistency:** The proposed RMA Program would not open new areas within the SVRA to OHV recreation. Existing use boundaries and equipment noise standards would remain in effect. Any construction equipment operation necessary for rehabilitation projects occurring near the SVRA property boundary would occur during weekday business hours. Equipment noise would not exceed 24-hour noise standards and would be similar to ambient noise levels at the closest private residences (Other CEQA Considerations section 13.3.6). Therefore, the RMA Program would be ***consistent*** with this policy.
Containment of Offsite Impacts policy: The boundaries of the SVRA and the different types of use zones shall be clearly marked by signs, fences, barriers, or combinations of these, as appropriate. Signs shall be clearly visible to, and worded for, the benefit of SVRA users.	**Project Consistency:** The RMA Program would establish fenced riding areas with gated access and signage to clearly mark use zones and riding restrictions (Project Description section 2.4.2). Therefore, the RMA Program would be ***consistent*** with this policy.
Watershed Management policy: Accelerated erosion and sedimentation resulting from OHV use in each compartment shall be contained in that compartment, to the greatest extent feasible.	**Project Consistency:** The objectives of the proposed RMA Program include soil protection while providing for sustainable, quality recreation (Project Description section 2.2.2). Each proposed RMA boundary is based on natural geography to allow for OHV management based on watershed management strategies. RMA Program activities are specifically proposed to address soil erosion and sedimentation concerns (section 2.4.2) within sub-watershed units, which would further facilitate implementation of the Soil Conservation Plan and SWMP. Therefore, the RMA Program would be ***consistent*** with this policy.

Table 4-2. RMA Program Consistency with Relevant 1981 General Plan Policies

General Plan Policies	Consistency of Proposed RMA Program
Watershed Management policy: OHV management in each watershed shall be based on a general watershed rehabilitation analysis which shall consider: 1. The expected extent of use (e.g. area, estimate of numbers of users per period of time); 2. The recreation demand for different types of terrain for OHV use; 3. The expected impact of OHV use -- both on and off-site; 4. The expected length of time OHV use can reasonably be expected to occur; 5. The mitigation or maintenance measures (including estimated frequency of such measures) necessary to provide for compliance with Section 5019.56c of the PRC; 6. The equipment and staff necessary to handle No. 5 above; and, 7. The necessary installation of capital improvements (e.g., debris basins).	**Project Consistency:** The RMA Program is proposed specifically for the purpose of managing OHV recreation within watershed units for sustainability and to rehabilitate areas as needed to minimize soil loss and protect water quality of downstream drainages. The RMA Program considers all recreational use intensity, maintenance needs, and sustainability when planning for implementation of each RMA unit (Project Description section 2.4.1). Therefore, the RMA Program would be ***consistent*** with this policy.
Watershed Management policy: If, at any time, the department lacks the ability to properly manage part or all of the given watershed, use areas shall be reduced in size so they can be properly maintained. A department objective shall be to properly rehabilitate closed areas within one year.	**Project Consistency:** The RMA Program is proposed to enable DPR to improve management of the SVRA watershed by establishing recreation access controls and rehabilitating damaged areas to control soil loss and erosion. Implementation of the RMA Program would reduce distributed riding areas and improve overall management of soil disturbance occurring within each sub-watershed. Area rehabilitation is an approximately 2-year-long process involving isolating the area with fencing, assessing the existing trail routes for trail sustainability, closing routes, developing replacement trail segments where needed, and rehabilitating non-designated trails or damaged resource areas (Project Description section 2.4.1). Therefore, the RMA Program would be ***consistent*** with this policy.

Table 4-2. RMA Program Consistency with Relevant 1981 General Plan Policies

General Plan Policies	Consistency of Proposed RMA Program
Watershed Management policy: When it is determined that vehicle use in an area is causing significant adverse impacts on adjacent properties, use of the specific area shall cease until containment is achieved and a repetition can be avoided.	**Project Consistency:** The RMA Program project would facilitate increased watershed management on 773 acres in the SVRA. The RMA Program would not open presently closed areas near the SVRA boundary (i.e., Waterfall Canyon and southern part of West Franciscan) to new OHV recreation access. Establishing new RMA boundaries along the southern and western portion of the SVRA and managing these RMAs for trails-only riding would reduce trail density and soil loss in these areas and would allow DPR to close public access if adverse impacts on adjacent properties become evident. Therefore, the RMA Program would be ***consistent*** with this policy.
Reclamation and Rehabilitation policy: When a trail, hillclimb, or use area is no longer desirable to riders for use, it shall be promptly reclaimed or rehabilitated. Rehabilitation shall be a high management priority.	**Project Consistency:** The RMA Program would newly re-evaluate OHV use on 773 acres of the SVRA as DPR begins to strategically evaluate recreational opportunity in each proposed RMA unit. Redundant, unused, or unsustainable trails or hillclimb areas will be planned for removal and rehabilitation as part of the initial planning efforts (Project Description section 2.4.1). Therefore, the RMA Program would be ***consistent*** with this policy.
Reclamation and Rehabilitation policy: No area shall remain open to OHV use if it has been determined that the area cannot feasibly be rehabilitated or reclaimed. A specific watershed rehabilitation analysis shall be made before the approval of intensive or organized OHV uses in areas designated for "trail use". This analysis shall consider the expected materials (plants, fertilizer, soils, etc.), staff, and other important factors necessary for complete rehabilitation of the specific use area.	**Project Consistency:** The RMA Program is proposed for the purpose of implementing OHV access controls to protect soils and provide for sustainable recreation. The OHV Program would reduce use intensity by reducing trail density in trails-only areas and reducing the acreage of distributed riding area. The RMA Program does not propose increased or intensive OHV use in areas designated for trail use. Specific watershed rehabilitation analysis for the RMA Program is not required. Therefore, the RMA Program would be ***consistent*** with this policy.

Table 4-2. RMA Program Consistency with Relevant 1981 General Plan Policies	
General Plan Policies	**Consistency of Proposed RMA Program**
Open Use Zone policy: Vehicle use may be allowed anywhere in this open use zone. Competitive events and activities sponsored by large, organized groups may be permitted in this zone, on approval by the department. **Trail Use Zone policy:** The Trail Use Zone shall be managed primarily for OHV trail riding. Vehicle use shall be permitted only on approved or designated open trails and roads. Open, unrestricted riding shall not be allowed because of the high cost and difficulty of land management, and the sensitive resource values. **Close Zone policy:** No unauthorized vehicle use shall be permitted in this zone.	**Project Consistency:** The 1981 General Plan designates the hills fronting on Corral Hollow as open (distributed) riding and hills in the southern one-third of the SVRA are restricted to trails-only. The proposed RMA Program would further limit the distributed riding acreage to specific RMA locations resulting in a net change of 169 acres of distributed riding area converted to trails-only riding area. This change represents a more restrictive use on the affected acreage that is consistent with the purpose and intent of the use zone classifications, which is to manage use intensity for sustainability of resource values. Special event area and use by organized groups would be unaffected by the RMA Program. Areas presently managed as closed zones would be unchanged by the proposed RMA Program. Therefore, the RMA Program would be ***consistent*** with this policy.

4.3.3.2 2024 General Plan Update

The RMA Program would establish new RMAs and manage OHV riding opportunities consistent with the General Plan Update use designations. Training Hill, Sand Hill, Carrol West and Carrol East RMAs would allow distributed riding areas consistent with the General Plan Distributed Riding Area designation. The Hillclimb Facility RMA would allow trail riding and open riding consistent with the Advanced Trails and Special Event Area general plan designations. The Edge RMA is proposed for trails-only riding, which is consistent with the Limited Recreation Area general plan designation.

The project activities associated with the RMA Program (Project Description section 2.4 and Table 2-7) would occur in areas classified by the General Plan Update as Advanced Trails, Distributed Riding, and Limited Recreation as shown in Figure 2-9. The RMA Program activities would conform with these designations. Therefore, the proposed project would be consistent with the General Plan Land Use Concept Map and Visitor Experience Areas (see Table 4-1 above in Land Use Plans and Policies section 4.1.5 and Figure 4-2).

The RMA Program would also be consistent with the relevant goals and guidelines in the General Plan Update, as shown Table 4-3. The goals and guidelines are briefly presented in Table 4-3 along with a project consistency analysis. The full text of the goals and guidelines are provided in Appendix C.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
Visitor Use and Experience Opportunities (VEO) Goal 1: When planning for recreation opportunities and visitor services, provide a broad range of OHV recreation experiences and opportunities for visitors to enjoy and appreciate. *VEO Guideline 1.2:* Provide facilities for a range of age and skill levels.	**Project Consistency Analysis.** The RMA Program would contribute toward provision of a broad range of OHV recreation experiences, by enhancing the designated OHV trail network with sustainable trails offering different riding skill levels and improved connectivity throughout the park as part of its initial planning effort (Project Description section 2.4.1). The proposed project was found to have less-than-significant impacts on recreation and no cumulative impact on recreation (Recreation section 11.3.2 and section 11.4). Therefore, the RMA Program would be ***consistent*** with this VEO Goal 1 and associated guideline.
OHV Use Goal 1: State Parks will maintain, improve, or expand visitor area connectivity, practice areas, and riding opportunities for all OHV recreationalists. *OHV Use Guideline 1.5:* Enhance or develop other trails, and riding opportunities for all skill levels as allowed in the visitor experience areas.	**Project Consistency Analysis.** The RMA Program does not propose any activity within the Corral Hollow Management Unit and would not interfere with existing or potential new visitor use facilities identified in the General Plan Update (see Figure 3-1). As DPR plans for new RMAs throughout the SVRA, OHV trails will be evaluated to reduce trail density where needed and develop new trails where needed for improved sustainability, connectivity, and skill level opportunities (Project Description section 2.4.1). Therefore, the RMA Program would be ***consistent*** with OHV Use Goal 1 and associated guidelines.
Water Goal 1: Manage the SVRA for the protection of jurisdictional waters of the United States, including wetlands and waters of the state, while maintaining a quality OHV recreational experience. *Water Guideline 1.1:* Avoid locating facilities in jurisdictional waters of the U.S. or state and areas regulated by CDFW. Minimize impacts if avoidance is not feasible. *Water Guideline 1.2:* Work to attain no net loss of wetlands functions and values. If impacts cannot be fully avoided determine acreage of impacts and provide compensatory mitigation.	**Project Consistency Analysis.** The RMA Program involves establishing new access and riding controls on 773 acres of the SVRA hills and rehabilitating approximately 175 acres across multiple sites to address specific locations with erosion issues (Figure 2-9). The RMA Program area includes ephemeral drainages, ponds, and one wetland. No RMA Program activities would occur in ponds or wetlands (Figure 7-4). New or reconstructed trail segments may cross ephemeral drainages, and rehabilitation projects may occur in ephemeral drainages to repair gully erosion. Projects would be designed based on standard practices listed in the OHV BMP Manual (Table 2-9) and would be designed to minimize impacts. Mitigation Measure BIO-11 (Biological Resources section 7.5) would minimize any impact on jurisdictional waters. The proposed RMA Program would have beneficial effects on water quality over the long term, and short-term impacts on water quality would be avoided or minimized by BMPs incorporated into the project, and compliance with other applicable water quality regulations (Recreation section 11.3.2). Therefore, the project would be ***consistent*** with Water Goal 1 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
Water Goal 2: Manage the SVRA for the protection of water quality while maintaining a quality OHV recreational experience. *Water Guideline 2.1:* Avoid siting facilities in or adjacent to riparian or stream corridors or within waters of the U.S. or the state including seeps, ponds, or drainages. *Water Guideline 2.2:* Implement BMPs consistent with the Storm Water Management Plan (SWMP). *Water Guideline 2.3:* Implement requirements of the SWMP. *Water Guideline 2.4:* Implement all water quality control measures required under the NPDES Construction General Permit. Incorporate construction BMPs from the OHV BMP Manual. *Water Guideline 2.5:* When developing facility plans incorporate permanent water quality control features with guidance from the SWMP, OHV BMP Manual, and the Soil Conservation Standard and Guidelines *Water Guideline 2.6:* To reduce erosion and sedimentation, improve erosion areas. Implement rehabilitation concepts as described in the SWMP. *Water Guideline 2.7:* Close OHV use area if it cannot feasibly be rehabilitated or reclaimed per OHMVR Division water quality management standards.	**Project Consistency Analysis.** The RMA Program involves establishing new access and riding controls on 773 acres of the SVRA hills and rehabilitating approximately 175 acres across multiple sites to address specific locations with erosion issues (Figure 2-9). The RMA Program area includes ephemeral drainages, ponds, and one wetland. No RMA Program activities would occur in ponds or wetlands (Figure 7-4). New or reconstructed trail segments may cross ephemeral drainages, and rehabilitation projects may occur in ephemeral drainages to repair gully erosion. Projects would be designed based on standard practices listed in the OHV BMP Manual (Table 2-9) and would include drainage features and water quality controls required by the SWMP and Soil Conservation Standard and Guidelines. Mitigation Measure BIO-11 (Biological Resources section 7.5) would minimize any impact on jurisdictional waters. The RMA Program would establish gated access throughout the SVRA, which would allow for area closure when needed for rehabilitation. By implementing projects to rehabilitate damaged areas and reduce or eliminate further soil loss the RMA Program advances the objectives of the SWMP and Soil Conservation Standard and Guidelines. All RMA Program activities would be designed to minimize impacts on surface water quality. The proposed RMA Program would have beneficial effects on water quality over the long term, and short-term impacts on water quality would be avoided or minimized by BMPs incorporated into the project, and compliance with other applicable water quality regulations (Recreation section 11.3.2). Therefore, the project would be ***consistent*** with Water Goal 2 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
Soils Goal 1: Manage the SVRA for a balance of uses that allow protection and conservation of soil while maintaining a quality OHV recreational experience. *Soils Guideline 1.1:* Manage the SVRA to meet the OHMVR Division Soil Conservation Standard and Guidelines. *Soils Guideline 1.3:* Incorporate the guidance and select, implement, and maintain BMPs provided in the OHV BMP Manual to avoid soil loss and the potential for resulting air pollution or degradation of water quality. *Soils Guideline 1.4:* Use slope to help manage soils. Limit trails on areas with slopes in excess of 45 percent. Implement BMPs to manage erosion potential. *Soils Guideline 1.5:* Restrict hillclimbing activities to the hills adjacent to Corral Hollow Creek with Altamont clay and Saruin loam and clay loam soils.	**Project Consistency Analysis.** The RMA Program is proposed specifically for the purpose of protecting SVRA soils and water quality through controlling recreation access and rehabilitating soil loss areas. The RMA Program would have a beneficial effect on soils in the long-term by reducing erosion and sedimentation through rehabilitation of erosion areas and protecting soils through trails-only riding designations and controlled distributed riding areas. The project would include BMPs from the OHV BMP Manual incorporated in the project to avoid soil erosion and sedimentation during construction (Table 2-9 and Table 2-10) and would comply with applicable regulations such as the Soil Conservation Standard and Guidelines. Slope gradient and soil sustainability would be considered when designing new trails, trail reroutes, or trail removal during the RMA planning phase (Project Description section 2.4.1). All distributed-riding hillclimb areas would be actively managed and limited to designated areas with soils capable of sustaining the intensity of use. (i.e., Training Hill, Sand Hill, Carrol East, and Carrol West RMAs, and the Hillclimb Event Facility). The RMA Program would not create new hillclimbing activity event areas. Therefore, the project would be ***consistent*** with Soil Goal 1 and associated guidelines.
Geo Goal 2: Promote staff education and visitor awareness of paleontological resources and proper procedures to be followed if fossils are discovered. *Geo Guideline 2.2:* If paleontological resources are discovered inadvertently during construction activities, cease construction activities and consult an OHMVR Division archaeologist or other qualified paleontological resource professional. *Geo Guideline 2.3*: If fossils become exposed during operation of the SVRA, require that they be collected by paleontologists or properly trained unit staff members, as designated by the State Parks geologist and area manager	**Project Consistency Analysis.** No paleontological resources are known to occur within the RMA Program project area. DPR staff receive annual training on the potential for discovery during construction activities. Mitigation Measure GEO-1 (Geology section 7.5) requires worker training on inadvertent discovery of paleontological resources prior to initiation of project construction activities. Therefore, the project would be ***consistent*** with Soil Goal 2 and associated guideline.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
Natural Resources Management (NRM) **Goal 1:** Manage Carnegie SVRA for a balance of uses that allow protection and stewardship of natural resources while maintaining a quality OHV recreational experience. *NRM Guideline 1.1:* Locate visitor-serving facilities in prior disturbed areas or areas of relatively low resource value to minimize disturbance to higher-value habitat areas. *NRM Guideline 1.2:* Before planning new facilities, conduct site-specific surveys/mapping of sensitive biological resources; avoid during planning, design, and construction; exclude public access; conduct worker awareness training before construction. *NRM Guideline 1.3:* In the event that disturbing a sensitive biological resource is unavoidable, minimize the disturbance to the minimum area necessary and identify and implement measures to offset those impacts. *NRM Guideline 1.5:* Focus new trail development in areas of low habitat value. Route new trails around the edges of high-quality habitat and include buffers to avoid habitat fragmentation. Maintain strict enforcement of riding destination requirements throughout the SVRA. Enact adaptive management techniques such as temporary closures or other measures proven effective at the SVRA.	**Project Consistency Analysis.** The RMA Program proposes balancing recreational opportunity and protection of natural resources through managing OHV access and repairing areas affected by erosion and soil loss. Redundant or unused trails would be removed. New or re-routed trail segments would be located to avoid or minimize disturbance to high value habitat areas during the project planning phase, which includes surveying the project area for potential presence of sensitive biological resources (Project Description section 2.4.1). Mitigation Measures BIO-1 through BIO-11 include requirements for worker awareness training to inform workers about special-status species and protection measures; a biological monitor during work when needed; protocols for protecting listed species encountered during construction; preconstruction surveys and protection measures for special-status plants and wildlife that could occur in or near the work sites; preconstruction surveys and protection measures for sensitive natural communities; and preconstruction surveys and protection measures for jurisdictional waters and habitats. BMPs incorporated into the project (Table 2-9 and Table 2-10) would also help prevent impacts on sensitive biological resources by preventing erosion and sedimentation and preventing polluted runoff water from affecting vegetation and habitats. Therefore, the project would be ***consistent*** with NRM Goal 1 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
NRM Goal 2: Encourage a balance of uses that allow for restoration or enhancement of natural habitats while maintaining a quality OHV recreational experience. *NRM Guidelines 2.2:* Implement adaptive management including temporary or rotating closures, invasive species management, and habitat enhancement to allow natural regenerative processes to occur. Use signage to inform visitors about sensitive resources or closed areas. *NRM Guideline 2.3:* Manage SVRA landscapes to preserve natural vegetation and to enhance native California plant communities and associated habitat functions and values.	**Project Consistency Analysis.** The RMA Program proposes balancing recreational opportunity with restoration and enhancement of natural resources through managing OHV access and repairing areas affected by erosion and soil loss. Redundant or unused trails would be removed. New or re-routed trail segments would be located to avoid or minimize disturbance to high value habitat areas during the project planning phase, which includes surveying the project area for potential presence of sensitive biological resources (Project Description section 2.4.1). The RMA Program is an adaptive management program that manages OHV recreation through trail and distributed riding area design, visitor access controls, monitoring for unauthorized use and resource damage, use of temporary closures or rotating managed hillclimbs to allow areas to recover, and rehabilitation of damaged areas (Project Description section 2.4.2). The RMA Program includes public outreach and signage to inform visitors about area closure and resource protection efforts (Project Description section 2.4.2.2). All areas requiring revegetation would be treated with native plant species consistent with DOM policy 310.4.1 on genetic integrity to reduce the potential for introduced species (Project Description section 2.4.2.6). Therefore, the project would be ***consistent*** with NRM Goal 2 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
Plant Goal 1: Manage the SVRA for a balance of uses that allow protection of special-status plants and sensitive natural communities while maintaining a quality OHV recreational experience. *Plant Guideline 1.1:* Conduct protocol-level surveys for special-status plants and sensitive natural communities on the sites of proposed facilities during the planning and design process *Plant Guideline 1.2:* Prohibit impacts on existing occurrences of special-status plants during project implementation *Plant Guideline 1.3:* Avoid siting facilities within 100 feet of known special-status plant occurrences to avoid indirect impacts *Plant Guideline 1.4:* Use drought-tolerant plants and native plants whenever feasible for landscaping *Plant Guideline 1.5:* Monitor for and prevent spread of existing and/or incipient populations of invasive weeds annually *Plant Guideline 1.6:* Limit removal of native trees. Replace native trees removed during construction.	**Project Consistency Analysis.** The RMA Program provides for protection of special-status plant species and sensitive natural communities as part of DPR's initial planning process for each RMA. This initial assessment of site conditions includes surveying the project area for potential presence of sensitive biological resources (Project Description section 2.4.1). SPRs and Mitigation Measures BIO-9, and BIO-10 include requirements for worker awareness training to inform workers about special-status species and protection measures; a biological monitor during work when needed; preconstruction surveys and protection measures for special-status plants and sensitive natural communities including setback distances; and protection measures for jurisdictional waters and drainages. BMPs incorporated into the project (Table 2-9 and Table 2-10) would also help prevent impacts on sensitive biological resources by controlling for spread of invasive weeds and preventing erosion and sedimentation and preventing polluted runoff water from affecting vegetation and habitats. Native trees could be removed if necessary for construction of re-routed or new trail segments. New trail segments would be sited to avoid or minimize impacts on native trees. Mitigation Measure BIO-11 includes replacement of removed trees. Therefore, the project would be ***consistent*** with Plant Goal 1 and associated guidelines.

Wildlife Goal 1: Manage the SVRA to maintain a quality OHV recreational experience while protecting native wildlife species, including special-status wildlife species and their designated habitats. *Wildlife Guideline 1.1:* If signs of burrowing owl use or active San Joaquin kit fox dens are detected, consider active management such as appropriate buffers. USFWS would be contacted regarding appropriate setbacks for a natal/pupping den if found, both occupied and unoccupied. *Wildlife Guideline 1.2:* Avoid siting new facilities within 150 feet of pools currently known or later identified to support California red-legged frog, California tiger salamander, pond turtle, or western spadefoot *Wildlife Guideline 1.3:* Avoid siting facilities within 100 feet of elderberry shrub locations *Wildlife Guideline 1.4*: Avoid siting facilities within 150 feet of preferred Alameda whipsnake habitat *Wildlife Guideline 1.5:* Avoid known breeding locations of all special-status avian species known to occur in the planning area *Wildlife Guidelines 1.6:* Conduct a preconstruction survey of construction zone and buffer within two weeks of construction. Implement avoidance measures. *Wildlife Guidelines 1.7:* Perform a preconstruction survey for special-status herpetofauna. Implement project-specific avoidance and minimization measures. *Wildlife Guidelines 1.8:* Perform preconstruction surveys for potential bat roosting habitat in proposed construction areas and a 100-foot buffer. Implement avoidance and minimization measures. *Wildlife Guidelines 1.9:* Perform preconstruction surveys for active burrowing owl burrows for construction that would occur within suitable habitat or within 50 feet of suitable habitat according to current CDFW guidelines. *Wildlife Guideline 1.10:* During placement of facilities avoid interference of movement through known migratory wildlife corridors during placement of new facilities.	**Project Consistency Analysis.** The RMA Program provides for protection of special-status wildlife species as part of DPR's initial planning process for each RMA. This initial assessment of site conditions includes surveying the project area for potential presence of sensitive biological resources (Project Description section 2.4.1). SPRs include requirements for worker awareness training to inform workers about special-status species and protection measures; a biological monitor during work when needed; preconstruction surveys and protection measures for special-status wildlife species and protection of species if found present during construction, and siting facilities to avoid species and their habitat. Mitigation Measures BIO-1 through BIO-8 specifically address elderberry beetle, Crotch's bumblebee, special-status amphibians, nesting birds, special-status and roosting bats, burrowing owl, American badger, and San Joaquin kitfox. All perimeter fencing includes installation of H braces every 500 feet to allow wildlife passage (Project Description section 2.4.2.1). As a result, implementation of the RMA Program would not interfere with wildlife movement through the SVRA. BMPs incorporated into the project (Table 2-9 and Table 2-10) would also help prevent indirect impacts on special-status wildlife by protecting habitat values through controlling for spread of invasive weeds and preventing erosion and sedimentation and preventing polluted runoff water from affecting vegetation and habitats. Therefore, the project would be ***consistent*** with Wildlife Goal 1 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
CR Goal 2: Protect, stabilize, and preserve cultural resources. *CR Guideline 2.4:* Design all SVRA undertakings to avoid or minimize significant impacts on all known cultural resources *CR Guideline 2.8:* If cultural resources are inadvertently discovered during construction activities, cease construction activities, consult a qualified professional, and implement measures as appropriate. *CR Guideline 2.10:* If human remains are discovered during project activities, temporarily halt work within 100 feet of the find, leave artifacts in place, and contact the State Parks District Superintendent who will notify the county coroner in accordance with section 7070.5 of the California Health and Safety Code. The NAHC will be notified if the remains are Native American per PRC section 5097.98.	**Project Consistency Analysis.** The RMA Program would not impact known cultural or tribal cultural resources within the SVRA. SPRs for cultural resources and Diablo District standard practices (Cultural and Tribal Cultural Resources sections 8.1.4 and 8.1.5) would be implemented to protect resources if discovered during project construction activities. Therefore, the project would be ***consistent*** with CR Goal 2 and associated guidelines.
TCR Goal 1: Identify and interpret the tribal cultural resources, traditional cultural places, and past and present cultural uses in the Park and protect these culturally significant places. *TCR Guideline 1.2:* Any maintenance, construction, or other activities that have the potential to encounter or disturb tribal cultural resources will involve consultation and monitoring in accordance with state law and State Parks policies. Native American monitoring will be conducted by a representative(s) of a local Tribe/local Tribes, as identified by the NAHC. *TCR Guideline 1.6:* If undocumented tribal cultural resources or suspected tribal cultural resources are identified during construction activities, halt construction activities until a Native American monitor inspects the resource and appropriate measures are implemented. In the event of an accidental discovery of human remains, cease work. The State Parks District Superintendent will notify the county coroner in accordance with section 7070.5 of the California Health and Safety Code. The NAHC will be notified if the remains are Native American per PRC section 5097.98	**Project Consistency Analysis.** The RMA Program would not impact known cultural or tribal cultural resources within the SVRA. SPRs and Diablo District standard practices for cultural resources would be implemented to protect resources if discovered during project construction activities. Therefore, the project would be ***consistent*** with TCR Goal 1 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
OM Goal 2: Maintain and enhance the quality of OHV recreational opportunities. *OM Guideline 2.1:* Provide recreation opportunities that enhance recreation at the SVRA and provide opportunities for a range of OHV types, riding skill development, and practice areas. *OM Guideline 2.4:* Provide SVRA park maps and trail signs that help visitors easily understand the allowable recreation activities within the different visitor experience areas.	**Project Consistency Analysis.** The proposed project would not interfere with the maintenance and enhancement of OHV recreational opportunities. Although the project would change some RMAs from distributed use to trails-only, some distributed areas and many legal OHV trails and facilities would remain or be implemented in the future as part of the General Plan Update. The proposed project was found to have less than significant project-related impacts on recreation and no cumulative impact on recreation (see Chapter 11. Recreation). Therefore, the project would be ***consistent*** with OM Goal 2 and associated guidelines.
OM Goal 3: Provide facilities and services that contribute to the safety and convenience of visitors and staff. *OM Guideline 3.1:* Provide signage to inform visitors of responsible OHV recreation practices and extreme temperature precautions. *OM Guideline 3.2:* Maintain and monitor recreation areas for hazards *OM Guideline 3.3:* Provide signage and/or fencing around areas of known potential hazard *OM Guideline 3.14:* Mark SVRA boundaries and visitor experience areas with signs, fences, barriers, or a combination	**Project Consistency Analysis.** The proposed project is compatible with the provision of facilities and services that contribute to the safety and convenience of visitors and staff. Implementation of the new RMAs would help to address potential hazards from erosion or steep trails to OHV recreationists by closing and rehabilitating hazardous trails. The project would comply with Goal OM 3 associated guidelines such as installation of appropriate signage and fencing. Therefore, the project would be ***consistent*** with OM Goal 3 and associated guidelines.
OM Goal 5: Develop and maintain SVRA facilities and monitor OHV activities to ensure compatibility with surrounding land uses. *OM Guideline 5.3:* Employ practices to reduce noise levels for noise-sensitive receptors during construction of facilities. Reduce noise generated during construction and maintenance activities *OM Guideline 5.4:* Maintain the fencing and existing buffer areas between Carnegie SVRA and adjacent properties to minimize conflicts and prevent OHV use where it is not allowed. *OM Guideline 5.5:* Place rest areas and steep uphill trails at locations to provide a barrier effect and/or increase the distance to noise-sensitive uses.	**Project Consistency Analysis.** The proposed new RMAs are not located near sensitive receptors (residences), and the project was found to have less than significant noise impacts (see Other CEQA Considerations section 13.3.6). The project would comply with OM Goal 5 and associated guidelines regarding noise, existing easements, and fencing and buffer areas. Therefore, the project would be ***consistent*** with OM Goal 5 and associated guidelines.

Table 4-3 RMA Program Consistency with Relevant 2024 General Plan Update Goals and Guidelines

General Plan Goals and Guidelines	Consistency of Proposed RMA Program
OM Goal 6: Limit potential air quality impacts on residential properties within the planning area that could result from construction, maintenance, and OHV recreation activities. *OM Guideline 6.1:* Implement current Bay Area Air Quality Management District (BAAQMD) Table 5-2 Basic Best Management Practices for Construction-Related Fugitive Dust Emissions *OM Guideline 6.2:* Implement current Bay Area Air Quality Management District (BAAQMD) Table 6-1 Best Management Practices for Construction-Related GHG Emissions *OM Guideline 6.3:* Implement current BAAQMD Table 5-3 Enhanced Best Management Practices for Construction-Related Fugitive Dust Emissions for projects with construction emissions above BAAQMD thresholds of significance *OM Guideline 6.4:* Implement San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII control measures for construction emissions of respirable particulate matter with an aerodynamic diameter of 10 micrometers or less *OM Guideline 6.5:* Implement current SJVAPCD Emission Reduction Clean Air Measures as necessary for projects with construction emissions above the SJVAPCD thresholds of significance.	**Project Consistency Analysis.** The proposed new RMA would manage riding area in a sustainable manner by reducing the acreage subject to distributed riding, reducing trail density, and rehabilitating eroded hillsides and gullies (see Project Objectives in section 2.2.2 and Project Characteristics in section 2.4). As a result, the project would result in reduced disturbed soil surfaces due to OHV recreation over the long-term management of the SVRA. Project construction activities would result in short-term fugitive dust and equipment exhaust emissions as discussed in Air Quality section 6.3.3 and section 6.4. DPR would implement air quality control on construction projects as required by the BAAQMD and SJVAPCD. These requirements are incorporated into the project as discussed in Project Description section 2.5 and listed in Table 2-9. Therefore, the project would be ***consistent*** with OM Goal 6 and associated guidelines.
OM Goal 8: Manage the SVRA to maintain current aesthetic qualities and reduce visual impacts on surrounding areas that could result from construction, maintenance, and OHV recreation activities. *Guideline 8.1:* Design any new structures such that they are similar in height and scale to existing structures. Locate facilities with minimal impact on the viewshed. Utilize native plants and trees to screen new facilities from views.	**Project Consistency Analysis.** The proposed project does not include any new structures or lighting and therefore would not conflict with OM Goal 8 or associated guidelines. The project could improve the visual quality of RMAs by changing some of them from open areas to trail only and closing and revegetating some existing trails. The proposed project was found to have less than significant project-related impacts on aesthetics and no cumulative impact on aesthetics (see Chapter 5. Aesthetics). Therefore, the project would be ***consistent*** with OM Goal 8 and associated guideline.

4.4 CUMULATIVE IMPACTS

Implementation of the proposed RMA Program would not conflict with applicable land use plans and policies, and RMA Program activities would not combine with impacts from other foreseeable projects listed for consideration of cumulative impacts in Impact Analysis Methodology section 3.3.3 to incrementally increase land use impacts. None of the projects considered for cumulative impacts would occur in the SVRA hillside area proposed for new RMA implementation. The RMA Program activities would not conflict with the SVRA 1981 General Plan policies or the 2024 General Plan Update goals and guidelines and therefore would not contribute toward potential impacts of future projects that may occur in the SVRA or adjacent communities. For these reasons, the RMA Program would have ***no cumulative impact*** on land use.

4.5 MITIGATION MEASURES

No significant impacts on land use plans and policies have been identified for the project based on the analysis contained in sections 4.3 and 4.4 above. No mitigation is required.

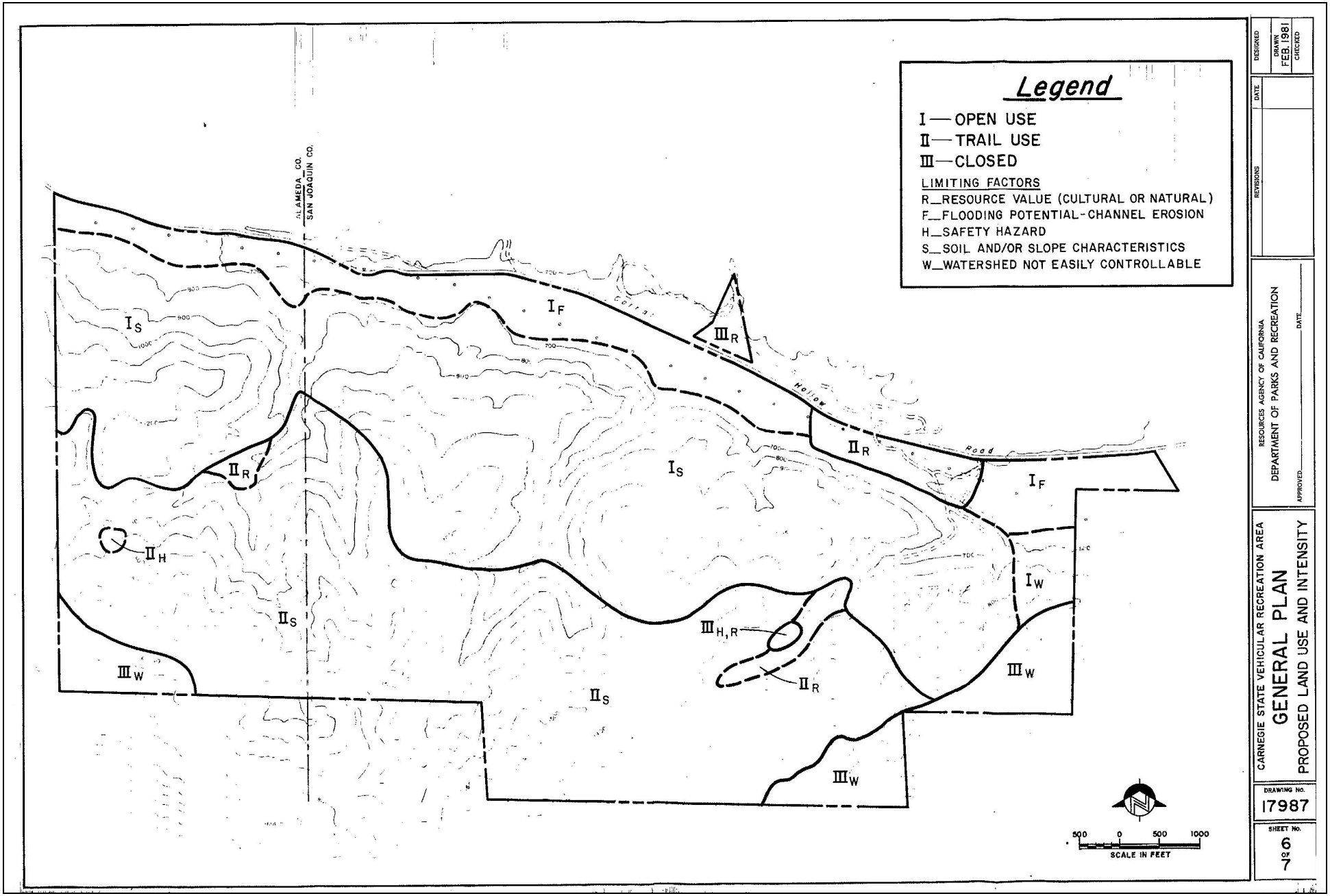
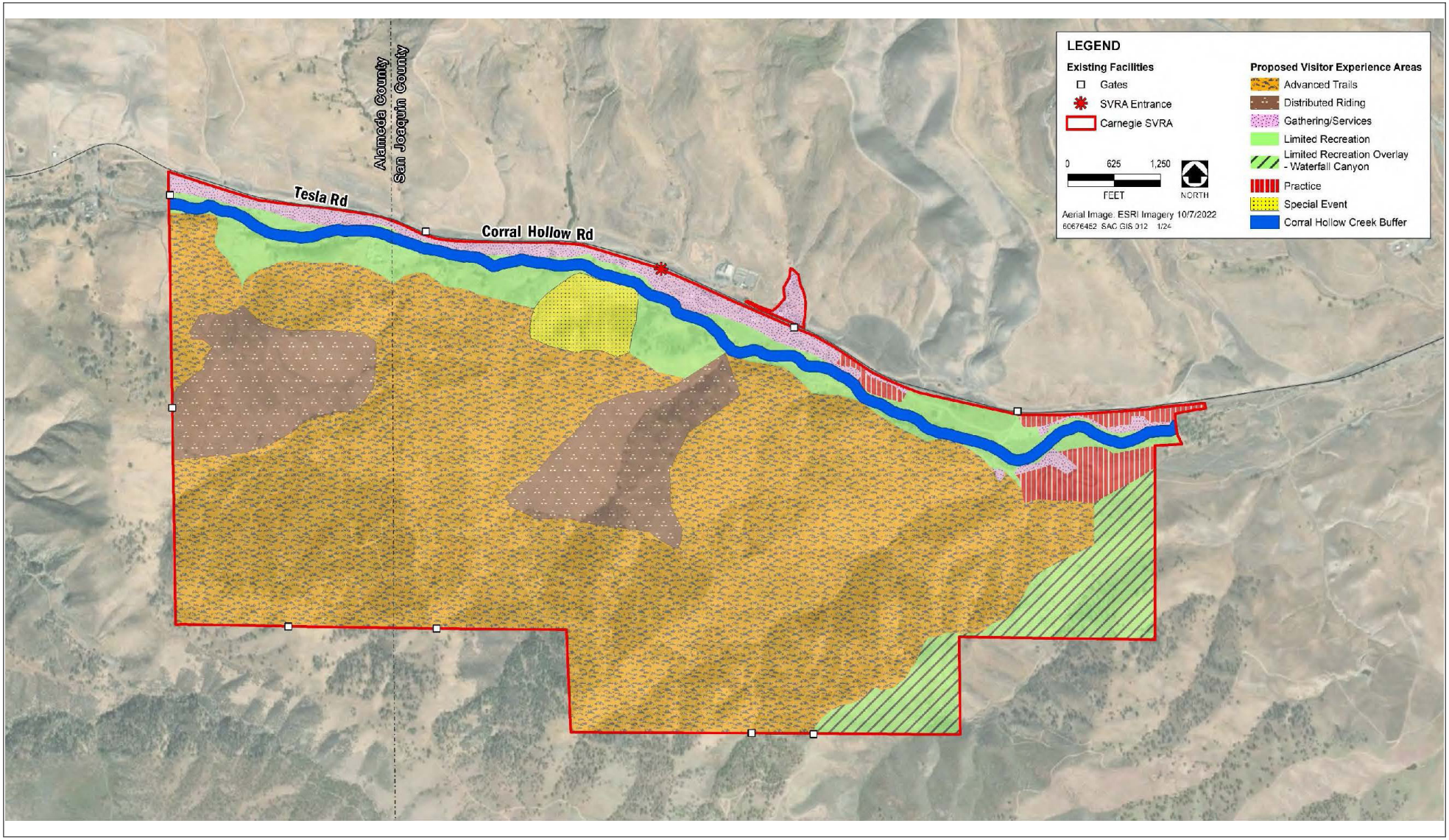


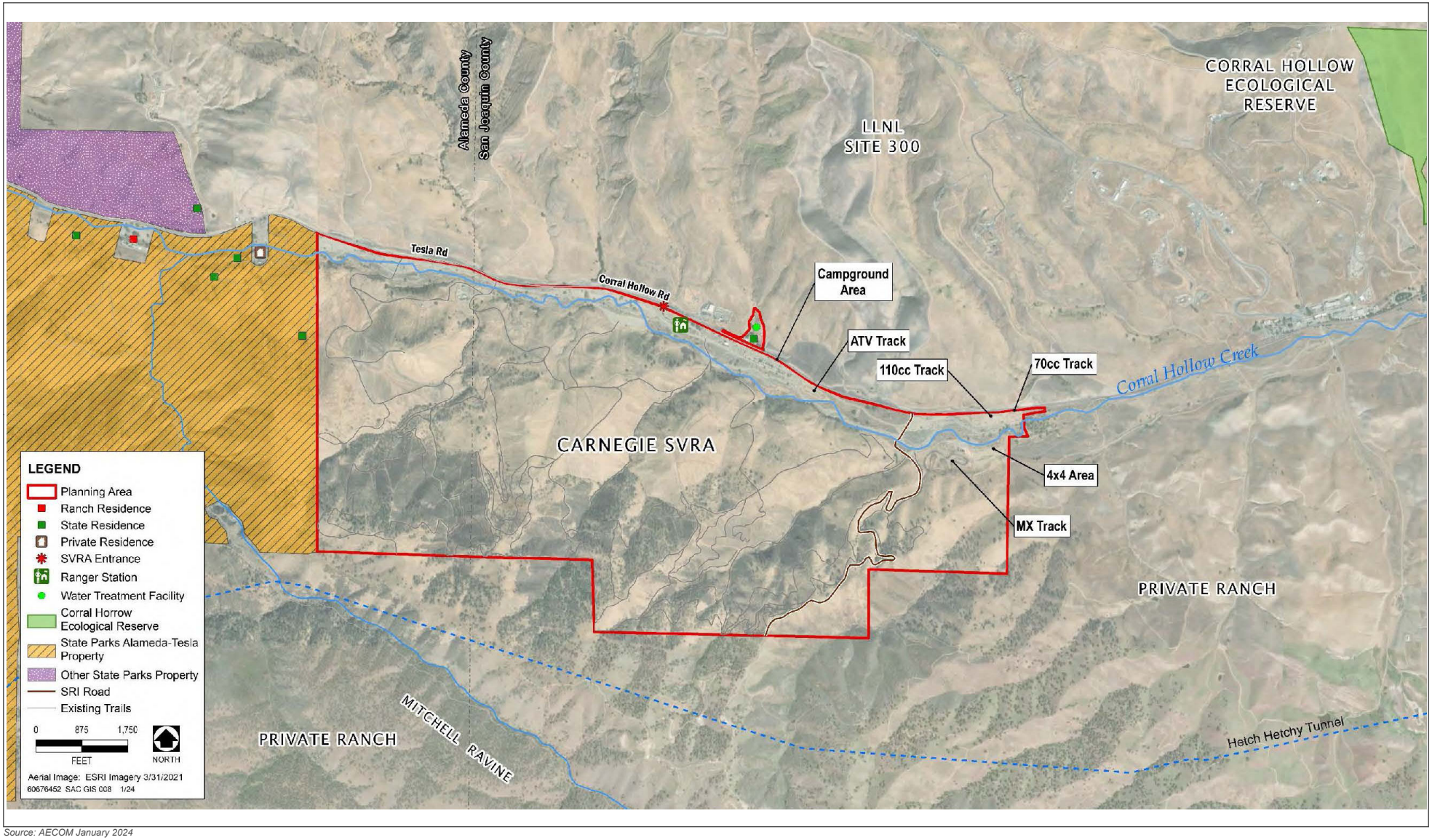
Figure 4-1 Carnegie SVRA 1981 General Plan Land Use and Intensity

Carnegie SVRA Resource Management Area Program EIR



Source: AECOM January 2024

Figure 4-2 Carnegie SVRA General Plan Land Use Concept Map and Visitor Experience Areas



Source: AECOM January 2024

Figure 4-3 Carnegie SVRA Existing Facilities and Surrounding Land Uses

CHAPTER 5. AESTHETICS

5.1 REGULATORY SETTING

5.1.1 California State Scenic Highway Program

Caltrans manages the California Scenic Highway Program. The purpose of this program is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code section 260 et seq. Caltrans provides guidance, and assists local government agencies, community organizations, and citizens with the process to officially designate scenic highways.

5.1.2 Local Regulations

Separate from the state's Scenic Highway Program, local jurisdictions including counties may also designate scenic routes through general plan or other local actions. As noted in the Carnegie SVRA General Plan Update, Alameda County and San Joaquin County general plans include policies that address scenic resources. Because the SVRA is owned by the State of California, it is not subject to compliance with local regulations, including Alameda or San Joaquin County policies or ordinances. However, DPR intends to continue to operate the SVRA in a manner compatible with the values expressed by the surrounding community (DPR 2024a).

5.2 ENVIRONMENTAL SETTING

5.2.1 Regional Context

Carnegie SVRA is located on both sides of the border between Alameda and San Joaquin counties in Corral Hollow Canyon. The surrounding area is characterized by steeply rolling hills. Undeveloped ridgelines and steep hillsides provide common background views near the SVRA. The hillsides and ridges are generally characterized by grasslands, with scattered oak woodlands, while valley bottoms have denser or riparian vegetation. The floor of Corral Hollow Canyon is characterized by historical rural industrial uses, including LLNL Site 300 (adjacent to the SVRA to the east) and former landfill and quarry uses near the mouth of the canyon and the intersection of Corral Hollow Road with I-580. Valley floors to the east (in the Central Valley) and the west (in the Livermore Valley) are generally characterized by a mix of agricultural and urban uses (DPR 2024a).

5.2.2 Public Views of Carnegie SVRA

The primary public road in Corral Hollow Canyon is Corral Hollow Road/Tesla Road. Corral Hollow Road in the vicinity of the SVRA is a San Joaquin County–designated scenic route. In addition, Tesla Road in the vicinity of the SVRA is designated as a scenic rural recreation route in Alameda County (DPR 2024b). There are no designated overlooks or viewpoints in or near the SVRA. Prominent, built features along the roadway fronting the SVRA include fences, overhead power lines, grading and roadway features, residences, the entrance station, parking, camping, and event areas in the SVRA, ; an industrial facility (LLNL Site 300); and areas showing evidence of previous grading or excavation associated with historical mining and landfill activities (DPR 2024b). Corral Hollow Creek flows alongside Corral Hollow Road for much of its route, and rocky and steep creek banks and vegetation are visible from the roadway.

Carnegie SVRA is visible to travelers along Corral Hollow Road/Tesla Road near the SVRA and to residents and users of nearby properties. Because of the surrounding topography, the SVRA is not visible from the Central Valley. Background views of the SVRA are generally of grassland hillsides with scattered oak woodlands or rocky slopes. Motorcycle tracks on Carnegie SVRA hills are visible primarily on the north facing slopes fronting the canyon floor and Corral Hollow Road (e.g., Hillclimb Facility and Training Hill). Example views of the SVRA from Corral Hollow Road are shown in Figure 5-1 Views of SVRA from Corral Hollow Road.

Carnegie SVRA General Plan Update EIR Figure 3.1-1 assessed the visibility of the SVRA and surrounding lands within a 3-mile planning area viewshed (see Figure 5-2). Locations of higher visibility have views across the entire planning area, whereas locations of moderate visibility have only partial views, and locations of lower visibility have very limited views of the planning area. High elevations within the SVRA have higher visibility from surrounding areas and lower elevations have less visibility, particularly those with views obstructed by hillsides such as in ravines. The figure provides a general assessment of potential views and does not factor in trees, buildings, other structures, or atmospheric conditions (e.g., haze) that may affect visibility (DPR 2024b).

5.2.3 Views from within Carnegie SVRA

Carnegie SVRA is generally open to the public, except for certain areas that are closed for resource conservation purposes. Views internal to the SVRA developed areas and OHV trails consist of trees, riparian vegetation and gravel floodplain along Corral Hollow Creek and grasslands, chaparral, and scattered oak trees on slopes and hilltops. Views of developed areas comprise large, open areas used for parking, camping, and staging areas for special events as well as park facilities (entrance station, park store, ATV tracks, 4x4 area, etc.). The developed area is confined to the canyon floor and is visually characterized by large expanses of gravel with few trees and little vegetation.

Hillsides in Carnegie SVRA have visible motorcycle tracks in distributed riding areas where OHV recreation is not confined to specific trails. Some areas with high density of tracks are visible only from within the SVRA trail system and not from external public views due to viewpoint distance, site elevation, slope orientation, and intervening topography (e.g., Confidence Hill; see Figure 2-2 and Figure 5-1).

Visually distinctive features include hilltops throughout the SVRA, but especially those facing Corral Hollow Canyon. These elevated viewpoints generally have long views up and down the canyon and across the Central Valley. The Sierra Nevada is visible from higher elevations on clear days.

5.3 PROJECT IMPACTS

5.3.1 Thresholds of Significance

Consistent with CEQA Guidelines Appendix G, the project would have a significant impact on aesthetics if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

- In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.3.2 Impacts Dismissed from Further Consideration

Substantial Adverse Effect on a Scenic Vista. Scenic vistas are typically categorized as either panoramic views (visual access to a large geographic area) or focal views (visual access to a particular object, scene, setting, or feature of interest). There are no designated scenic vistas, overlooks, or viewpoints in or near Carnegie SVRA. Therefore, implementation of the proposed RMA Program activities would have no impact on a scenic vista, and this issue is not discussed further in this EIR.

Substantially Damage Scenic Resources within a State Scenic Highway. The nearest State Scenic Highway to the SVRA is State Route 580, approximately 5.5 miles north-northwest of the SVRA (Caltrans 2019). Because of the viewing distance and intervening topography, the project area is not visible from State Route 580. Therefore, no impact from damage to scenic resources within a State Scenic Highway would occur, and this issue is not discussed further in this EIR.

New Source of Substantial Light or Glare. The proposed new RMAs would not include lighting and therefore would not create a new source of light or glare. There would be no project-related impacts related to light or glare, and this issue is not discussed further in this EIR.

5.3.3 Visual Character or Quality of Public Views

The proposed RMA Program would not have an adverse impact on visual character and quality of public views of the site and its surroundings and could have an overall positive aesthetic effect. The RMA Program would reduce trail density, increase vegetation, build and maintain sustainable trails, limit most OHV recreation to designated trails, and enforce trails-only riding where designated. The proposed implementation of the RMA Program would reduce and control designated distributed riding area with fencing and eliminate distributed riding practices in unfenced areas designated as trails-only riding. Based on past RMA implementation, the conversion of distributed riding areas to trails-only riding areas results in increased vegetation cover and reduced scarring from multiple trails throughout the area. See Figure 2-8 for an example of before and after photos of past RMAs that were converted to a trails-only riding area.

The proposed project could have short-term effects on the appearance of the project area from ground disturbance during implementation of individual rehabilitation projects or specialized maintenance projects within an established RMA. The work areas closest to Corral Hollow Road would have the most potential to be visible from public views. These include work sites #1 and #2 in The Edge RMA (Trans Am Management Unit), work site #3 in the Death Canyon RMA (Dead Cow Management Unit), and work sites #21-23 in the Top of the World RMA (Dead Cow Management Unit) shown in Figure 2-2. Other work areas would be visible from nearby OHV trails and from trails along ridgelines Due to the site geography as shown in Figure 2-2, views into the SVRA where the RMA Program activities would occur would largely be obscured from Corral Hollow Road or other public views within the SVRA by intervening topography. As shown in the viewshed map (Figure 5-2), visibility of the Carnegie SVRA hills is mostly limited to ridgelines and upper slopes. Some RMA Program work sites at the west end of the SVRA,

such as those occurring in the Training Hill RMA, could be visible from Alameda-Tesla state park. Views from Alameda-Tesla would likely be obscured by intervening topography and distance.

As discussed in Project Description section 2.4.3, 47 individual rehabilitation projects are identified potentially affecting 175 acres. Based on the known scale of projects (Table 2-7) and the 10-year implementation period, it is estimated that rehabilitation projects would not disturb more than 20 acres in any given year. Short-term visual impacts from RMA projects would be minor due to scale, gradual implementation over a 10-year period, scattered locations throughout the park, and limited visibility.

Short-term visual impacts would be further minimized by the implementation of BMPs incorporated into the project. Erosion and sedimentation would be minimized during construction with implementation of BMPs from the OHV BMP Manual for Erosion and Sediment Control (OHV BMP Manual). These BMPs consist of the use of a variety of methods: placement of erosion control blankets, seed, mulch, and fiber rolls; gully rehabilitation; application of dust suppressants; removal of accumulated sediment from sediment basins and culverts; and construction of low-water crossings and bridges. BMPs applicable to the anticipated project activities are listed in Project Description Table 2-10. A description of each of these BMPs is presented in Appendix B. The prevention of erosion and sedimentation during construction would help to minimize the short-term visual impacts of the project. Other BMPs incorporated into the project, such as fugitive dust control, storm water and drainage control, avoidance of work during wet weather, and construction trash removal could also help improve the visual quality of work areas during construction by keeping the areas clean and free of dust or sediment (see Project Description Table 2-9).

Because the long-term visual effects of implementing the proposed RMA Program activities (e.g., hillside and drainage rehabilitation, trail density reduction), would be beneficial, and the short-term impacts would be minimized by the gradual implementation of the project and BMPs incorporated into the project, and because implementing new or improved trail segments, fencing, and signage would not change the overall aesthetic character along existing scenic vistas internal to the SVRA nor be distinguishable to views from outside of the SVRA, the RMA Program project effects on the visual character or quality of public views of the site and its surroundings would be ***less than significant.***

5.4 CUMULATIVE IMPACTS

Like the proposed RMA Program activities, the General Plan Update projects (see Impact Analysis Methodology Table 3-1) would be implemented over a period of several years and not all at the same time. There would be no spatial overlap between the proposed RMA Program activities occurring in the hillside management units with the proposed General Plan Update projects occurring in the Corral Hollow Creek Management Unit (Figure 3-1); only facilities for communication or technology support could be located in any of the hillside management units. It is possible that a General Plan Update project could be implemented at the same time and in the same viewshed as an RMA Program project; however, the RMA Program projects would not cause adverse long-term visual effects and would not contribute an adverse impact to any long-term visual impact associated with the General Plan projects. All potential aesthetics impacts were found to be less than significant for both the proposed RMA Program and the Preliminary General Plan Update (DPR 2024b). Therefore, the visual effects of the RMA Program when combined with General Plan Update projects are not expected to be cumulatively significant.

Likewise, there is no spatial overlap between the proposed RMA Program activities and trail maintenance operations in existing RMAs (see Table 3-1 and Figure 2-5). Since the existing RMAs are on the east side of Carnegie SVRA and the new RMAs are on the west side, they are not visually connected from internal park viewpoints except perhaps at the tops of certain ridgelines (see Figure 5-2). Implementation of the new RMAs and ongoing trail maintenance operations may sometimes overlap temporally, but trail maintenance operations are generally minor actions to maintain surface tread, trail width, and sustainability (Project Description section 2.4.2.9) on existing trails and do not create new visual disturbance areas. Therefore, the visual effects of the RMA Program activities combined with ongoing trail maintenance operations of existing designated trail routes are not expected to be cumulatively significant.

Parts of the Alameda-Tesla property located on the western border of Carnegie SVRA are visible from the new RMAs, particularly from the tops of ridgelines (Figure 5-2). The exact future use of the Alameda-Tesla property is currently unknown, but it will remain State Parks land either with limited public access or open to passive recreation. Any future uses or development at Alameda-Tesla, and any potential for resulting cumulative impacts, are speculative at this time.

For the reasons described above, the proposed RMA Program would have ***no cumulative impact*** on aesthetics.

5.5 MITIGATION MEASURES

No significant impacts on aesthetics have been identified for the project based on the analysis contained in sections 5.3 and 5.4 above. No mitigation is required.

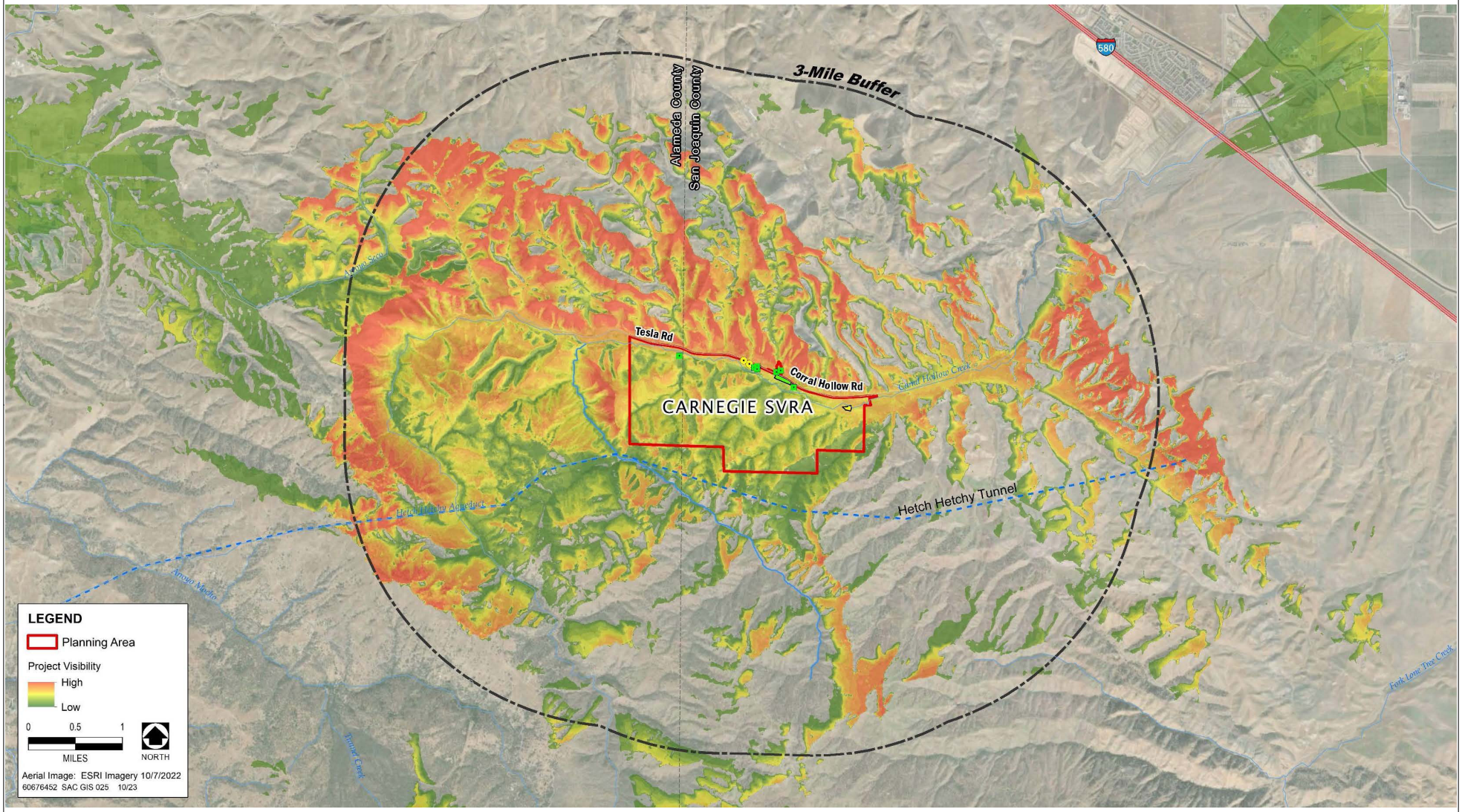


View from west end of Carnegie SVRA looking southeast toward Training Hill area of SVRA.



View of Training Hill and Burned Pottery areas of Carnegie SVRA looking south with internal park access road and Corral Hollow Creek in the foreground.

Figure 5-1 Views of Carnegie SVRA from Corral Hollow Road



Source: 2024 General Plan Update (AECOM 2024)

Figure 5-2 Carnegie SVRA Viewshed

Carnegie State Vehicular Recreation Area RMA

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CHAPTER 6. AIR QUALITY

6.1 REGULATORY SETTING

6.1.1 Regulated Air Pollutants

The U.S. Environmental Protection Agency (U.S. EPA) has established National Ambient Air Quality Standards (NAAQS) for six common air pollutants: ozone (O_3), carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); particulate matter (PM), which consists of "inhalable coarse" PM (particles with an aerodynamic diameter between 2.5 and 10 microns in diameter, or PM_{10}) and "fine" PM (particles with an aerodynamic diameter smaller than 2.5 microns, or $PM_{2.5}$); and lead. The U.S. EPA refers to these six common pollutants as "criteria" pollutants because the agency regulates the pollutants on the basis of human health and/or environmentally based criteria.

The California Air Resources Board (CARB) has established California Ambient Air Quality Standards (CAAQS) for the six common air pollutants regulated by the federal Clean Air Act (CAA), plus the following additional air pollutants: hydrogen sulfide (H_2S), sulfates (SO_X), vinyl chloride, and visibility-reducing particles (CARB 2024a).

A description of the air pollutants associated with the proposed RMA Program and its vicinity is provided below. As described in section 6.1.3 below, O_3, PM, CO, NO_2, SO_2, and lead are the primary pollutants of concern in Alameda County and San Joaquin County. The other criteria air pollutants, such as H_2S, vinyl chloride, and visibility-reducing particles, are generally of lesser concern and are not typically associated with the covered activities proposed under RMA Program implementation. Accordingly, the following are the only criteria air pollutants discussed in detail below.

- **Ground-level O_3**, or smog, is not emitted directly into the atmosphere. It is created from chemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOCs), also called reactive organic gases (ROG), in the presence of sunlight (U.S. EPA 2024a). Thus, O_3 formation is typically highest on hot sunny days in urban areas with NO_X and ROG pollution. O_3 irritates the nose, throat, and air pathways and can cause or aggravate shortness of breath, coughing, asthma attacks, and lung diseases such as emphysema and bronchitis.
- ROG is a CARB term defined as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, and includes several low-reactive organic compounds which have been exempted by the U.S. EPA (CARB 2004).
- VOCs is a U.S. EPA term defined as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. The term exempts organic compounds of carbon which have been determined to have negligible photochemical reactivity such as methane, ethane, and methylene chloride (CARB 2004).
- **PM**, also known as particle pollution, is a mixture of extremely small solid and liquid particles made up of a variety of components such as organic chemicals, metals, and soil and dust particles (U.S. EPA 2024b).

- **PM_{10}**, also known as inhalable coarse, respirable, or suspended PM_{10}, consists of particles less than or equal to 10 micrometers in diameter (approximately $1/7^{th}$ the thickness of a human hair). These particles can be inhaled deep into the lungs and possibly enter the blood stream, causing health effects that include, but are not limited to, increased respiratory symptoms (e.g., irritation, coughing), decreased lung capacity, aggravated asthma, irregular heartbeats, heart attacks, and premature death in people with heart or lung disease (U.S. EPA 2024b).
- **$PM_{2.5}$**, also known as fine PM, consists of particles less than or equal to 2.5 micrometers in diameter (approximately $1/30^{th}$ the thickness of a human hair). These particles pose an increased risk because they can penetrate the deepest parts of the lung, leading to and exacerbating heart and lung health effects (U.S. EPA 2024b).
- **CO** is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicles are the single largest source of carbon monoxide in the San Francisco Bay Area Air Basin (SFBAAB). At high concentrations, CO reduces the oxygen-carrying capacity of the blood and can aggravate cardiovascular disease and cause headaches, dizziness, unconsciousness, and even death (U.S. EPA 2024c).
- **NO_2/NO_X** is a by-product of combustion. NO_2 is not directly emitted but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM. NO_2 can cause breathing difficulties at high concentrations (U.S. EPA 2024d).
- **SO_2** is one of a group of highly reactive gases known as SO_X. Fossil fuel combustion in power plants and industrial facilities are the largest emitters of SO_2. Short-term effects of SO_2 exposure can include adverse respiratory effects such as asthma symptoms. SO_2 and other SO_X can react to form PM (U.S. EPA 2024e).
- **Sulfates (SO_4^{-2})** are the fully oxidized ionic form of sulfur. SO_4^{2-} are primarily produced from fuel combustion. Sulfur compounds in the fuel are oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. Sulfate exposure can increase risks of respiratory disease (CARB 2024b).
- **Lead** is a metal found naturally in the environment as well as in manufactured products. Mobile sources used to be the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. EPA established national regulations to gradually reduce the lead content in gasoline, and in 1996, lead was banned from gasoline. As a result of these efforts, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically. Lead can adversely affect multiple organ systems of the body and people of every age group. Lead poisoning in young children can cause brain damage, behavioral problems, and liver or kidney damage. Lead poisoning to adults can cause reproductive problems, muscle and joint pain, nerve disorders and kidney disease (CARB 2024c).

6.1.2 Federal and State Clean Air Acts

The federal CAA, as amended, provides the overarching basis for both federal and state air pollution prevention, control, and regulation. The federal CAA establishes the U.S. EPA's responsibilities for protecting and improving the nation's air quality. The U.S. EPA oversees federal programs for setting air quality standards and designating attainment status, permitting

new and modified stationary sources of pollutants, controlling emissions of hazardous air pollutants, and reducing emissions from motor vehicles and other mobile sources.

The U.S. EPA also requires that each state prepare and submit a State Implementation Plan (SIP) that consists of background information, rules, technical documentation, and agreements that an individual state will use to attain compliance with the NAAQS within federally imposed deadlines. State and local agencies implement the plans and rules associated with the SIP, but the rules are also federally enforceable.

In addition to being subject to federal requirements, air quality in California is also governed by the California CAA. In California, both the federal and state CAAs are administered by CARB, which sets all air quality standards (including emission standards for vehicles, fuels, and consumer goods), monitors air quality, and sets control measures for toxic air contaminants (TACs). CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional level.

6.1.3 Attainment Status

The federal and state governments have established emissions standards and limits for air pollutants that may reasonably be anticipated to endanger public health or welfare. These standards typically take one of two forms: standards or requirements that are applicable to specific types of facilities or equipment (e.g., petroleum refining, metal smelting), or concentration-based standards that are applicable to overall ambient air quality. Air quality conditions are best described and understood in the context of these standards; areas that meet, or attain, concentration-based ambient air quality standards are considered to have levels of pollutants in the ambient air that, based on the latest scientific knowledge, do not endanger public health or welfare.

- **Attainment.** A region is "in attainment" if monitoring shows ambient concentrations of a specific pollutant are less than or equal to the NAAQS or CAAQS. In addition, an area that has been re-designated from nonattainment to attainment is classified as a "maintenance area" for 10 years to ensure that the air quality improvements are sustained.
- **Nonattainment.** If the NAAQS or CAAQS are not met, the region is designated as nonattainment for that pollutant. It is important to note that some NAAQS and CAAQS require multiple exceedances of the standard in order for a region to be classified as nonattainment (see section 6.1.1). Federal and state laws require nonattainment areas to develop strategies, implementation plans, and control measures to reduce pollutant concentrations to levels that meet, or attain, standards.
- **Unclassified.** An area is unclassified if the ambient air quality monitoring data are incomplete and do not support a designation of attainment or nonattainment.

6.1.3.1 San Francisco Bay Area Air Basin Attainment Status

Table 6-1 lists the NAAQS and CAAQS and summarizes the San Francisco Bay Area Air Basin (SFBAAB) attainment status for criteria air pollutants. The SFBAAB is in attainment or unclassified for all criteria air pollutant standards other than O_3, PM_{10}, and $PM_{2.5}$.

Table 6-1. Ambient Air Quality Standards and SFBAAB Attainment Status

Pollutant	Averaging	California Standards[A]		National Standards[A]	
		Standard[B]	Attainment Status[C]	Standard[B]	Attainment Status[C]
Ozone	1-Hour	0.09 ppm	Nonattainment	--	--
	8-Hour	0.070 ppm	Nonattainment	0.070 ppm	Nonattainment
PM_{10}	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassifiable
	Annual Average	20 µg/m^3	Nonattainment	--	--
$PM_{2.5}$	24-Hour	--	--	35 µg/m^3	Nonattainment[C]
	Annual Average	12 µg/m^3	Nonattainment	9 µg/m^3 [D]	Attainment[E]
Carbon Monoxide	1-Hour	20 ppm	Attainment	35 ppm	Attainment
	8-Hour	9 ppm	Attainment	9 ppm	Attainment
Nitrogen Dioxide	1-Hour	0.18 ppm	Attainment	100 ppb	Unclassifiable
	Annual Average	0.030 ppm	--	0.053 ppm	Attainment
Sulfur Dioxide	1-Hour	0.25 ppm	Attainment	75 ppb	Attainment
	24-Hour	0.04 ppm	Attainment	--	--
Lead	3-Months Rolling	--	--	0.15 µg/m^3	Attainment
Hydrogen Sulfide	1-Hour	0.03 ppm	Unclassifiable	--	--
Sulfates	24-Hour	25 µg/m^3	Attainment	--	--
Vinyl Chloride	24-Hour	0.010 ppm	--	--	--

Source: BAAQMD (2017a), U.S. EPA (2024f); Modified by MIG.

(A) This table summarizes the CAAQS and NAAQS and the SFBAAB's attainments status. This table does not present comprehensive information regarding the CAAQS and NAAQS. Each CAAQS and NAAQS has its own averaging time, standard unit of measurement, measurement method, and statistical test for determining if a specific standard has been exceeded. Standards are not presented for visibility reducing particles, which are not concentration-based. The SFBAAB is unclassified for visibility reducing particles.

(B) Respective standards are shown in terms of micrograms per cubic meter (µg/m^3), parts per million (ppm), and parts per billion (ppb).

(C) On January 2013, the U.S. EPA issued a final rule to determine the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This U.S. EPA rule suspends key SIP requirements as long as monitoring data continue to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

(D) On February 9, 2024, the U.S. EPA reduced the annual average $PM_{2.5}$ national standard from 12.0 µg/m^3 to 9.0 µg/m^3.

(E) The SFBAAB was in attainment for the 2012 $PM_{2.5}$ national standard (12.0 µg/m^3). It typically takes the U.S. EPA several years after establishing a new NAAQS to make attainment designation.

6.1.3.2 San Joaquin Valley Air Basin Attainment Status

Table 6-2 lists the NAAQS and CAAQS and summarizes the San Joaquin Valley Air Basin's (SJVAB's) attainment status for criteria air pollutants. The SJVAPCD is in attainment or unclassified for all criteria air pollutants other than O_3, PM_{10}, and $PM_{2.5}$.

Table 6-2. Ambient Air Quality Standards and San Joaquin Valley Air Basin Attainment Status

Pollutant	Averaging	California Standards[A]		National Standards[A]	
		Standard[B]	Attainment Status[C]	Standard[B]	Attainment Status[C]
Ozone	1-Hour	0.09 ppm	Nonattainment	--	--
	8-Hour	0.070 ppm	Nonattainment	0.070 ppm	Nonattainment
PM_{10}	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Attainment
	Annual Average	20 µg/m^3	Nonattainment	--	--
$PM_{2.5}$	24-Hour	--	--	35 µg/m^3	Nonattainment[C]
	Annual Average	12 µg/m^3	Nonattainment	9 µg/m^3 [D]	Nonattainment[C]
Carbon Monoxide	1-Hour	20 ppm	Attainment/ Unclassified	35 ppm	Attainment/ Unclassified
	8-Hour	9 ppm	Attainment/ Unclassified	9 ppm	Attainment/ Unclassified
Nitrogen Dioxide	1-Hour	0.18 ppm	Attainment	100 ppb	Unclassified
	Annual Average	0.030 ppm	Attainment	0.053 ppm	Attainment
Sulfur Dioxide	1-Hour	0.25 ppm	Attainment	75 ppb	Attainment
	24-Hour	0.04 ppm	Attainment	--	--
Lead	30 Day Average	0.03 ppm	Attainment	--	--
	Rolling 3 Month Period	--	--	0.15 µg/m^3	No Designation/ Classification
Hydrogen Sulfide	1-Hour	25 µg/m^3	Unclassified	--	--
Sulfates	24-Hour	0.010 ppm	Attainment	--	--
Vinyl Chloride	24-Hour	0.09 ppm	Attainment	--	--

Source: SJVAPCD (2024c); U.S. EPA (2024f); Modified by MIG.

(A) This table summarizes the CAAQS and NAAQS and the SJVAB's attainments status. This table does not present comprehensive information regarding the CAAQS and NAAQS. Each CAAQS and NAAQS has its own averaging time, standard unit of measurement, measurement method, and statistical test for determining if a specific standard has been exceeded. Standards are not presented for visibility reducing particles, which are not concentration-based. The SJVAB is unclassified for visibility reducing particles.

(B) Respective standards are shown in terms of micrograms per cubic meter (µg/m^3), parts per million (ppm), and parts per billion (ppb).

(C) San Joaquin Valley is designated nonattainment for the 1997 $PM_{2.5}$ NAAQS. The U.S. EPA designated San Joaquin Valley as nonattainment for the 2006 $PM_{2.5}$ NAAQS on November 13, 2009 (effective December 14, 2009). San Joaquin Valley has yet to receive an attainment designation for the 2024 $PM_{2.5}$ NAAQS.

(D) On February 9, 2024, the U.S. EPA reduced the annual average $PM_{2.5}$ national standard from 12.0 µg/m^3 to 9.0 µg/m^3.

6.1.4 State Regulations

6.1.4.1 In-Use Off-Road Diesel Equipment Program

CARB's In-Use Off-Road Diesel Equipment regulation is intended to reduce emissions of NO_X and PM from off-road diesel vehicles, including construction equipment, operating within California. The regulation imposes limits on idling; requires reporting equipment and engine information and labeling all vehicles reported; restricts adding older vehicles to fleets; and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines or installing exhaust retrofits for PM. The requirements and compliance dates of the off-road regulation vary by fleet size, and large fleets (fleets with more than 5,000 horsepower) must meet average targets or comply with Best Available Control Technology (BACT) requirements. CARB has off-road anti-idling regulations affecting self-propelled diesel-fueled vehicles of 25 horsepower and up. The off-road anti-idling regulations limit idling on applicable equipment to no more than five minutes, unless exempted due to safety, operation, or maintenance requirements. In 2022, CARB approved amendments requiring the use of renewable diesel fuel starting January 1, 2024. Fleets comprised of Tier 4 Final equipment or zero-emission equipment are exempt from this requirement.

6.1.4.2 On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

CARB's In-Use Heavy-Duty Diesel-Fueled regulation (also known as the Truck and Bus Regulation, 13 CCR, Section 2025 et. Seq.) is intended to reduce emissions of NO_X, PM, and other criteria pollutants generated from existing on-road diesel vehicles operating in California. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, and for privately and publicly owned school buses. Heavier trucks and buses with a GVWR greater than 26,000 pounds must comply with a schedule by engine model year or owners can report to show compliance with more flexible options. Since 2023, all trucks and buses have been required to meet least 2010 model year engine standards, with few exceptions as described in title 13, CCR, section 2025. To help enforce this regulation, beginning January 1, 2020, only vehicles compliant with this regulation were allowed to be registered by the California Department of Motor Vehicles.

6.1.5 Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) is the agency primarily responsible for monitoring air pollution and regulating emissions of criteria and TACs to improve air quality conditions within the SFBAAB. The BAAQMD carries out its responsibility by preparing, adopting, and implementing plans, regulations, and rules that are designed to achieve attainment of state and national air quality standards.

6.1.5.1 Clean Air Plan

On April 29, 2017, the BAAQMD adopted its *Spare the Air-Cool the Climate 2017 Clean Air Plan* (2017 Clean Air Plan) (BAAQMD 2017b). The 2017 Clean Air Plan updated the 2010 Clean Air Plan to fulfill state O_3 planning requirements. Over the next 35 years, the 2017 Clean Air Plan will focus on the three following goals:

- Attain all state and national quality standards;
- Eliminate disparities among Bay Area communities in cancer health risk from TACs; and

- Reduce Bay Area greenhouse gas emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.

The 2017 Clean Air Plan includes 85 distinct control measures to help the region reduce air pollutants and has a long-term strategic vision which forecasts what a clean air Bay Area will look like in the year 2050. The control measures aggressively target the largest source of GHG, O_3 pollutants, and particulate matter emissions – transportation. The 2017 Clean Air Plan includes more incentives for electric vehicle infrastructure, off-road electrification projects, and reducing emissions from trucks, school buses, marine vessels, locomotives, and off-road equipment.

6.1.5.2 Rules and Regulations

The BAAQMD currently has 14 regulations containing more than 100 rules that control and limit emissions from sources of pollutants. Table 6-3 below presents the major BAAQMD rules and regulations that may be applicable to the proposed project.

Table 6-3. Potentially Applicable BAAQMD Rules and Regulations

Regulation	Rule	Description
1- General Provisions and Definitions	1- General Provisions and Definitions	301 – Public Nuisance: Establishes that no person shall discharge quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number or person or the public; or which endangers the comfort, repose, health or safety of any such person or the public.
6 – Particulate Matter	1 – General Requirements	Limits visible PM emissions.
6 – Particulate Matter	6 – Prohibition of Trackout	Limits the quantity of PM by controlling trackout of solid materials onto public roads.
7- Odorous substances	Odorous Substances	Establishes general limitations on odorous substances and specific emission limitations on certain odorous compounds, such as ammonia.
Source: BAAQMD (2024)		

6.1.6 San Joaquin Valley Air Pollution Control District

The SJVAPCD is the agency primarily responsible for monitoring air pollution and regulating emissions of criteria and toxic air pollutants to improve air quality conditions within the SJVAB.

6.1.6.1 Ozone Plans

The 2007 Ozone Plan for 8-hour O_3, adopted in April 2007, was designed to bring the San Joaquin Valley into attainment for the 1997 federal 8-hour O_3 standard of 0.08 ppm by December 31, 2023. As of November 30, 2024, the U.S. EPA has designated the San Joaquin Valley as nonattainment for the 1997 federal 8-hour O_3 standard. The 2007 Ozone Plan included a wide array of regulatory- and incentive-based measures to reduce O_3 and PM precursors

throughout the SJVAB but primarily focused on advancements in pollution control technologies for mobile and stationary sources.[3]

In June 2016, the SJVAPCD adopted the 2016 Plan for the 2008 8-Hour Ozone Standard, which outlined the strategy to address attainment of the 2008 federal standard of 75 parts per billion (ppb) by December 31, 2031. As of November 30, 2024, the U.S. EPA has designated the San Joaquin Valley as nonattainment for the 2008 federal 8-hour O_3 standard.

On December 15, 2022, the SJVAPCD adopted the 2022 Ozone Plan, outlining the regional strategy for attaining the federal 2015 8-hour standard of 70 ppb by December 31, 2037 (SJVAPCD 2022). As of November 30, 2024, the U.S. EPA has designated the San Joaquin Valley as nonattainment for the 2015 federal 8-hour O_3 standard. Emission reductions from mobile sources continue to be a key element of reducing O_3 emissions in the SJVAB. The 2022 Ozone Plan establishes 2037 as the attainment date for the federal 2015 8-hour O_3 standard and is being implemented in conjunction with continuing NO_x (primary precursor for O_3) reductions to meet the 2016 Ozone Plan attainment of 75 ppb by 2031.[4]

6.1.6.2 $PM_{2.5}$ Plans

The SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards (2018 $PM_{2.5}$ Plan) in November 2018 in order to meet NAAQS for $PM_{2.5}$ as described below (SJVAPCD 2018):

- U.S. EPA federal 1997 annual standard of 15 $\mu g/m^3$ and 24-hour standard of 65 $\mu g/m^3$ by 2020
- 2006 24-hour standard of 35 $\mu g/m^3$ by 2024
- 2012 annual standard of 12 $\mu g/m^3$ by 2025

In addition to developing a framework to reduce $PM_{2.5}$ emissions, the 2018 $PM_{2.5}$ Plan aims to reduce NOx emissions, which is a precursor to $PM_{2.5}$ and O_3. The SJVAPCD was on track to meet this standard by the projected attainment target of 2020, but significant wildfire impacts and data collection issues at the air monitoring site in Bakersfield delayed this. In August 2021, the SJVAPCD approved the Attainment Plan Revision for the 1997 Annual $PM_{2.5}$ Standard, which established a new attainment target of 2023 for the 1997 annual standard, given the wildfire impacts and data collection issues in 2020. The SJVAB was reclassified to serious nonattainment for the 2012 $PM_{2.5}$ standard of 12 $\mu g/m^3$ in December 2021. As of November 30, 2024, the U.S. EPA has designated the San Joaquin Valley as nonattainment for the 2012, 2006, and 1997 federal annual $PM_{2.5}$ standards, respectively.

On June 20, 2024, the SJVAPCD adopted the 2024 Plan for the 2012 Annual $PM_{2.5}$ Standard (2024 $PM_{2.5}$ Plan) (SJVAPCD 2024a). The 2024 $PM_{2.5}$ Plan does not replace the 2018 $PM_{2.5}$ Plan but rather builds upon it by focusing specifically on attainment of the 2012 Annual $PM_{2.5}$ NAAQS. The 2024 $PM_{2.5}$ Plan includes an updated emissions inventory and strategy primary

[3] The SJVAPCD also approved a 2013 Plan for the Revoked 1-Hour Ozone Standard on September 19, 2013. This 2013 Plan is in reference to the revoked 1979 federal 1-hour O_3 standard.

[4] The 2022 Ozone Plan was created and adopted in conjunction with the emissions reduction strategies presented in the 2007 and 2016 Ozone Plans, however the previous attainment dates of historical standards are still required as the U.S. EPA has yet to update the attainment status for the San Joaquin Valley of the 1997 federal 8-hour and 2008 federal 8-hour standards, respectively.

focused around adopting additional regulations to control emissions from agriculture and stationary sources; achieving greater mobile source emissions reductions; offering incentives to turn over older, higher polluting equipment; and partnering with industry to advance air pollution control technologies. The strategy specifies efforts to bolster collaboration with both the private sector as well as CARB and the U.S. EPA and outlines contingency measures that will be implemented if the primary strategies do not meet progress milestones. The 2024 $PM_{2.5}$ Plan has been designed to achieve the 2012 annual $PM_{2.5}$ standard by 2030. As noted in Table 6-2, the U.S. EPA lowered the annual $PM_{2.5}$ standard to 9 $\mu g/m^3$ in February 2024, however CARB has yet to submit the initial recommendations for nonattainment area designations. The U.S. EPA will finalize nonattainment area designations by February 2026.

6.1.6.3 Rules and Regulations

The SJVAPCD's primary means of implementing its air quality plans is by adopting and enforcing rules and regulations. Table 6-4 below summarizes the major SJVAPCD rules and regulations that may be applicable to the proposed project.

Table 6-4. Potentially Applicable SJVAPCD Rules and Regulations

Regulation	Rule	Description
III – Fees	3135 – Dust Control Plan Fee	Establishes a fee structure applicable to SJVAPCD's review of Dust Control Plans prepared pursuant to Rule 8021.
IV – Prohibitions	4101 – Visible Emissions	Prohibits visible air contaminant emissions applicable to any source operation which emits or may emit air contaminants.
	4102 – Nuisance	Prohibits discharge of air contaminants which cause injury, detriment, nuisance or annoyance to the public.
Regulation VIII – Fugitive PM_{10} Prohibitions	8011 – General Requirements	Requires actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions in order to reduce ambient concentrations of fine particulate matter.
	8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities	Requires dust control measures for any construction, demolition, excavation, extraction, or other earthmoving activities.
	8041 – Carryout and Trackout	Requires cleanup or prevention of carryout or trackout where carryout or trackout has occurred or may occur on paved public roads, including shoulders of a paved public road.
	8051 – Open Areas	Requires implementation of dust control measure(s) for an open area that is a disturbed surface area, or where vehicles are used, in order to limit fugitive dust emissions.
	8061 – Paved and Unpaved Roads	Requires dust control measures and/or cleanup or prevention of carryout and trackout measures for any new or existing public or private paved or unpaved road, road construction or road modification project.

Table 6-4. Potentially Applicable SJVAPCD Rules and Regulations		
Regulation	**Rule**	**Description**
	8071 – Unpaved Vehicle/Equipment Traffic Areas	Requires dust control measures for any unpaved or equipment traffic area, including if vehicle activity originates from and remains exclusively within an unpaved vehicle/equipment traffic area.
Source: SJVAPCD (2024b)		

6.1.7 BMPs and SPRs for Air Quality

DPR implements air quality BMPs required by the local air districts (BAAQMD and SJVAPCD) to control construction fugitive dust and equipment emissions. These BMPs are incorporated into the Carnegie SVRA General Plan OM Guidelines 6.1 through 6.5 listed in Appendix C. DPR also implements SPRs for air quality as presented in Appendix B. These measures include spraying construction areas with dust suppressant to control fugitive dust, covering haul truck beds tranporting loose material, maintaining equipment, sweeping or washing accumulated sediment from paved streets, and suspending earthwork activity during windy conditions.

6.1.8 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Operation and Maintenance (OM) Goals and Guidelines to protect air quality. OM Goal 6 and OM Guidelines 6.1 through 6.5 are relevant to the RMA Program and identify DPR actions to reduce potential maintenance and construction-related emissions and the resulting air quality impacts on residential properties within the SVRA and surrounding area. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

6.2 ENVIRONMENTAL SETTING

Air quality is a function of pollutant emissions and topographic and meteorological influences. The physical features and atmospheric conditions of a landscape interact to affect the movement and dispersion of pollutants and determine its air quality. California's air basins have been created to group together regions that have similar factors affecting air quality. Ambient concentrations of air pollutants are determined by the level of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport, dilution, and generation of air pollutants include terrain, wind, atmospheric stability, and the presence of sunlight.

Existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the emissions released by existing air pollutant sources. Because the project area straddles two air basins and would be expected to have some characteristics of and influence from both basins, this analysis presents environmental considerations that affect air quality in both the SFBAAB and the SJVAB. The environmental factors and pollutant sources that affect ambient concentrations of air pollutants are discussed separately.

6.2.1 Topography, Meteorology, and Climate

6.2.1.1 San Francisco Bay Area Air Basin

The climate of the Bay Area region is classified as Mediterranean. The climate is dominated by the Pacific high-pressure system that results in generally mild, dry summers and mild, wet winters. In addition to the SFBAAB's topography and geographic location, El Niño and La Niña patterns in the central Pacific Ocean can also have large effects on weather and rainfall received in the SFBAAB between November and March. Local weather conditions within the SFBAAB are also dependent on local topography and proximity to the Pacific Ocean, as marine air has a moderating effect on coastal areas during much of the year.

Winds flow through the Golden Gate from the Pacific Ocean, but direct flow into eastern Alameda County, the area in which the project area is located, is impeded by the East Bay hills. Marine air is mostly blocked from the area until late afternoons, except on days when deep marine inversions develop with strong onshore flows. On clear nights with light winds, inversions develop in the coastal valleys, separating the surface wind flow from winds aloft. Winds from the west-southwest are most prevalent during spring and summer afternoons. These are the breezes that blow from the Pacific Ocean through gaps in the East Bay hills. When the ocean breeze is weak, winds become light and variable. In addition, a drainage flow typically develops at night. The drainage flow is usually light and stable, flowing toward the Carquinez Strait.

Temperatures near the project area are typical of the Bay Area's inland coast valleys, which are minimally affected by exposure to sea breezes. Temperatures during the summer (i.e., from June to August) are generally in the upper 80s Fahrenheit (°F) during the day and the mid-50s at night). In the winter (from November to February), temperatures are typically in the upper 50s and low 60s during the day and the upper 30s to low 40s at night. The area in which the project is located receives approximately 14 inches of annual precipitation, with most occurring in the winter months (WRCC 2016).

The BAAQMD maintains publicly available meteorological data for use in air quality analyses. One of the closest meteorological stations to the project site with recent data (i.e., from 2013 through 2016, new data are not available) is the Livermore Rincon station, located approximately 12.3 miles west-northwest of Carnegie SVRA.[5] Figure 6-1 presents 24-hour and daytime wind conditions at the Livermore Rincon meteorological station.

As shown in Figure 6-1, the prevailing wind at the Livermore Rincon meteorological station is primarily from the west (both annually and during daytime hours).

6.2.1.2 San Joaquin Valley Air Basin

The SJVAB, which occupies the area south of Sacramento and north of the Tehachapi Mountains, encompasses the San Joaquin Valley, the foothills, and San Joaquin Valley watersheds. Approximately 250 miles long and 35 miles wide on average, the SJVAB is a well-defined climatic region with distinct topographic features on three sides. The Coast Ranges, which have an average elevation of 3,000 feet, are located on the western border of the SJVAB. The San Emigdio Mountains, which are part of the Coast Ranges, and the Tehachapi Mountains,

[5] The Livermore Rincon station is located slightly northwest of the Rincon Avenue and Locust Street intersection in Livermore.

which are part of the Sierra Nevada, are both located in the southern portion of the SJVAB. The Sierra Nevada forms the eastern border of the SJVAB. No topographic feature delineates the northern edge of the basin, but the SJVAB has jurisdiction south of Sacramento County. The SJVAB can be considered a "bowl," open only to the north.

The SJVAB is essentially flat, with a downward gradient in terrain to the northwest. Air flows into the SJVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin Delta from the San Francisco Bay Area. The mountains bordering the SJVAB to the east (the Sierra Nevada) create a barrier to airflow, which leads to entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. As a result, the SJVAB is highly susceptible to pollutant accumulation over time.

The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. Precipitation and fog tend to reduce or limit concentrations of some pollutants. For instance, clouds and fog block sunlight, which is necessary to fuel photochemical reactions that form O_3. Because CO is partially water soluble, precipitation and fog also tend to reduce CO concentrations in the atmosphere. In addition, PM_{10} can be washed from the atmosphere through wet deposition processes such as rain. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, resulting in elevated concentrations of air pollutants (e.g., CO, PM_{10}).

Summer is considered "ozone season" in the SJVAB. This season is characterized by poor air movement in the mornings and longer daylight hours. The longer daylight hours provide plentiful sunlight to fuel photochemical reactions between ROG and NOx, resulting in O_3 formation. During the summer, winds usually originate at the north end of the San Joaquin Valley and flow in a south-southeasterly direction through Tehachapi Pass and into the Southeast Desert Air Basin (SJVAPCD 2015a).

Similar to the BAAQMD, the SJVAPCD provides meteorological data for air quality analyses from various stations throughout the SJVAB. The Tracy Municipal Airport, located approximately six (6) miles northeast of Carnegie SVRA, is one of these locations. Figure 6-2 presents 24-hour and daytime wind conditions between 2004 and 2008 (newer data not available) at Tracy Municipal Airport.

As shown in Figure 6-2, winds at Tracy Municipal Airport are primarily from the west over a 24-hour period; however, during the daytime, there is a much larger north-westerly component.

6.2.2 CARB Regional and County-wide Criteria Air Pollutant Emission Inventories

6.2.2.1 San Francisco Bay Area Air Basin and Alameda County Emissions

CARB's estimate of the amount of emissions generated within Alameda County and the SFBAAB in 2017, the most recent year for which data is available, is summarized in Table 6-5.

Table 6-5. Alameda County and SFBAAB Emissions Summary (2017)

Geographic Area	Source Type	Emissions (Tons Per Day)				
		ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Alameda County	Stationary Sources(A)	13.1	3.2	3.6	3.7	1.7
	Area-wide Sources(B)	16.6	9.7	2.4	11.5	3.2
	Mobile Sources(C)	19.8	174.4	39.3	3.3	1.9
	Alameda County Total(D)	49.5	187.3	45.4	18.5	6.7
SFBAAB	Stationary Sources(A)	68.2	38.7	32.6	16.0	10.5
	Area-wide Sources(B)	79.2	69.2	12.1	59.8	18.7
	Mobile Sources(C)	97.5	797.0	152.2	13.6	7.9
	SFBAAB Total(D)	244.9	904.9	196.9	89.4	37.0

Source: CARB (2024d)

(A) Stationary sources include fuel combustion in stationary equipment or a specific type of facility such as printing and metals processing facilities.

(B) Area-wide sources include solvent evaporation (e.g., consumer products, painting, and asphalt paving) and miscellaneous processes such as residential space heating, fugitive windblown dust, and cooking.

(C) Mobile sources include automobiles, trucks, and other vehicles intended for "on-road" travel and other self-propelled machines such as construction equipment and ATVs intended for "off-road" travel.

(D) Totals may not equal due to rounding.

As shown in Table 6-5, mobile sources are the primary sources of emissions for ROG, CO, and NOx, while area-wide sources are the largest contributors to PM emissions.

6.2.2.2 San Joaquin County and San Joaquin Valley Air Basin Emissions

CARB's estimate of the amount of emissions generated within San Joaquin County and the SJVAB in 2017, the most recent year for which data is available, is summarized in Table 6-6.

As shown in Table 6-6, mobile sources comprise the largest source of emission for CO and NOx in San Joaquin Valley and the SJVAB; however, unlike the SFBAAB, area-wide sources comprise the largest source of ROG emissions. Furthermore, PM_{10} emissions from area-wide sources are almost four times greater in the SJVAB than in the SFBAAB, while $PM_{2.5}$ emissions are approximately two-and-a-half times greater. These differences in PM emissions are primarily related to agricultural activities occurring throughout San Joaquin County.

Table 6-6. San Joaquin County and SJVAB Emissions Summary (2017)

Geographic Area	Source Type	Emissions (Tons Per Day)				
		ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
San Joaquin County	Stationary Sources(A)	10.8	3.2	2.3	1.4	0.7
	Area-wide Sources(B)	15.3	9.2	1.5	24.6	4.8
	Mobile Sources(C)	13.3	90.5	28.3	2.2	1.5
	San Joaquin County Total(D)	39.4	102.9	32.1	28.2	7.0
SJVAB	Stationary Sources(A)	83.5	22.0	23.0	12.6	7.9
	Area-wide Sources(B)	164.0	159.4	12.1	240.0	50.9

Table 6-6. San Joaquin County and SJVAB Emissions Summary (2017)

Geographic Area	Source Type	Emissions (Tons Per Day)				
		ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
SJVAB (continued)	Mobile Sources(C)	73.5	498.8	193.3	14.5	10.1
	SJVAB Total(D)	320.9	680.2	228.5	267.2	68.8

Source: CARB (2024d)

(A) Stationary sources include fuel combustion in stationary equipment or a specific type of facility such as printing and metals processing facilities.

(B) Area-wide sources include solvent evaporation (e.g., consumer products, painting, and asphalt paving) and miscellaneous processes such as residential space heating, fugitive windblown dust, and cooking.

(C) Mobile sources include automobiles, trucks, and other vehicles intended for "on-road" travel and other self-propelled machines such as construction equipment and ATVs intended for "off-road" travel.

(D) Totals may not equal due to rounding.

6.2.3 Local Air Quality Conditions

6.2.3.1 San Francisco Bay Area Air Basin

The BAAQMD maintains a comprehensive air quality monitoring network consisting of over 30 stations distributed among the nine Bay Area counties in its jurisdiction. The monitoring station closest to Carnegie SVRA is located at 793 Rincon Avenue in Livermore, approximately 10 miles to the west. Table 6-7 shows the three most recent years' worth of data from the Livermore station. The Livermore station monitors O_3, NO_x, and $PM_{2.5}$. In general, the ambient air-quality measurements from this station are representative of the air quality near Carnegie SVRA, because the monitoring station is located in the same air basin with similar natural and anthropogenic (human-caused) factors that affect air quality.

Table 6-7. SFBAAB Local Air Quality Conditions 2017-2019

Pollutant	Averaging Time	2017	2018	2019
Ozone	Maximum 1-hour Concentration (ppm)	0.109	0.099	0.105
	Maximum 8-hour Concentration (ppm)	0.086	0.078	0.078
	Number of days exceeding State 1-hr standard	5	2	4
	Number of days exceeding State 8-hr standard	6	3	7
	Number of days exceeding Federal 8-hr standard	6	3	7
$PM_{2.5}$	Maximum 24-hour Concentration ($\mu g/m^3$)	41.5	172.6	28.8
	Number of days exceeding Federal 24-hr standard	2	14	0
Nitrogen Dioxide	Maximum 1-hour Concentration (ppm)	0.045	0.056	0.048
	Annual Average Concentration (ppm)	0.009	0.009	0.008
	Number of days exceeding State 1-hour standard	0	0	0
	Number of days exceeding Federal 1-hour standard	0	0	0

Source: BAAQMD (2023c)

As shown in Table 6-7, air quality conditions have generally improved or remained about the same over the 2017 to 2019 time period:

- Ozone concentrations were generally consistent from 2017 to 2019. Ozone exceedances for the state and federal 8-hour standards ranged between three in 2018 and seven in 2019. Exceedances of the 1-hour standard ranged from two in 2018 to five in 2017.
- $PM_{2.5}$ concentrations increased from 2017 to 2018 and decreased in 2019 to levels below both 2017 and 2018 concentrations. NAAQS exceedances increased from 2017 to 2018, but there were no exceedances in 2019.
- NO_2 concentrations had no NAAQS or CAAQS exceedances between 2017 and 2019.

6.2.3.2 San Joaquin Valley Air Basin

Air quality conditions in the SJVAB are affected by emission sources within the San Joaquin Valley, as well as sources upwind of the SJVAB. These upwind sources include both regional (e.g., from the SFBAAB and Sacramento County) and international sources (e.g., O_3 from China). Wind at ground level and higher altitudes transports pollutants into, around, and out of the valley and the amount of pollution transported varies. During the warmer summer months, surface winds pick up O_3 precursors emitted in regions to the north of the Valley and transport them southeast toward the central and southern end of the Valley. Air flow also ascends along the Sierra Nevada Mountains during the day as the air warms, and then descends in the evening as the air cools (SJVAPCD 2022).

Criteria air pollutants are monitored at multiple stations throughout the SJVAB. The Tracy Airport monitoring station, which is the site closest in proximity to the SVRA, is located approximately seven miles east of Carnegie SVRA. Table 6-8 shows data available between 2017 and 2019 from the monitor located at Tracy Airport on Tracy Boulevard. The Tracy Airport station monitors O_3, NO_2, PM_{10}, and $PM_{2.5}$. In general, the ambient air-quality measurements from this station are representative of the air quality east of Carnegie SVRA.

Table 6-8. SJVAB Local Air Quality Conditions 2017-2019

Pollutant	Averaging Time	2017	2018	2019
Ozone	Maximum 1-hour Concentration (ppm)	0.093	0.099	0.098
	Maximum 8-hour Concentration (ppm)	0.082	0.081	0.079
	Number of days exceeding State 1-hr standard	0	1	0
	Number of days exceeding State 8-hr standard	3	3	2
	Number of days exceeding Federal 8-hr standard	3	3	2
$PM_{2.5}$	Maximum 24-hour Concentration ($\mu g/m^3$)	47.9	257.5	30.6
	Number of days exceeding Federal 24-hr standard	5	20	0
PM_{10}	Maximum 24-hour Concentration ($\mu g/m^3$) (California)	152.0	250.2	241.4
	Number of days State 24-hr standard exceeded	20	27	10
	Number of days Federal 24-hr standard exceeded	1	2	1
Nitrogen Dioxide	Maximum 1-hour Concentration (ppm)	0.040	0.049	0.037
	Annual Average Concentration (ppm)	0.018	0.019	0.015
	Number of days exceeding State 1-hour standard	0	0	0
	Number of days exceeding Federal 1-hour standard	0	0	0

Source: CARB (2024e)

As shown in Table 6-8, air quality conditions have fluctuated but generally remained about the same over the 2017 to 2019 time period:

- Ozone concentrations remained about the same from 2017 to 2019. Ozone exceedances for the state and federal 8-hour standards ranged from two in 2019 to three in 2017 and 2018. The 1-hour standard was exceeded once in 2018.
- $PM_{2.5}$ concentrations increased substantially between 2017 and 2018 but then decreased in 2019 to levels that were below both 2017 and 2018 concentrations. This sharp increase observed from 2017 to 2018 is likely associated with wildfire activity during November 2018 that brought smoke into the San Joaquin Valley from wildfires in both Northern and Southern California. NAAQS exceedances remained approximately the same from 2017 to 2018 but then decreased in 2019.
- PM_{10} concentrations substantially increased between 2017 and 2018, and then slightly decreased from 2018 to 2019. The observed increase from 2017 to 2018 is likely associated with wildfire activity as described above under the $PM_{2.5}$ discussion. The winter of 2019 also marked the first period during which the San Joaquin Valley operated under the approved amendments to SJVAPCD Rule 4901, which imposed more stringent requirements for wood burning in Madera, Fresno, and Kern Counties. This may be a contributing factor to the observed decrease in PM emissions for 2019. PM_{10} exceedances of the state 24-hour standard generally decreased from 2017 to 2019, and exceedances of the federal 24-hour standard ranged from one in 2019 to two in 2018. The federal 24-hour standard was not exceeded in 2017.
- NO_2 concentrations did not exceed the NAAQS or CAAQS between 2017 and 2019.

6.2.4 Air Quality Sensitive Receptors

Sensitive land uses or sensitive receptors are facilities that generally accommodate people who may experience adverse effects from unhealthful concentrations of air pollutants. Commonly identified sensitive land uses are residences, hotels and motels, schools, preschools, playgrounds, childcare centers, retirement or convalescent homes, hospitals, and clinics.

There are several residences located in proximity of the project site that provide lodging for DPR staff. Although these receptors are located close to the proposed project, they would be protected under the Occupational Safety and Health Administration (OSHA) laws and regulations for DPR staff and their families. Receptors staying at the SVRA's campgrounds could be potentially located in the vicinity of the proposed project; however, they would be temporarily located in the park area and would not have prolonged exposure to emissions generated by the project. The nearest off-site sensitive receptor in proximity of the SVRA is a private, single-family residence located approximately 3,200 feet west of the SVRA's westernmost boundary, on Tesla Road.

6.2.5 Toxic Air Contaminants

The U.S. EPA and CARB have classified certain pollutants as hazardous air pollutants (HAPs) and TACs, respectively. These pollutants can cause severe health effects at very low concentrations, and many are suspected or confirmed carcinogens. The U.S. EPA has identified 188 HAPs, including such substances as arsenic and chlorine; CARB considers all U.S. EPA designated HAPs, as well as particulate emissions from diesel-fueled engines (DPM) and other substances, to be a TAC. Since CARB's list of TACs references and includes U.S. EPA's list of HAPs, this document uses the term TAC when referring to HAPs and TACs. A description of the TACs generated by vehicles and equipment operating at and in proximity of Carnegie SVRA is provided below.

- **Gasoline-Powered Mobile Source Air Toxics.** Operation of gasoline-powered motor vehicles produce emissions during fuel combustion. Combustion of gasoline emits several TACs, including 1,3-Butadiene, Acetaldehyde, Acrolein, Benzene, Ethylbenzene, Formaldehyde, Naphthalene, Polycyclic Organic Matter.
- **Diesel Particulate Matter (DPM).** Diesel engines emit both gaseous and solid material; the solid material is known as DPM. Almost all DPM is less than 1 micrometer (μm) in diameter and thus is a subset of $PM_{2.5}$. DPM is typically composed of carbon particles and numerous organic compounds. Diesel exhaust also contains gaseous pollutants, including VOCs and NO_x. The primary sources of diesel emissions are ships, trains, trucks, rail yards and heavily traveled roadways. These sources are often located near highly populated areas, resulting in greater DPM related health consequences in urban areas. The majority of DPM is small enough to be inhaled into the lungs, and what particles are not exhaled can be deposited on the lung surface and in the deepest regions of the lungs where the lung is most susceptible to injury. In 1998, CARB identified DPM as a TAC based on evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects. DPM also contributes to the same non-cancer health effects as $PM_{2.5}$ exposure (CARB 2024f).

6.2.6 Existing Emissions Associated with RMA Maintenance Activities

Existing RMA maintenance activities involve the use of equipment and vehicles at Carnegie SVRA that generate air quality emissions. These sources of emissions are described in detail below.

6.2.6.1 Equipment and Vehicle Trips

Gasoline- and diesel-fuel combustion in on-site heavy duty and small, utility off-road equipment and on- and off-site vehicle trips generate emissions of ROG, NO_X, CO, exhaust PM, and other pollutants. The age, type, amount, size, and hours of activity for equipment, and the number of vehicle trips and corresponding vehicle miles travelled (VMT) by these trips, influence the amount of exhaust emissions generated by existing equipment operations and vehicle trips associated with RMA maintenance activities.

Existing DPR park operation and maintenance activities include the following fuel combustion sources:

- **Heavy-Duty Off-Road Equipment** such as graders, tractors/loaders/backhoes, dozers, and excavators. Most pieces of heavy-duty off-road equipment used at the SVRA are owned and maintained by DPR; however, some pieces of equipment are rented occasionally for training purposes or specific applications (e.g., erosion control work).
- **Small, Utility Off-Road Equipment** such as utility terrain vehicles (e.g., Gators), rubber track concrete buggies (e.g., canycoms), jumping jacks, vibroplates, and mowers.
- **Parks-Owned, On- and Off-Road Vehicles** such as pickup trucks, dump trucks, and water trucks. These vehicles are used to transport State Parks staff throughout the SVRA, as well as undertake construction and dust suppression activities.
- **Worker and Vendor Trips** such as those made to and from the site by DPR staff, as well as supplies (e.g., sand, aggregate, wooden boards, hydroseed/seed mix, etc.) for park maintenance activities (e.g., erosion control and stabilization).

MIG, Inc. estimated fuel combustion-related emissions from existing park maintenance operations using equipment and vehicle activity and usage data tracked by DPR and emission factors and information obtained from EMFAC2021 (on-road vehicles), OFFROAD2021 (heavy-duty and small utility off-road equipment), U.S. EPA Tier III and IV Final emission factors (heavy-duty off-road equipment), and CalEEMod version 2022.1 (load factors). Emissions were estimated for activities conducted over a four-year period (from 2019 through 2022) that included activities such as grading ruts in the hillside as part of a rehabilitation project, installation of straw wattles, and application of hydromulch and native grass seed for stabilization. The activities conducted during this four year period are considered representative of the range of overall RMA activities and, therefore, provide a basis for evaluating potential future RMA maintenance activity air quality impacts. The annual fuel combustion-related emissions associated with 2019 to 2022 RMA maintenance activities are summarized in Table 6-9.

Table 6-9. Estimated Annual Emissions from RMA Activities (2019 – 2022)

Year	Pollutant Emissions (Tons per Year)				
	ROG	CO	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2019	1.9	5.9	0.9	0.3	0.3
2020	2.0	6.2	0.9	0.4	0.4
2021	0.4	0.9	0.6	0.3	0.3
2022	0.4	0.8	0.4	0.3	0.3

Note: See Appendix D.

As shown in Table 6-9, emissions associated with implementing previous RMA activities were greatest in 2020, when the West Franciscan (43.9 acres) and Bunkhouse (85.1 acres) RMAs were implemented (see Table 2-3). It is noted that while State Parks tracks activity data (e.g., mileage, runtime, etc.) for the various pieces of equipment that it owns and operates, this data is not tracked by job type. For example, the annual hourly runtime logged on heavy duty off-road equipment such as graders covers both RMA and non-RMA-related activities (e.g., basins cleanout). The same is true for the mileage logged on DPR's vehicles such as Ford F350s, Ram 4500s, etc. Thus, the annual emissions estimates presented in Table 6-9 are considered overestimates of potential RMA maintenance activity emissions. In addition, it is important to note that DPR's RMA maintenance activities do not generate consistent emissions on a daily basis because the type and amount of equipment that is used, the daily and total duration of equipment operations, and the number of workers needed to complete each maintenance activity varies by activity. Although State Parks does not track individual daily equipment runtime and VMT, the potential average daily emissions associated with previous RMA maintenance activities can be estimated by dividing annual emissions estimates by the number of annual workdays RMA maintenance activities could occur (5 days per week, 52 weeks per year, or 260 workdays per year). Table 6-10 summarizes the average daily emissions associated with DPR's RMA maintenance activities.

Table 6-10. Estimated Average Daily Emissions from RMA Activities (2019 – 2022)

Year	Pollutant Emissions (Average Pounds per Day)				
	ROG	CO	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2019	14.9	45.7	6.8	2.6	2.6
2020	15.2	47.4	7.2	2.8	2.8
2021	2.9	7.1	4.4	2.3	2.3
2022	3.4	6.3	3.2	2.1	2.1

Notes: See Appendix D.

6.2.6.2 Fugitive Dust

Existing park operation and maintenance activities generate fugitive dust (including PM_{10} and $PM_{2.5}$) from ground and soil-disturbing activities such as grading, excavation, soil stockpiling, etc., as well as from equipment and vehicle travel on paved and unpaved roads in and around the SVRA. Silt content, moisture level, volume of material moved, vehicle weight, vehicle speed, and amount of equipment operations are all factors that affect fugitive dust emissions from existing park management. As described above, DPR does not track daily runtimes or VMT. Similarly, DPR does not track the other variables that are needed to estimate annual and daily fugitive dust emissions (e.g., daily disturbance areas, soil movement volumes, etc.). Accordingly, it is not possible to specifically estimate fugitive dust emissions associated with existing park operation and maintenance activities; however, generalized emissions may be estimated. For example, according to the Western Regional Air Partnership Fugitive Dust Handbook, fugitive PM_{10} emissions from construction operations average 0.11 tons per acre per month (WRAP 2006, Table 3-2). Although the average monthly area of disturbance associated with RMA activities is not known, as shown in Table 2-3 and Table 2-7, from 2019 to 2022 the average disturbed area for DPR's RMA activities was approximately 21 acres per year. Therefore, from 2019 to 2022, it is estimated that previous RMA activities generated up to approximately 2.31

tons per year (or less) of fugitive dust emissions on average.[6] This estimate is for uncontrolled fugitive dust emissions. As described in Table 2-10 and Appendix C, 6.1.7 DPR implements sediment, erosion, and dust control measures (e.g., site watering, application of stabilizers, etc.) that reduce the potential for fugitive dust emissions to be generated by RMA maintenance activities. Such measures are commensurate with BAAQMD and SJVAPCD recommended BMPs for controlling fugitive dust and serve to lower potential fugitive dust emissions from RMA activities.

6.2.6.3 Valley Fever

Coccidioidomycosis (Valley Fever) is caused by a fungus residing in the top 2 to 12 inches of soil called *coccidioides*. When soil containing *coccidioides* is disturbed, fungal spores are released into the surrounding air, and Valley Fever can be contracted if spore-contaminated dust is inhaled. Sixty percent of Valley Fever symptoms are asymptomatic, and most people who get it do not see a doctor. People who do get sick may experience symptoms such as fever, tiredness, cough, chest pain, aches, and/or rash for a month or more. Most people who contract Valley Fever fully recover and are usually protected from getting Valley Fever again (SJCPHS 2018).

Most cases of Valley Fever in California are reported from the Central Valley and Central Coast regions, but cases are generally on the rise throughout California, including in the northern Central Valley and southern coastal areas of California (CDPH 2024). In 2022, Alameda County reported 79 cases of valley fever for a contraction rate of 4.8 per 100,000 people and San Joaquin County reported 104 cases for a contraction rate of 13.3 per 100,000 people, while statewide there were 7,451 total cases reported for a contraction rate of 4.8 per 100,000 people (CDPH 2024). According to the Department of Industrial Relations, populations with more than 20 cases per 100,000 people (annually) are considered highly endemic regarding Valley Fever (DIR 2024). Therefore, neither Alameda County nor San Joaquin County is considered highly endemic regarding Valley Fever.

6.3 PROJECT IMPACTS

6.3.1 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the proposed project would have a significant air quality impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; or

[6] Based on the proposed project activity acreage presented in Table 2-7, project activities are estimated to occur in approximately 23% of the new RMA Program area (175 project acres out of 773 new RMA acres). Conservatively, it was assumed that all existing 2019 to 2022 RMA rehabilitation activities occurred on 30% of the RMA boundary area, i.e., up to approximately 21 acres per year for the 2019 to 2022 period. Based on the Western Regional Air Partnership Fugitive Dust Handbook's fugitive PM_{10} dust emissions rate of 0.11 tons per acre per month, it is estimated that historical RMA activities generated approximately 2.3 tons or less per year of fugitive dust during the 2019 to 2022 period.

- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Carnegie SVRA is located on the border of Alameda County and San Joaquin County where two different air districts manage air quality – the BAAQMD in Alameda County and the SJVAPCD in San Joaquin County. The CEQA Guidelines are structured such that the guidance and threshold criteria established by the air quality management district in which the project is located may be used to make significance determinations with regard to potential air quality impacts. Therefore, since activities associated with the proposed project would occur in two air basins managed by two different air quality management districts, this EIR evaluates potential impacts associated with the proposed project using both BAAQMD- and SJVAPCD-recommended guidance and thresholds of significance. The analysis conservatively assesses the impact of the proposed RMA Program as though all activities would occur in full in both air districts (i.e., activities and emissions were not assumed to just occur in either the SFBAAB or the SJVAB).

6.3.1.1 BAAQMD CEQA Thresholds of Significance

The BAAQMD CEQA Air Quality Guidelines contain the BAAQMD's recommendations to Lead Agencies for evaluating and assessing the significance of potential project- and plan-level air quality impacts. The BAAQMD's project-level, construction-related thresholds of significance for criteria air pollutants and TACs are summarized in Table 6-11.

Table 6-11. BAAQMD Project-Level Construction CEQA Thresholds of Significance

Pollutant	Average Daily Emissions (lbs per day)
ROG	54
NO_X	54
Exhaust PM_{10}	82
Exhaust $PM_{2.5}$	54
Fugitive Dust $PM_{10}/PM_{2.5}$	BMPs
Local CO	*None*
Risks and Hazards – New Source/Receptor (Individual)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >10.0 in a million; and Increased non-cancer risk of >1.0 Hazard Index (chronic or acute); and Ambient PM2.5 increase: >0.3µg/m^3 annual average
Risks and Hazards – New Source/Receptor (Cumulative)	Compliance with Qualified Community Risk Reduction Plan; or Increased cancer risk of >100 in a million (from all local sources); and Increased non-cancer risk of >10.0 Hazard Index (from all local sources) (chronic); and Ambient PM2.5 increase: >0.8µg/m^3 annual average (from all local sources)
Accidental Release of Acutely Hazardous Pollutants	*None*
Odors	*None*
Source: BAAQMD (2023a)	

As provided in the BAAQMD Air Quality CEQA Guidelines:

> "The Air District provides project-level thresholds of significance for criteria air pollutants for which the SFBAAB is in non-attainment. These are the levels at which the Air District has determined that an individual project's contribution to the cumulative impact (non-attainment) is cumulatively considerable" (BAAQMD 2023b, pg. 5-4).

6.3.1.2 SJVAPCD CEQA Thresholds of Significance

The SJVAPCD has adopted mass emissions-based thresholds of significance for construction and operational permitted and non-permitted equipment and activities. The SJVAPCD's construction-related thresholds of significance for criteria air pollutants and TACs are summarized in Table 6-12.

Table 6-12. SJVAPCD Construction CEQA Thresholds of Significance

Pollutant	Annual Emissions (tons per year)
ROG	10
NO_X	10
PM_{10}	15
$PM_{2.5}$	15
Local CO	100
Risks and Hazards	Increased cancer risk of >20.0 in a million
Source: SJVAPCD (2015b, 2015c)	

As explained in the SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI), these thresholds represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SJVAB's existing air quality conditions. If annual emissions of criteria air pollutants or precursors would exceed any applicable threshold, then the project could conflict with or obstruct implementation of the applicable air quality plan and result in a cumulatively considerable net increase in emissions for the respective criteria air pollutant. Emissions exceeding applicable SJVAPCD quantitative thresholds of significance would be considered a significant impact.

6.3.2 Impacts Dismissed from Further Consideration

Conflict With or Obstruct the Applicable Air Quality Plan. Implementation of the proposed project would not conflict with or obstruct implementation of the BAAQMD 2017 Clean Air Plan or the SJVAPCD attainment plans for O_3 and $PM_{2.5}$. The project is not proposing to increase park attendance, staffing levels, or increase vehicle use to accommodate the proposed RMA activities. The project, therefore, is consistent with the underlying emission-generating characteristics and assumptions that were used by the BAAQMD and SJVAPCD to forecast emissions for their respective air quality plans and identify the measures and strategies that would be required to bring their air basin into attainment. The SJVAPCD GAMAQI further stipulates that projects whose emissions would be less than the recommended thresholds of significance for criteria air pollutants would not conflict with or obstruct implementation of applicable air quality plans. As described under section 6.3.3 below, the proposed project would not generate emissions that would have the potential to exceed SJVAPCD thresholds of significance. This impact would be ***less than significant.***

Odors. According to the BAAQMD's CEQA Air Quality Guidelines, land uses associated with odor complaints include agricultural operations, wastewater treatment plants, landfills, and certain industrial operations (such as manufacturing uses that produce chemicals, paper, etc.). The proposed project does not involve the development or operation of any of these land uses. Further, any exhaust emissions generated by construction equipment would be done so sufficiently far from receptors such that they would not be significant. ***No impact*** would occur.

6.3.3 Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Basin is Designated Non-Attainment

Proposed RMA activities would generate exhaust and fugitive dust emissions from vehicle and equipment fuel combustion and ground disturbance and related earth moving activities. As described below, the emissions associated with proposed RMA Program activities would be ***less than significant.***

6.3.3.1 Construction Exhaust Emissions

Construction activities associated with proposed RMA activities would generate exhaust emissions from the same sources as existing conditions (e.g., heavy-duty equipment operation, vehicle trips, etc.; see section 6.2.6 above). State Parks is not proposing to increase the number of employees at Carnegie SVRA or the number of SPEOs, meaning that State Parks' capacity to expand the intensity/frequency at which RMA activities are being undertaken would be limited. As such, average daily and annual emissions associated with the proposed RMA activities are anticipated to be similar to existing conditions. Table 6-13 and Table 6-14 compare historical RMA-related emissions to BAAQMD and SJVAPCD thresholds, respectively.

Table 6-13. Average Daily Air Quality Emissions Compared Against BAAQMD Thresholds

Existing Emissions Year	Average Daily Emissions (lbs per day)				
	ROG	CO	NOx	PM_{10}	$PM_{2.5}$
2019	14.9	45.7	6.8	2.6	2.6
2020	15.2	47.4	7.2	2.8	2.8
2021	2.9	7.1	4.4	2.3	2.3
2022	3.4	6.3	3.2	2.1	2.1
Maximum Value	15.2	47.4	10.5	2.8	2.8
BAAQMD Threshold	**54**	**N/A**	**54**	**82**	**54**

Notes: See Appendix D and Table 6-10.

Table 6-14. Annual Air Quality Emissions Compared Against SJVAPCD Thresholds

Existing Emissions Year	Annual Emissions (tons per year)				
	ROG	CO	NOx	PM_{10}	$PM_{2.5}$
2019	1.9	5.9	0.9	0.3	0.3
2020	2.0	6.2	0.9	0.4	0.4

Table 6-14. Annual Air Quality Emissions Compared Against SJVAPCD Thresholds					
Existing Emissions Year	**Annual Emissions (tons per year)**				
	ROG	**CO**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
2021	0.4	0.9	0.6	0.3	0.3
2022	0.4	0.8	0.4	0.3	0.3
Maximum Value	2.0	6.2	1.4	0.4	0.4
SJVAPCD Threshold	**10**	**100**	**10**	**15**	**15**
Notes: See Appendix D and Table 6-9.					

As shown in Table 6-13 and Table 6-14, average daily and annual RMA-Program related emissions would be substantially below BAAQMD and SJVAPCD thresholds.[7] With regards to annual emissions, the pollutant that is closest to a SJVAPCD-recommended threshold is ROG (estimated at 2.0 tons per year). To exceed the SJVAPCD's recommended 10 tons per year threshold for ROG, State Parks would have to increase RMA maintenance activities by a magnitude of approximately 5.0. Similarly, with regards to average daily emissions, the pollutant that is closest to a BAAQMD-recommended threshold is also ROG (estimated at 15.2 pounds per day). State Parks would have to increase equipment and vehicle operations by a factor of up to approximately 3.6 to exceed the BAAQMD's recommended 54 pounds per day threshold for ROG. This is considered unlikely to occur because, of the 24 full-time and 20-30 seasonal staff at Carnegie SVRA, only 2 are certified as State Parks Equipment Operators (SPEOs), and the schedules for the two SPEOs are staggered such that they only overlap one day per week. Per Departmental Notice No. 2016-01,[8] SPEOs are generally the only staff at Carnegie SVRA that may operate the heavy-duty equipment owned or rented by State Parks. Given that State Parks is not proposing to increase staffing nor increase the number of SPEOs at the SVRA, it is very unlikely that RMA activities would increase more than two times above historical levels. For these reasons, potential RMA-related fuel-combustion emissions would be ***less than significant***.

6.3.3.2 Fugitive Dust

Although not included in the PM_{10} and $PM_{2.5}$ emissions estimates presented above, proposed RMA Program activities would not have the potential to increase fugitive dust emissions (including PM_{10} and $PM_{2.5}$) such that an applicable threshold could be exceeded. RMA Program activities (e.g., grading or balancing cut and fill for erosion control purposes) would generate fugitive dust emissions, but these emissions already exist at the SVRA and, as described above, State Parks would need to substantially increase the magnitude of RMA maintenance operations in order to meet or exceed the SJVAPCD's thresholds of significance for annual pollutant emissions. In addition, the BAAQMD's thresholds for fugitive dust are not based on a

[7] As described in Air Quality section 6.2.6, the existing emissions estimates for heavy-duty off-road equipment and State Parks on-road vehicles (e.g., F350s) include activity data (e.g., vehicle miles traveled and fuel consumed) for all activities occurring at the SVRA; not those isolated or limited to RMA activities. Therefore, even if all heavy-duty off-road equipment and on-road vehicles were used solely for RMA activities (i.e., State Parks used the equipment for no other activities, such as maintenance, basin clear out, etc.) emissions would still remain far below applicable thresholds, even if RMA activities increased beyond historical norms.

[8] Departmental Notice No. 2016-01 allows non-SPEO operators to use some pieces of heavy-duty equipment when an SPEO is not reasonably available, as determined by District management.

quantitative limit, but rather compliance with BAAQMD's Basic BMPs for Construction-Related Fugitive Dust Emissions, which DPR incorporates into its projects as a standard practice and has adopted as a guideline in the 2024 General Plan Update (see OM Guideline 6.1 in Appendix C). The implementation of other OM Guidelines (e.g., OM Guidelines 6.4) would further reduce the magnitude of this impact by requiring mitigation measures beyond (i.e., in addition to) those required by the BAAQMD.

For these reasons, fugitive dust emissions that could be generated by the proposed RMA activities would be ***less than significant***.

6.3.3.3 Operational/Long-term Fugitive Dust Emissions

As shown in Table 2-5, under proposed conditions, approximately 169 of the 336 acres of existing distributed riding would be redesignated to trails-only riding. This change in management approach would support the establishment of vegetation in more portions of the SVRA than under current conditions (i.e., because vehicles traveling over the land would not have the potential to disturb or uproot new vegetation), meaning that the SVRA, as a whole, should become less emissive. This impact would be ***less than significant***.

6.3.4 Potential Impacts Related to Receptor Exposure to Substantial Pollutant Concentrations

The proposed RMA Program activities would emit criteria air pollutants and TACs, including DPM, from vehicle and equipment exhaust. DPM is a TAC, and high concentrations of criteria air pollutants may result in potentially significant health risks. Although RMA Program activities such as transporting materials to the SVRA (e.g., vendor deliveries), moving materials within the SVRA (e.g., using pickup trucks and utility vehicles), and operating heavy-duty and small, utility off-road equipment would emit TACs and criteria air pollutants, activities would not result in substantial pollutant concentrations at receptor locations for several reasons, including:

- Construction activities associated with the project would not take place adjacent to any off-site sensitive receptors. As described in section 6.2.4, the nearest off-site sensitive receptor is located approximately 3,200 feet (over half a mile) from the nearest SVRA boundary. Construction activities associated with the proposed RMA activities would take place at distances farther than that, providing exhaust emissions with ample time and space such that they would be at very low concentrations before reaching any sensitive receptor locations.
- As presented in section 6.2.1, daytime winds are generally from the west in Livermore and from the northwest in Tracy (see Figure 6-1 and Figure 6-2). Since Carnegie SVRA is located between the two monitoring stations at which the meteorological data was collected, it is reasonable to expect that daytime winds at Carnegie SVRA are also from the west/northwest. As described in section 6.2.4, the nearest sensitive receptor is located west of the site. Therefore, exhaust and fugitive dust emissions generated by the proposed project would not disperse in the direction of the sensitive receptor, but away from it.
- Construction activities associated with the project would take place intermittently at various geographic locations within the SVRA over the years. Some activities may occur near visitors and park residences; however, prior to beginning new work at a project site new fencing would be installed to exclude all visitor use. All proposed RMA boundaries and project sites are located in the hills, away from camp sites.

Visitor access to project sites would not be opened until the rehabilitated work sites are stabilized and OHV use in the area can resume. Therefore, visitors and park employees would not be exposed to substantial changes in emissions or pollutant concentrations above existing RMA activities. Future RMA Program activities would take place at various locations throughout the SVRA, meaning emissions (and emission concentrations) would be spread out, reducing the magnitude of possible maximum concentration pollutants at any one location.

The proposed project also would not have the potential to result in significant Valley Fever risks. As explained in section 6.2.6.2 neither Alameda County nor San Joaquin County have elevated Valley Fever risks, and State Parks implements fugitive dust control measures consistent with BAAQMD and SJVAPCD requirements that would limit the potential for fugitive dust generation and inhalation of potential *coccidiodes* spores by on- and off-site receptors.

For the reasons described above, the proposed RMA Program project would not generate or expose receptors to substantial adverse pollutant concentrations. This impact would be ***less than significant***.

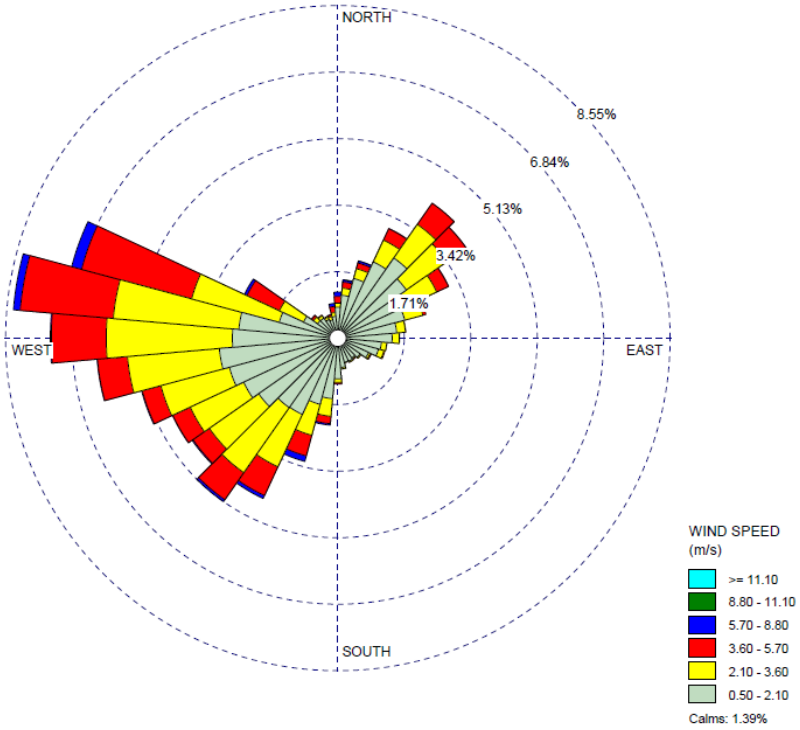
6.4 CUMULATIVE IMPACTS

As described in section 6.3.1, the BAAQMD's and SJVAPCD's thresholds are structured such that project-level impacts would also be cumulatively considerable. Since the proposed project would not result in a significant project-level impact, it would not result in a cumulative impact. Therefore, the proposed RMA Program would have ***no cumulative impact*** on air quality.

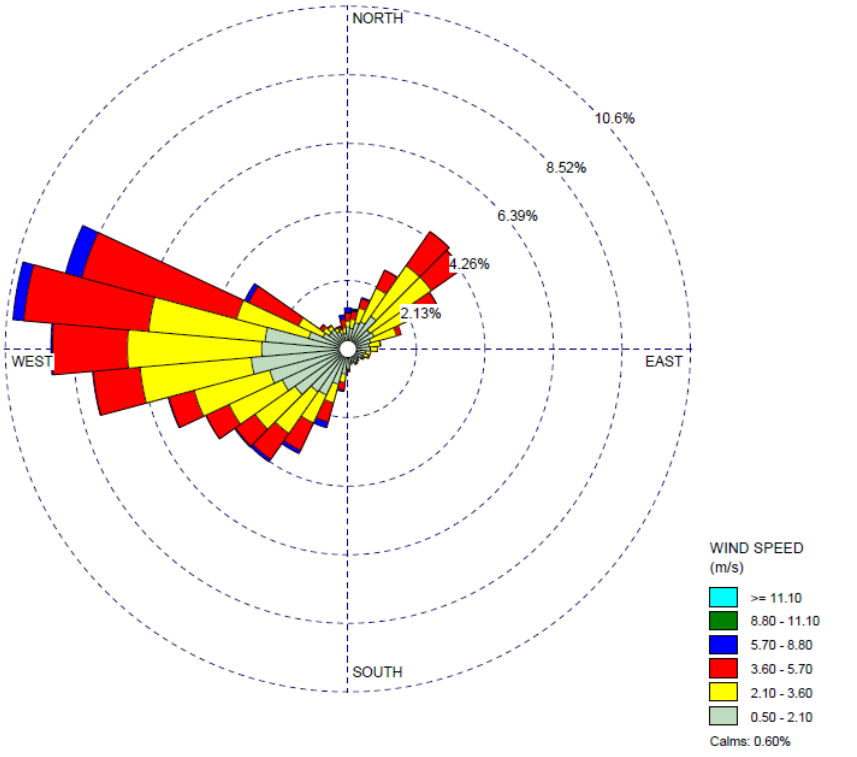
6.5 MITIGATION MEASURES

No significant impacts on air quality have been identified for the project based on the analysis contained in sections 6.3 and 6.4 above. No mitigation is required.

Annual Wind Pattern (2013-2016)



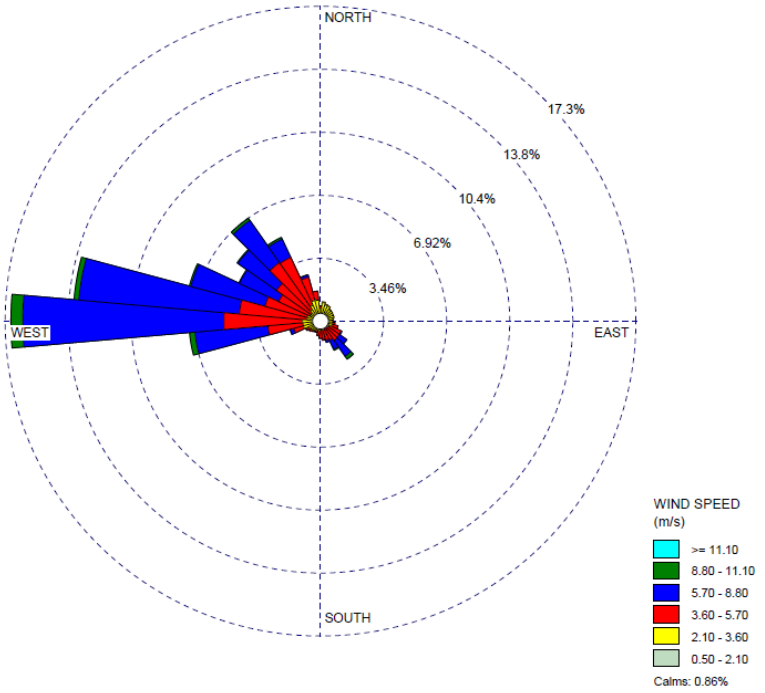
Daytime (7 AM to 7 PM) Wind Pattern (2013-2016)



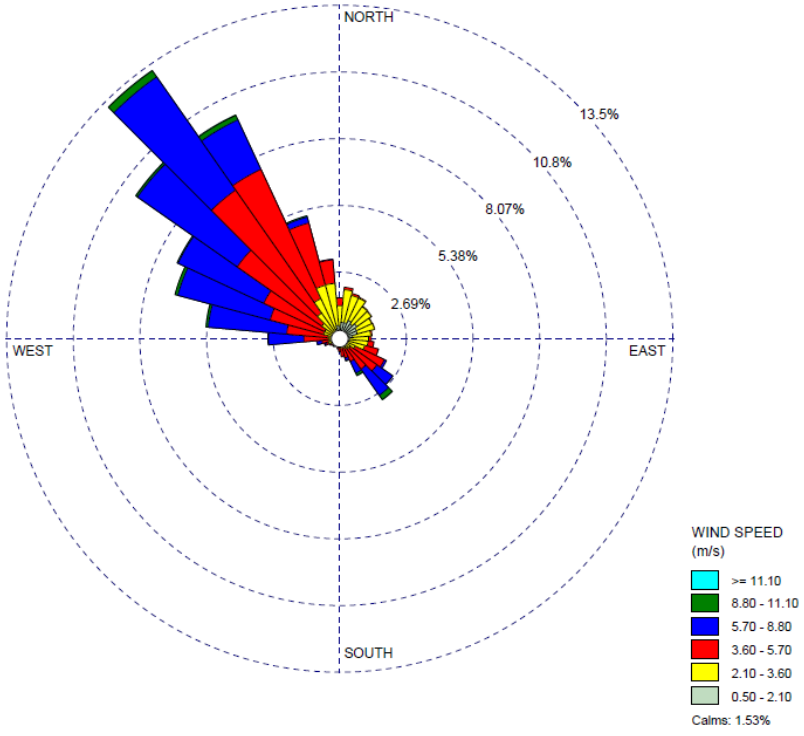
Source: (BAAQMD 2022)

Figure 6-1 Prevailing wind at Livermore Rincon Meteorological Station

Annual Wind Pattern (2004-2008)



Daytime (7 AM to 7 PM) Wind Pattern (2004-2008)



Source: (SJVAPCD n.d.)

Figure 6-2 Prevailing Wind at Tracy Municipal Airport

CHAPTER 7. BIOLOGICAL RESOURCES

7.1 REGULATORY SETTING

7.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973 (16 USC § 1531 *et seq.*), as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under FESA. FESA has the following four major components: (1) provisions for listing species, (2) requirements for consultation with the United States (U.S.) Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), (3) prohibitions against "taking" (i.e., harassing, harming, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct) of listed species, and (4) provisions for permits that authorize take. FESA also discusses recovery plans and the designation of critical habitat for listed species.

Both the USFWS and NOAA Fisheries share the responsibility for administration of FESA. Section 7 requires federal agencies, in consultation with, and with the assistance of the USFWS or NOAA Fisheries, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. Non-federal agencies and private entities can seek authorization for take of federally listed species under Section 10 of FESA, which requires the preparation of a Habitat Conservation Plan (HCP).

7.1.2 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC § 703 *et seq.* Title 50 Code of Federal Regulations [CFR] Part 10) makes it "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill; attempt to take, capture or kill; possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or in part, of any such bird or any part, nest or egg thereof…" In short, under MBTA it is illegal to disturb a nest that is in active use, since this could result in killing a bird, destroying a nest, or destroying an egg. The USFWS enforces MBTA. MBTA does not protect some birds that are non-native or human-introduced or that belong to families that are not covered by any of the conventions implemented by MBTA. A Department of Interior memo dated April 11, 2025, reinstated a 2017 interpretation of the MBTA (Solicitor's Opinion M-37050) determining that the MBTA does not prohibit accidental or incidental taking or killing of migratory birds. This interpretation does not exclude intentional take.

7.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC § 668 *et seq.*) makes it unlawful to import, export, take, sell, purchase, or barter any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), or their parts, products, nests, or eggs. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbance.

Exceptions may be granted by the USFWS for scientific or exhibition use, or for traditional and cultural use by Native Americans. However, no permits may be issued for import, export, or commercial activities involving eagles.

7.1.4 California Endangered Species Act

The California Endangered Species Act (CESA; Fish & Game Code § 2050 *et seq.*), administered by CDFW, generally parallels FESA. It establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. Section 2080 of the California Fish and Game Code prohibits the take, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or regulations. "Take" is defined in Section 86 of the California Fish and Game Code as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." This definition differs from the definition of take under FESA. CESA allows for take incidental to otherwise lawful projects and mandates that state agencies seek to conserve endangered and threatened species and utilize their authority in furtherance of the purposes of CESA.

7.1.5 California Migratory Bird Protection Act

Fish & Game Code section 3513 prohibits taking or possessing all migratory birds (both game and nongame) designated in the MBTA as of January 1, 2025, and any additional migratory bird subsequently designated in the MBTA, except as provided by the Department of the Interior unless the federal rules or regulations are inconsistent with the Fish and Game Code. Section 3513 ensures that prohibitions against both intentional and incidental take provided under the MBTA as of January 1, 2025, will remain in force in California. CDFW does not cite acts prohibited under federal law, including the MBTA, but may cite acts prohibited by CDFW regulations or Fish and Game Code sections 2000, 3513, or other applicable provisions.

7.1.6 Native Plant Protection Act

The Native Plant Protection Act (NPPA) was created in 1977 with the intent to preserve, protect, and enhance rare and endangered plants in California (Fish & Game Code § 1900 *et seq*.). The NPPA is administered by CDFW, which has the authority to designate native plants as endangered or rare and to protect them from take. CDFW maintains a list of plant species that have been officially classified as endangered, threatened or rare. These special-status plants have special protection under California law.

7.1.7 California Fish and Game Code

The California Fish and Game Code protects a variety of species, separate from the protection afforded under CESA, as well as sensitive habitats including lakes and streams.

Fully Protected Species. The classification of California fully protected (CFP) species was CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibians and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. Fish and Game Code sections 5515 for fish, 5050 for amphibian and reptiles, 3511 for birds, and 4700 for mammals deal with CFP species and state that with limited exceptions, these species may not be taken or possessed at any time. This language makes the CFP designation the strongest and most restrictive regarding the take of these species. Take of CFP species may be authorized pursuant to specific statutes including an approved NCCP (Fish & Game Code § 2835; a permit from CDFW for necessary scientific research, including efforts to recover fully

protected, threatened, or endangered species (Fish & Game Code § 2081(a)); and for certain specified infrastructure, renewable energy, or transportation projects (Fish & Game Code § 2081.15).

Nesting Birds. Nesting birds, including raptors, are protected under California Fish and Game Code section 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." In addition, under California Fish and Game Code section 3503.5, "it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Passerines and non-passerine land birds are further protected under California Fish and Game Code section 3513. As such, CDFW typically recommends surveys for nesting birds that could potentially be directly (e.g., actual removal of trees/vegetation) or indirectly (e.g., noise disturbance) impacted by project-related activities. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered take by CDFW.

Non-Game Mammals. Sections 4150-4155 of the California Fish and Game Code protect non-game mammals, including bats. Section 4150 states "A mammal occurring naturally in California that is not a game mammal, fully protected mammal, or fur-bearing mammal is a non-game mammal. A non-game mammal may not be taken or possessed except as provided in this code or in accordance with regulations adopted by the commission." The non-game mammals that may be taken or possessed are primarily those that cause crop or property damage.

Lake or Streambed Alteration. Sections 1600-1607 of the California Fish and Game Code require that a Notification of Lake or Streambed Alteration Agreement (LSAA) application be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW reviews the proposed actions in the application and, if necessary, prepares an LSAA that includes measures to protect affected fish and wildlife resources, including mitigation for impacts on bats and bat habitat.

7.1.8 California Species of Special Concern

California species of special concern (CSSC) is an administrative designation broadly defined as animals not listed under FESA or CESA but which are nonetheless of concern to CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by CDFW, land managers, consulting biologists, and others and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under CEQA during project review.

7.1.9 California Rare Plant Rank

The California Native Plant Society (CNPS), in collaboration with CDFW, prepares and regularly updates an "Inventory of Rare and Endangered Vascular Plants of California." In general, CDFW considers plant species on List 1B (Plants Rare, Threatened, or Endangered in

California and Elsewhere) or List 2 (Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere) of the CNPS Inventory as qualifying as Endangered, Rare or Threatened Species under CEQA (14 CCR § 15380). Species on List 3 (Plants about which we need more information – A Review List) or List 4 (Plants of Limited Distribution – A Watch List) may, but generally do not, qualify as such.

7.1.10 Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities and habitats that are unique in constituent components, of relatively limited distribution in the region, or of particularly high wildlife value. These communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies, or regulations or by CDFW (e.g., California Natural Diversity Database [CNDDB]) or USFWS. CNDDB identifies a number of natural communities as rare, which are given the highest inventory priority (CDFW 2026a). Impacts on sensitive natural communities and habitats must be considered and evaluated under CEQA Guidelines Appendix G.

7.1.11 SPRs for Biological Resources

DPR implements SPRs for general biological resources, plants, and wildlife. SPRs are briefly noted below and fully presented in Appendix B. All equipment must be clean before entering or leaving a work site to prevent the spread of noxious weeds. All new or modified trails would be consistent with the State Parks Trail Manual guidelines. At DPR discretion, project activities would be monitored to ensure that impacts to special-status species are minimized. Signs would be posted as needed for work sites closed for more than three months.

Construction personnel must be trained on the life history of the special-status species relevant to the project site, work constraints, and any other pertinent information related to the species. At the discretion of the Environmental Scientist, project activities would be monitored to ensure that impacts to special-status species are minimized.

Special-status or locally rare plant species would be flagged and avoided with a 100-foot buffer. BMPs to avoid creation of dust would be employed during all construction activities within 100 feet of special-status plants or locally rare plants. Prior to the start of on-site construction activities and when the plants are in a phenological stage conducive to positive identification, a DPR-approved botanist would conduct surveys for special-status and locally rare plant species with the potential to occur in the project work area. Prior to the start of on-site construction activities, a DPR-approved biologist would flag and fence sensitive plant communities and jurisdictional waters within 100 feet of the project area to avoid impacts. DPR would employ BMPs for erosion control to avoid runoff of project-related sediments, vehicle fluids, and other liquids into sensitive plant communities.

Project activities would avoid or minimize impacts to federally protected wetlands and other jurisdictional waters to the extent practicable by conducting work in upland areas.

Trees are to be protected from encroachment of project activity. A DPR-approved biologist, forester, or certified arborist must be present during all ground-disturbing activities within the specified area of trees. Trenching near root zones must be done by hand and no roots over two inches in diameter may be cut. Plant material used for revegetation must be sourced from Carnegie SVRA or from the same ecological region, elevation, and site characteristics as the site to be revegetated to protect genetic integrity.

If feasible, DPR would initiate all RMA Program work between September 16 and January 31 to avoid impacts to nesting birds. If work is required during the nesting bird season (February 1-September 15) a DPR-approved biologist would conduct a survey to identify active nests[9] within the project's area of disturbance including staging and storage areas plus a 250-foot (passerines) and 1,000-foot (raptor nests) buffer around these areas. If active nest(s) are found during the nesting bird survey, no construction would occur within these buffers during the nesting bird season or until the young have fledged, as determined by a DPR-approved biologist. If individuals or other recent signs of special-status animals are observed within 500 feet of the project work site, a DPR-approved biologist would be present on the site to monitor during construction activities at his/her discretion. Immediately prior to the start of work each morning, a DPR-approved biologist would conduct a visual inspection of the work site. If a special-status species is found on the project site, work must be delayed until the species moves out of the way on its own or is relocated by an appropriate biologist (depending on the listing status of the species). To prevent trapping of wildlife, all holes and trenches would be covered at the close of each working day with plywood or similar materials or would include escape ramps constructed of earth fill or wooden planks; all pipes would be capped. DPR would not remove any trees equal to or greater than four-inches diameter-at-breast-height (DBH) unless first inspected by a DPR-approved biologist and determined to be unsuitable as habitat for roosting bats.

7.1.12 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Goals and Guidelines addressing water, natural resources management, plants, and wildlife. Water Goal 1, Natural Resources Management Goal 1 and Goal 2, Plant Goal 1 and Wildlife Goal 1, and associated guidelines are relevant to the RMA Program and identify DPR actions to protect these biological resources. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

7.2 ENVIRONMENTAL SETTING

This section describes existing biological resources in Carnegie SVRA, including vegetation communities, common wildlife species, special-status plant and animal species, sensitive vegetation communities, jurisdictional waters and habitats, and wildlife movement and nursery sites.

7.2.1 Background Review

Available background information pertaining to the biological resources on and near Carnegie SVRA were reviewed. The following sources were consulted:

- CNDDB 12-USGS quadrangle record search including: *Midway*, *Byron Hot Springs*, *Clifton Court Forebay*, *Union Island*, *Tracy*, *Lone Tree Creek*, *Mount Boardman*, *Eylar Mountain*, *Mount Day*, *Mendenhall Springs*, *Cedar Mountain.*, and *Altamont* (CDFW 2026a). Three additional USGS quadrangles were included in the record search since the project area spans two USGS quadrangles.

[9] Active nesting is present if a bird is building a nest, sitting in a nest, a nest has eggs or chicks in it, or adults are observed carrying food to the nest.

- CNPS Rare Plant Program *Inventory of Rare and Endangered Plants of California* 12-USGS quadrangle record search, including: *Midway*, *Byron Hot Springs*, *Clifton Court Forebay*, *Union Island*, *Tracy*, *Lone Tree Creek*, *Mount Boardman*, *Eylar Mountain*, *Mount Day*, *Mendenhall Springs*, *Cedar Mountain*, and *Altamont* (CNPS 2026a).
- A Manual of California Vegetation (CNPS 2026b).
- CNDDB for natural communities of special concern that occur within the project region (CDFW 2026a).
- Information for Planning and Consultation (IPaC) tool (USFWS, IPaC Resource List. 2026).
- eBird Database – Information on Distribution of Birds (Cornell Lab of Ornithology 2026).
- Other relevant scientific literature, technical reports, technical databases, resource agency reports, and Federal Register notices and other information published by USFWS to assess the current distribution of special-status plants and animals in the project vicinity.

Additionally, the following technical reports and other data sources prepared for Carnegie SVRA were reviewed:

- *Vegetation Classification and Mapping Report for Carnegie SVRA.* Prepared by Melissa Patten, Environmental Scientist, Natural Resources Division, California State Parks on July 1, 2022 (DPR 2022b).
- *Carnegie State Vehicular Recreation Area Rare Plant and Native Grassland Survey Report*. Prepared by MIG, Inc. for Carnegie State Vehicular Recreation Area in October 2021 (MIG, Inc. 2021a)
- *Habitat Use by Mountain Lions at Carnegie State Vehicular Recreation Area in Alameda and San Joaquin Counties, California.* Prepared by MIG, Inc. for Carnegie State Vehicular Recreation Area in October 2020 and updated in June 2021 (MIG, Inc. 2021b).
- *Rodent Diversity and Population Dynamics in an Off-highway Vehicle Area*. Prepared by MIG for Carnegie State Vehicular Recreation Area in December 2020 (MIG, Inc. 2020).
- Data collected from annual wildlife surveys as part of Carnegie SVRA WHPP, including amphibian and avian surveys.
- *Carnegie State Vehicular Recreation Area, Alameda and San Joaquin Counties, California. Delineation of State and Federal Jurisdictional Waters* (Michael Baker International 2016).

7.2.2 Vegetation Communities, Habitats, and Land Cover Types

Carnegie SVRA is located within the San Francisco Bay Area and Central Coast Subregions of the Central Western Californian Region, both of which are contained within the larger California Floristic Province (Baldwin, et al. 2012). The SVRA was mapped in 2021 by State Parks using CDFW's Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2026b). Additionally, a 2021 survey of the project area mapped an additional native grassland alliance as defined by VegCAMP (MIG, Inc. 2021a). Based on data from these three surveys, the project area contains 17 vegetation alliances,

associations, and land cover types, which are listed, along with acreages, in Table 7-1, and their distribution is depicted in Figure 7-1 Vegetation Communities, Habitats, and Land Cover Types.

The information below is also consistent with what is presented in the General Plan Update, except that the names of some of the communities are revised slightly to match the VegCAMP alliance and association names, and the nonnative grassland community was reclassified according to the VegCAMP alliance that it falls into (it was previously mapped using an older classification system).

7.2.2.1 Woodland/Forest Communities

California Juniper Woodland (*Juniperus californica* Alliance). This type is mapped in areas where California juniper (*Juniperus californica*) cover is dominant (>50% relative cover) in the tree stratum, with blue oak (*Quercus douglasii*) as the second highest cover. At Carnegie SVRA, juniper is often mixed with blue oak, but there are only a few small stands where juniper cover is higher than blue oak. California Juniper Woodland occupies 13.9 acres of Carnegie SVRA.

California Buckeye Groves (*Aesculus californica* Alliance). This type is mapped when California buckeye (*Aesculus californica*) is dominant in the tree canopy. Blue oak may also be present. The shrub layer is sparse and the herbaceous layer is generally dominated by non-native grasses, with native forbs present in the spring. California Buckeye Groves occupy 2.9 acres of Carnegie SVRA.

Blue Oak Woodland and Forest (*Quercus douglasii* Alliance). Blue Oak Woodland and Forest (*Quercus douglasii* Alliance) was mapped at a finer scale within Carnegie SVRA, to the association level, as described below. Blue Oak Woodland and Forest occupies 245.2 acres of Carnegie SVRA.

Mixed Herbaceous Association (Blue Oak / Grass; *Quercus douglasii*). This type is mapped where blue oaks occur over a grassy or herbaceous understory. Blue oak is the dominant species in the tree stratum, but California juniper and California buckeye are also present at low cover. If buckeye reaches >30% relative cover, see the Blue Oak – Buckeye Association. The canopy may be intermittent to continuous, or savannah-like, where tree cover is as low as 5% absolute cover, but is spatially consistent. The shrub layer is <10% (if higher, see the Blue Oak / Shrub Association), and is usually dominated by California sagebrush (*Artemisia californica*). The understory is herbaceous, generally dominated by non-native grasses with native forbs present in the spring.

Grass Association (Blue Oak – Buckeye; *Quercus douglasii – Aesculus californica*). This type is mapped when blue oaks and buckeyes are co-dominant in the tree canopy, with a similar understory as in the Blue Oak / Grass Association. If buckeye relative cover is >50%, the area was mapped as California Buckeye Groves (see above).

Blue Oak / Shrub (*Quercus douglasii / Ericameria linearifolia* Association). This type is mapped when blue oaks are dominant in the tree stratum and are >10% absolute cover, and there is significant (>10%) shrub cover in the understory. At Carnegie SVRA, the shrubs in the understory for this type are most commonly California sagebrush, and black sage (*Salvia mellifera*). Narrowleaf goldenbush (*Ericameria linearifolia*) is sometimes present at low cover, as is chaparral honeysuckle (*Lonicera subspicata* var. *denudata*). This is the most appropriate association for this vegetation type currently defined in VegCAMP, although its documented occurrences usually have higher cover of narrowleaf goldenbush than California sagebrush in the shrub layer (Buck-Diaz and Evens 2011, CNPS 2026b).

Table 7-1. Summary of Vegetation Communities, Habitats, and Land Cover Types in the Project Area

Vegetation/ Land Cover Type	NVCS Name	Rarity Ranking (if known)	Sensitive?	Common name map label	Total Acres
Tree Overstory (Woodland/ Forest) Vegetation	*Juniperus californica* Alliance	G4 S4	No	California Juniper Woodland	13.9
	Aesculus californica Alliance	G3 S3	**Yes**	California Buckeye Groves	2.9
	**Quercus douglasii* Alliance				
	• *Quercus douglasii* / Mixed herbaceous Association		No	Blue Oak / Grass	194.4
	• *Quercus douglasii* - *Aesculus californica* / grass Association		No	Blue Oak - Buckeye	13.3
	• *Quercus douglasii* / *Ericameria linearifolia* Association		No	Blue oak / Shrub	37.5
	Populus fremontii - *Fraxinus velutina* - *Salix gooddingii* Alliance	G4 S3	**Yes**	Fremont Cottonwood Forest and Woodland	35.4
Shrubland Vegetation	**Rhus trilobata* - *Crataegus rivularis* - *Forestiera pubescens* Alliance				
	• *Forestiera pubescens* Provisional Association	G1 S1 or G2 S2	**Yes**	Desert Olive Patches	9.6
	Baccharis salicifolia Alliance	G5 S4	No	Mulefat Thickets	12.3
	Malacothamnus fasciculatus – *Malacothamnus* spp. Alliance	G4 S4	No	Bush Mallow Scrub	60.9
	**Salvia mellifera* Alliance				
	• *Salvia mellifera* – *Artemisia californica-Malosma laurina* Association		No	Black Sage - California Sagebrush	195.9
	• *Salvia mellifera* – *Malacothamnus fasciculatus* Association	G3 S3	**Yes**	Black sage - Bush Mallow	21.1
	**Artemisia californica – (Salvia leucophylla)* shrubland alliance				
	• *Artemisia californica* Association	G4 S4	no	California Sagebrush	49.8
Herbaceous Vegetation	*Avena* spp. – *Bromus* spp. Semi-Natural Alliance			Wild Oats and Annual Brome Grassland	761.8
	**Nassella spp – Melica* spp. Alliance				
	• *Nassella pulchra* – *Avena* spp. – *Bromus* spp. Association	G3 S3	**Yes**	Purple Needlegrass Grassland	1.5
Non-Vegetated	• Barren			Barren	11.1
	• Developed			Developed	90.1
	• Water			Water	0.3
SUM					**1,512**

* Alliances with asterisk are included in the table for classification clarity, although they are not displayed as mapping units on the map.

Fremont Cottonwood Forest and Woodland (*Populus fremontii - Fraxinus velutina - Salix gooddingii* Alliance). This wetland type is characterized by Fremont cottonwood (*Populus fremontii*) in the tree layer. The shrub canopy is absent or may have sparse cover of mulefat (*Baccharis salicifolia*). The herbaceous layer may be sparse to intermittent and tends to be weedy. This type occurs along Corral Hollow Creek, which is seasonally wet. Cottonwoods must be at least 5% absolute cover in order to meet the membership rules of this alliance. The alliance is mapped in patchy stands since cottonwood cover is not consistently high enough along the entire creek corridor to qualify as a stand. Fremont Cottonwood Forest and Woodland occupies 35.4 acres of Carnegie SVRA.

7.2.2.2 Shrubland Communities

Basket Bush-River Hawthorn-Desert Olive Patches (*Rhus trilobata - Crataegus rivularis - Forestiera pubescens* Alliance). This semi-wetland type occurs in draws and drainages at the park, often extending up adjacent slopes. At Carnegie SVRA, stands of this type are strongly dominated by desert olive (*Forestiera pubescens)*, and correspond to the *Forestiera pubescens* Provisional Association (Desert Olive Patches). Other species include elderberry (*Sambucus nigra* ssp. *caerulea*), coyote brush (*Baccharis pilularis*), and poison oak (*Toxicodendron diversilobum*). The shrub canopy is dense and there is little herbaceous understory. Desert Olive Patches occupy 9.6 acres of Carnegie SVRA.

Mulefat Thickets (*Baccharis salicifolia* Alliance). This wetland type is mapped in Corral Hollow Creek, in between Fremont cottonwood stands. Shrub cover is sparse and patchy, and the herbaceous layer may be sparse to intermittent and tends to be weedy. Tree tobacco (*Nicotiana glauca*), a non-native invasive species, may be present in more disturbed areas. California poppy (*Eschscholzia californica*) patches are characteristic in the spring. Mulefat Thickets occupy 12.3 acres of Carnegie SVRA.

Bush Mallow Scrub (*Malacothanmus fasciculatus - Malacothamnus* spp. Alliance). This shrub alliance is mapped in areas where bush mallow (*Malacothamnus* spp.) is strongly dominant (>60% relative cover). Yerba santa (*Eriodictyon californicum*) and bush monkeyflower (*Diplacus aurantiacus*) may occur at low cover. Note that unfurled bush mallow (*Malacothamnus fremontii*) is the species of bush mallow that occurs at Carnegie SVRA, and chaparral bush mallow (*Malacothamnus fasciculatus*) is not present at the park. The herbaceous layer is sparse but may include non-native grasses or fire-following forbs. At Carnegie SVRA, this type was observed on slopes that had burned in the June 2019 Hollow fire, two years prior to surveys. Bush Mallow Scrub occupies 60.9 acres of Carnegie SVRA.

Black Sage Scrub (*Salvia mellifera* Alliance). Black Sage Scrub (*Salvia mellifera* Alliance) was mapped at a finer scale within Carnegie SVRA, to the association level, as described below. Black Sage Scrub occupies 217 acres of Carnegie SVRA, mostly Black Sage-California Sagebrush.

Black Sage – California Sagebrush (*Salvia mellifera - Artemisia californica -Malosma laurina* Association). This shrub alliance is mapped when black sage (*Salvia mellifera*) and California sagebrush (*Artemisia californica*) together add up to >60% cover. Bush mallow (*Malacothamnus fremontii*) may also be present at lower cover, or the three species may have nearly equal cover in the shrub canopy. Generally, more bush mallow is present in areas that burned more recently, and over time following a fire the community shifts to higher proportions of black sage and California sagebrush. The herbaceous layer is sparse and consists mostly of non-native grasses.

Black Sage – Bush Mallow (*Salvia mellifera - Malacothamnus fasciculatus* Association). This shrub association is mapped when black sage (*Salvia mellifera*) and bush mallow (*Malacothamnus fremontii*) together add up to >60% relative cover. California sagebrush (*Artemisia californica*) may be present at lower cover. At Carnegie SVRA, this type was observed on slopes that had burned in the August 2015 Tesla fire, six years prior to surveys. The herbaceous layer is sparse and consists mostly of non-native grasses.

California Sagebrush - (Purple Sage) Scrub (*Artemesia californica* – (*Salvia leucophylla*) Alliance). California Sagebrush - (Purple Sage) Scrub was mapped at a finer scale within Carnegie SVRA, to the association level, as described below. California sagebrush - (Purple Sage) Scrub occupies 49.8 acres of Carnegie SVRA, all the *Artemisia californica* Association.

California Sagebrush (*Artemisia californica* Association). This shrub association is mapped when California sagebrush is >60% relative cover in the shrub layer. Note that although this association is within the *Artemisia californica - (Salvia leucophylla)* Alliance, purple sage (*Salvia leucophylla*) is not present at Carnegie SVRA. The herbaceous layer is sparse to dense and consists of non-native grasses and native forbs.

7.2.2.3 Herbaceous Communities

Wild Oats and Annual Brome Grasslands (*Avena* spp. – *Bromus* spp. Semi-Natural Alliance). Most of the grassland at the park is mapped as this type, except for the native stand described above. Most of the park is dominated by non-native grasses including bromes (*Bromus* spp.), and wild oats (*Avena* spp.). However, in less disturbed areas there are native forbs which are especially evident in the spring, including fiddlenecks (*Amsinckia* spp.), blue dicks (*Dipterostemon capitatus*), Ithuriel's spear (*Triteleia laxa*), lupines (*Lupinus* spp.), California goldfields (*Lasthenia californica*), California plantain (*Plantago erecta*), and others. This community was called the California annual and perennial grassland macrogroup in the General Plan Update,but was changed to match the VegCAMP Alliance name and mapping in this DEIR. Wild Oats and Annual Brome Grasslands occupy 761.8 acres of Carnegie SVRA.

Needlegrass – Melic Grass Grassland (*Nassella* spp. – *Melica* spp. Alliance). Needlegrass – Melic Grass Grassland was mapped at a finer scale within Carnegie SVRA, to the association level, as described below. Needlegrass – Melic Grass Grassland occupies 1.5 acres of Carnegie SVRA, all the *Nassella pulchra – Avena* spp. – *Bromus* spp. Association.

***Nassella pulchra– Avena* spp. – *Bromus* spp. Association.** This association is an herbaceous vegetation community that is found in rehabilitation areas within Carnegie SVRA. Purple needlegrass (*Stipa (Nassella*) pulchra) is co-dominant with non-native grasses or characteristically present with cover ranging from 2 to 50%. Non-native grasses include foxtail barley (*Hordeum murinum*), foxtail brome (*Bromus madritensis*), soft brome (*Bromus hordeaceus*), and slender oat (*Avena barbata*). Native grasses observed included one-sided bluegrass (*Poa secunda*) and small fescue (F*estuca microstachys*). In general, these areas generally have a higher cover of non-native herbs with some native herbs present. Native herbs observed included blue dicks (*Dipterostemon capitatus*), common fiddleneck (*Amsinckia intermedia*), and Ithuriel's spear (*Triteleia laxa*). Non-native herbs observed included black mustard (*Brassica nigra*) and rough cat's ear (*Hypochaeris radicata*). Scattered trees and shrubs were present and included California matchweed (*Gutierrezia californica*), California sagebrush, and blue oak (MIG, Inc. 2021a).

7.2.2.4 Non-vegetated Land Covers

Barren. Polygons were designated "Barren" when there was <2% vegetation cover on native substrate across the minimum mapping unit of 1 acre. This land cover type covers approximately 11 acres of Carnegie SVRA.

Developed. Developed areas include roads, buildings, parking lots, tracks, and campgrounds and covers approximately 90 acres of Carnegie SVRA.

Open Water. There are a few designated ponds in the park but only one had visible standing water in the 2020 aerial imagery. Years with more rainfall may have more water polygons. Water covers approximately 0.3 acre of Carnegie SVRA. However, there is also an intermittent stream (Corral Hollow Creek), ephemeral streams, sediment basins, and freshwater wetlands in the SVRA that don't show up on an aerial as open water. See section 7.2.6 below for more information on these aquatic features.

7.2.3 Common Wildlife

In addition to the special-status wildlife species that are known to inhabit or may inhabit Carnegie SVRA (described below), a variety of common native wildlife species have been observed during regular survey and monitoring efforts making use (e.g., nesting, foraging, commuting) of the SVRA and its vegetation communities, habitats, and landcover types. Those common species that have been commonly observed in the SVRA include, but are not limited to, the following species:

- Northern pacific rattlesnake (*Crotalus oreganus*)
- Western fence lizard (*Sceloporus occidentalis*)
- Western whiptail (*Cnemidophorus tigris*)
- Pacific chorus frog (*Pseudacris regilla*)
- American robin (*Turdus migratorius*)
- Acorn woodpecker (*Melanerpes formicivorus*)
- House finch (*Carpodacus mexicanus*)
- Common raven (*Corvus corax*)
- California scrub jay (*Aphelocoma californica*)
- California quail (*Callipepla californica*)
- California thrasher (*Toxostoma redivivium*)
- Western meadowlark (*Sturnella neglecta*)
- Oak titmouse (*Baeolophus inornatus*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Black-tailed jackrabbit (*Lepus californicus*)
- Coyote (*Canis latrans*)
- Mule deer (*Odocoileus hemionus*)

Roosting Bats. Small maternity colonies or small numbers of non-reproductive common species, such as the California myotis (*Myotis californicus*) and big brown bat (*Eptesicus fuscus*) may occasionally roost in cavities and crevices in trees, buildings, rock outcrops, and cave habitat in Carnegie SVRA. Roost sites play a critical role in mating, hibernation, rearing young, conserving energy, and protection from adverse weather and predators (Kunz 1982). Maternity roosts tend to have sensitivity to disturbance, with documented instances of abandonment even during the presence of flightless young. In California, maternity roosts may remain active from April through August.

Nesting Birds. Dozens of species of birds have been observed within Carnegie SVRA and surrounding area (Cornell Lab of Ornithology 2026). Many species may nest within trees, shrubs, open grassland, shallow scrapes on bare ground, and man-made structures in and around the SVRA. The nesting bird season for most species in the area is February 1 – September 15.

7.2.4 Special-Status Species

Special-status species are those plants and animals that are legally protected or otherwise recognized as vulnerable to habitat loss or population decline by federal, state, or local resource conservation agencies and organizations. For the purposes of this EIR, special-status species include species:

- Listed, proposed for listing, or a candidate for possible future listing as threatened or endangered under FESA;
- Listed or a candidate for listing as threatened or endangered under CESA;
- Designated as rare under NPPA;
- Designated as a CFP Species;
- Designated as a CSSC; and
- Designated as a CRPR 1-4 species.

MIG performed an on-site habitat assessment and a review of available information on special-status species documented from the project region to evaluate the potential for them to occur based on the presence or absence of suitable habitat in Carnegie SVRA. As described in section 7.2.1 above, review of information included: 1) a search of the CNDDB and CNPS Rare Plant Inventory for records of species occurring within a search area of 12 USGS quadrangles where the proposed project is located including the surrounding area; 2) a species list created for the project using the USFWS IPaC online tool; 3) citizen science observations from iNaturalist and eBird; and 4) technical reports prepared specifically for Carnegie SVRA.

7.2.4.1 Special-Status Plants

Based on a review of USFWS, CNPS, and CNDDB databases, technical reports and other data sources, the biologist's knowledge of sensitive species, and an assessment of the types of habitats within Carnegie SVRA, numerous special-status plant species are documented in the USGS 12-quadrangle area that encompasses the SVRA and surrounding areas.

The General Plan Update Table 2-9 and Table 2-10 list special-status plant species documented within the SVRA or within 5 miles of the SVRA (see Appendix E). Five of the special-status plant species that are documented in the region are known to be present in the SVRA, and an additional ten species have the potential to occur in the SVRA based on the presence of essential habitat requirements for the species and/or the SVRA's location being within the species' known range of distribution. The legal status, habitat requirements, blooming period, and known presence or potential presence in the SVRA and surrounding areas are presented in Table 7-2. The distribution of the special-status plants known to occur in the SVRA are shown in Figure 7-2.

Multiple species identified in the General Plan species lists are not expected to occur in the Carnegie SVRA for one of the following reasons: the Carnegie SVRA is outside of the known geographic range of the species, there are no recent records of the species in Alameda or San Joaquin counties (since 2000), the species was not detected during the 2016 floristic inventory

(Kramer 2016) or the 2021 rare plant survey in the project area (MIG, Inc. 2021a) and/or there is no suitable habitat in the SVRA such as vernal pools or serpentine substrate.

Several additional species listed in General Plan Update Table 2-10 are excluded from Table 7-2 below based on updated information. Round-leaved filaree (*California macrophyllum*) is no longer a CRPR species. Dwarf cudweed (*Hesperevax caulescens*, CRPR 4.2), small-flowered morning glory (*Convolvulus simulans,* CRPR 4.2), and Douglas' fiddleneck (*Amsinckia douglasiana,* CRPR 4.2) are listed as occurring in Carnegie SVRA/Alameda-Tesla property from the 2016 floristic inventory by Neal Kramer; however, this is a database error. These species were not observed. Finally, a Southern black walnut (*Juglans californica*, CRPR 4.2) was observed as occurring in Carnegie SVRA/Alameda-Tesla property in 2003 but is noted as an ornamental/non-native (EcoSystems West Consulting Group 2004).

Table 7-2. Special-Status Plants Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activity Sites

Species	Listing Status	Habitat and Bloom Period	Comments
Santa Clara thorn mint *Acanthomintha lanceolata*	CRPR 4.2	Annual herb that occurs in rocky outcrops on slopes, sometimes serpentine, in chaparral and cismontane woodland plant communities. Blooms from March to June.	**May be Present.** There have been numerous documented occurrences since 2000. There are also 30 occurrences before 2000 for this species from Alameda and San Joaquin Counties with the most recent occurrence from 1998 (Calflora 2026). This species was documented in the Alameda-Tesla Property during the 2016 floristic inventory (Kramer 2016) and 2021 rare plant survey (MIG, Inc. 2021a) on steep southwest-facing slopes composed of decomposing hard shale substrate in the California sagebrush, black sage scrub, blue oak woodland and forest, and California juniper woodland vegetation communities, but not in Carnegie SVRA.
Large-flowered fiddleneck *Amsinckia grandiflora*	FE, SE, CRPR 1B.1	Annual herb that occurs on grassy slopes in cismontane woodland, and valley and foothill grassland. Blooms from March to May	**May be Present.** Within Alameda County there are two documented occurrences since 2000 and no occurrences since 2000 from San Joaquin County (Calflora 2026). There are at least four documented occurrences before 2000 for this species from Alameda and San Joaquin Counties with the most recent occurrence from 1995 at Site 300 near the Property (Calflora 2026). This species was not detected during the 2016 floristic inventory (Kramer 2016) or the 2021 rare plant survey (MIG, Inc. 2021a) in Carnegie SVRA or the Alameda-Tesla Property.
California androsace *Androsace elongata* ssp. *acuta*	CRPR 4.2	Annual herb that occurs on slopes in cismontane woodland, grassland, and chaparral, often on rocky substrate. Blooms from March to June.	**May be Present.** Within Alameda and San Joaquin counties, there are numerous documented occurrences since 2000 (Calflora 2026). This species was documented in the Alameda-Tesla Property during the 2016 floristic inventory, but not from Carnegie SVRA (Kramer 2016).

Table 7-2. Special-Status Plants Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activity Sites

Species	Listing Status	Habitat and Bloom Period	Comments
Big tarweed *Blepharizonia plumosa*	CRPR 1B.1	Annual herb that occurs on dry slopes, often in disturbed areas, in valley and foothill grassland. Blooms from July to October.	**May be Present.** Within Alameda County, there are several documented occurrences since 2000 (Calflora 2026). There are no documented occurrences since 2000 in San Joaquin County (Calflora 2026). This species was documented growing in the wild oats and brome grassland vegetation community in 2016 (Kramer 2016) and 2021 (MIG, Inc. 2021a) in the Alameda-Tesla Property, but not from Carnegie SVRA.
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	CRPR 1B.2	Perennial herb that grows on slopes (sometimes in mesic areas) within chaparral, coast scrub, and cismontane woodlands. The blooming period for this species extends from April to June.	**Present.** Within Alameda County, there are four documented occurrences since 2000 from the Alameda- Tesla Property, Carnegie SVRA, and the Ohlone Regional Wilderness (EcoSystems West Consulting Group 2004) (Kramer 2016) (Calflora 2026). This species was observed growing at Carnegie SVRA on the banks along drainages in Carrol Canyon and Kiln Canyon during the 2021 rare plant survey in the California sagebrush, and black sage -bush mallow scrub vegetation communities (MIG, Inc. 2021a).
Jepson's woolly sunflower *Eriophyllum jepsonii*	CRPR 4.3	Perennial subshrub herb that occurs in oak woodland and chaparral plant communities, sometimes on serpentine substrate. The blooming period for this species extends from April to June.	**Present.** Within Alameda County, there have been numerous documented occurrences since 2000, including one 2003 occurrence from the Alameda-Tesla Property (EcoSystems West Consulting Group 2004, Calflora 2026). There are no documented occurrences in San Joaquin County (Calflora 2026). This species was observed growing in Carnegie SVRA during the 2016 floristic inventory (Kramer 2016) and the 2021 rare plant survey (MIG, Inc. 2021a) on moderate to steep north-facing slopes in open grassy areas in California sagebrush, black sage scrub, and blue oak woodland and forest vegetation communities.
Diamond petaled California poppy *Eschscholzia rhombipetala*	CRPR 1B.1	Annual herb that occurs in valley and foothill grassland plant communities in alkaline clay soils. The blooming period for this species extends from March to April.	**May be Present.** Within Alameda County, there have been two documented occurrences since 2000, both from Site 300 (Calflora 2026). There are no documented occurrences since 2000 in San Joaquin County (Calflora 2026). There are four occurrences before 2000 in Alameda and San Joaquin counties with the most recent occurrence from 1997 at Site 300 (Calflora 2026). This species was not detected during the 2016 floristic inventory (Kramer 2016) or the 2021 rare plant survey (MIG, Inc. 2021a) in Carnegie SVRA or the Alameda-Tesla Property.

Table 7-2. Special-Status Plants Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activity Sites

Species	Listing Status	Habitat and Bloom Period	Comments
Stinkbells *Fritillaria agrestis*	CRPR 4.2	Perennial bulbiferous herb that occurs in clay and sometimes serpentine substrate in chaparral cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland plant communities. The blooming period for this species extends from March to June.	**Present.** Within Alameda County, there have been numerous documented occurrences since 2000, including recent occurrences from 2021, 2022 and 2023 from the Alameda-Tesla property (MIG, Inc. 2021a, Calflora 2026). There are no documented occurrences from San Joaquin County (Calflora 2026). This species was not observed in Carnegie SVRA during the 2016 floristic inventory (Kramer 2016) and the 2021 rare plant survey (MIG, Inc. 2021a). However, in 2019 an undocumented single individual was observed in Carnegie SVRA growing in the open grassland understory of the blue oak woodland and forest vegetation community adjacent to the Franciscan Loop Trail (Gallagher, D. pers. observation 2019).
Phloxleaf bedstraw *Galium andrewsii* ssp. *gatense*	CRPR 4.2	Perennial herb that occurs in dry, rocky places, often in serpentine soil, in chaparral or open oak/pine woodland. The blooming period for this species extends from April to July.	**May be Present.** Within Alameda County there have been numerous documented occurrences since 2000, including a 2016 occurrence on the Alameda-Tesla Property (Kramer 2016). There are no documented occurrences from San Joaquin County (Calflora 2026). This species was not detected in Carnegie SVRA or the Alameda-Tesla Property during the 2021 rare plant survey (MIG, Inc. 2021a).
Brewer's western flax *Hesperolinon breweri*	CRPR 1B.2	Annual herb that occurs in foothill woodland, chaparral, valley grassland communities. The blooming period for this species extends from May to July.	**May be Present.** This species was documented in the Alameda-Tesla Property in 2014 (TRA Environmental Sciences, Inc. 2014) but was not observed during the 2016 floristic inventory or the 2021 rare plant survey of Carnegie SVRA and the Alameda-Tesla Property (Kramer 2016) (MIG, Inc. 2021a, Calflora 2026). The species has not been documented in Alameda or San Joaquin counties, other than the one 2014 occurrence from the Alameda-Tesla Property (TRA Environmental Sciences, Inc. 2014).
Forked hareleaf *Lagophylla dichotoma*	CRPR 1B.1	Annual herb that occurs in openings in foothill woodland, valley grassland communities. The blooming period for this species extends from April to June.	**May be Present.** There is one documented occurrence of this species from Alameda County and no documented occurrences from San Joaquin County (Calflora 2026). This species was observed in 2003 within Carnegie SVRA and the Alameda-Tesla Property (EcoSystems West Consulting Group 2004).This species was not detected during the 2016 floristic inventory (Kramer 2016) or the 2021 rare plant survey (MIG, Inc. 2021a) in Carnegie SVRA or the Alameda-Tesla Property.

Table 7-2. Special-Status Plants Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activity Sites

Species	Listing Status	Habitat and Bloom Period	Comments
Sylvan microseris *Microseris sylvatic*	CRPR 4.2	Perennial herb that occurs in open areas in chaparral; pinyon and juniper woodland; cismontane woodland; and valley and foothill grassland vegetation communities. The blooming period for this species extends from March to June.	**Present.** Within Alameda County there is one documented occurrence from 2003 in the Alameda-Tesla Property (EcoSystems West Consulting Group 2004). There are no documented occurrences from San Joaquin County (Calflora 2026). During the 2016 floristic inventory, at least 30 individuals were observed in the Alameda-Tesla Property near Hidden Pond where they were growing in the wild oats and annual brome grassland vegetation community (Kramer 2016). Additionally, in 2019 an undocumented single individual was observed in Carnegie SVRA growing in the open grassland understory of the blue oak woodland and forest vegetation community adjacent to the Franciscan Loop Trail (Gallagher, D. pers. observation 2019).
Michael's rein orchid *Piperia michaelii*	CRPR 4.2	Perennial herb that occurs in dry sites within foothill woodland; coastal shrub and prairie; and closed-cone coniferous and mixed evergreen forests. The blooming period for this species extends from April to August.	**May be Present.** Within Alameda County, there are three documented occurrences since 2000, including a 2016 occurrence from the Alameda-Tesla Property (Kramer 2016) and a 2023 occurrence southwest of Carnegie SVRA (Calflora 2026). There are seven occurrences before 2000 for this species from Alameda County with the most recent occurrence from 1999 in Albany Hill Park (Calflora 2026). A small population of five individuals was observed in the Alameda-Tesla Property, adjacent to upper Corral Hollow Creek during the 2016 floristic survey, growing in the Fremont cottonwood forest and woodland vegetation community (Kramer 2016). This species was not detected during the 2021 rare plant survey in Carnegie SVRA or the Alameda-Tesla Property (MIG, Inc. 2021a).
Chaparral harebell *Ravenella exigua*	CRPR 1B.2	Annual herb that occurs on dry slopes, often in disturbed areas, in valley and foothill grassland. Blooms from February to May.	**Present.** Within Alameda County, there are three documented occurrences since 2000 and no documented occurrences from San Joaquin County (Calflora 2026). There are 12 occurrences before 2000 for this species from Alameda County with the most recent occurrence from 1995 at Los Mochos Boy Scout Camp, east of Ohlone Regional Wilderness (Calflora 2026). This species was observed at Carnegie SVRA at two locations near the upper Franciscan Loop Trail during the 2016 floristic inventory, growing in the black sage-bush mallow vegetation community that had burned the previous year (Kramer 2016). It is not known whether this species is a strict fire follower, appearing only immediately after a fire for a few years or the species is always present, but is much more abundant after a fire. During the 2021 rare plant survey this species was not observed at the same locations (MIG, Inc. 2021a). Regardless, the seed bank is likely still present at both locations.

Table 7-2. Special-Status Plants Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activity Sites

Species	Listing Status	Habitat and Bloom Period	Comments
California ragwort *Senecio aphanactis*	CRPR 2B.2	Annual herb that occurs on drying, alkaline flats and dry, open rocky areas in cismontane woodland and chaparral. The blooming period for this species extends from January to April.	**May be Present.** Within Alameda County there are two documented occurrences since 2000 and there are no documented occurrences since 2000 from San Joaquin County (Calflora 2026). There are five occurrences before 2000 for this species from Alameda and San Joaquin Counties with the most recent occurrence from 1998 at Almeda-Tesla Property (Calflora 2026). This species was also documented in 2003 in the Alameda-Tesla Property (Ecosystems West 2004). This species was not detected during the 2016 floristic inventory (Kramer 2016) or the 2021 rare plant survey (MIG, Inc. 2021a) in Carnegie SVRA or the Alameda-Tesla Property.

Key to Listing Status Abbreviations: Federally Endangered (FE); State Endangered (SE); California Rare Plant Rank (CRPR). CRPR 1B = Plants rare, threatened, or endangered in California and elsewhere; CRPR 4 = Plants of limited distribution-a watch list; 0.1 = seriously threatened in California; 0.2 = moderately threatened in California; 0.3 = not very threatened in California

7.2.4.2 Locally Rare Plant Species

In addition to the designations described above, CEQA requires that impacts to "resources that are rare or unique to that region" be evaluated (CEQA Guidelines 15125[c]). This includes, but is not limited to, botanical resources that are peripheral populations, disjunct subpopulations, sensitive, declining, or have a restricted distribution. These are informal terms that refer to those species that might be declining or need concentrated conservation actions to prevent decline or extirpation but have no legal protection of their own. Also, CEQA Guidelines Section 15380 states "a species not included in any listing…shall nevertheless be considered to be rare or Endangered if the species is likely to become Endangered within the foreseeable future throughout all or a significant portion of its range and may be considered Threatened as that term is used in the FESA."

The East Bay chapter of CNPS, since 1989, has developed and maintains a Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties which tracks populations of locally rare and statewide rare plants which have limited distribution in Alameda and Contra Costa counties, including many that reach their range limit in these two counties (CNPS East Bay 2026). The following identifies rarity rankings in the Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties:

- *A: Species in Alameda and Contra Costa counties listed as rare, threatened or endangered statewide by federal or state agencies, or by state CNPS (includes *A1, *A1x, and *A2 species).
- A1: Species known from two or fewer botanical regions in Alameda and Contra Costa Counties, either currently or historically (includes *A1 and A1 species).
- A1x: Species previously known from Alameda or Contra Costa Counties, but now believed to have been extirpated, and no longer occurring here (includes *A1x and A1x species).

- A1?: Species possibly occurring in Alameda or Contra Costa counties but there are questions about their identification or location.
- A2: Species currently known from three to five regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc. (includes *A2 and A2 species).
- B: A High-Priority Watch List: Species currently known from 6 to 9 regions in the two counties, or, if more, meeting other important criteria as described above for A2.
- C: A Second-Priority Watch List: Species currently known from 10 to 15 regions in the two counties, but potentially threatened if certain conditions persist such as over-development, water diversions, excessive grazing, and/or weed or insect invasions, etc.

Species not listed as rare, threatened or endangered statewide by federal or state agencies, or have a CRPR rank are not regarded as special-status species by the USFWS or CDFW and are therefore not tracked by these agencies. However, all locally rare A-ranked species that are not classified as special-status should be considered under CEQA guidelines for planning purposes and to support CNPS's goal of preserving plant biodiversity on a regional and local scale.

The 2016 floristic inventory detected 20 A-ranked locally rare species (that are not classified as special-status) in Carnegie SVRA and the adjacent Alameda-Tesla Property (Kramer 2016). An additional seven A-ranked locally rare species (that are not classified as special-status) may also be present in Carnegie SVRA. These locally rare species are listed in Table 7-3.

Table 7-3. Locally Rare Plants (Rank A) Observed or Potentially Present in Carnegie SVRA and the Alameda-Tesla Property

Scientific Name	Common Name	Rank	Location Observed
Allium crispum	crinkled onion	A1	Carnegie SVRA
Amsinckia vernicosa	Waxy fiddleneck	A1	May be Present
Astragalus didymocarpus var. *didymocarpus*	two-seeded milkvetch	A1	Carnegie SVRA
Athysanus unilateralis	heterodraba	A1	May be Present
Caulanthus flavescens	yellow-flowered thelypodium	A2	May be Present
Elymus elymoides var. *elymoides*	squirreltail	A1	Alameda-Tesla Property
Epilobium cleistogamum	cleistogamous boisduvalia	A1	Alameda-Tesla Property
Eremalche exilis	white mallow	A1	Alameda-Tesla Property
Eremalche parryi ssp. *parryi*	Parry's mallow	A1	May be Present
Eremothera boothii ssp. *decorticans*	shredding evening primrose	A1	May be Present

Table 7-3. Locally Rare Plants (Rank A) Observed or Potentially Present in Carnegie SVRA and the Alameda-Tesla Property

Scientific Name	Common Name	Rank	Location Observed
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat	A1	Alameda-Tesla Property
Eriogonum fasciculatum var. *polifolium*	Mojave desert California buckwheat	A1	Carnegie SVRA
Eriogonum nudum var. *pauciflorum*	little-flower wild buckwheat	A1	Alameda-Tesla Property
Erythranthe nasuta	shy monkeyflower	A2	May be Present
Hesperolinon disjunctum	dwarf flax	A1	Alameda-Tesla Property
Heterotheca oregona var. *scaberrima*	Oregon false goldenaster	A1	Carnegie SVRA
Holozonia filipes	whitecrown	A1	Alameda-Tesla Property
Silene antirrhina	sleepy catchfly	A1	Alameda-Tesla Property
Delphinium parryi subsp. *parryi*	Parry's larkspur	A2	Alameda-Tesla Property
Elatine californica	waterwort	A2	Alameda-Tesla Property
Eriogonum roseum	wand wild buckwheat	A2	Alameda-Tesla Property
Lasthenia microglossa	small-ray goldfields	A2	Alameda-Tesla Property
Lasthenia minor	coastal goldfields	A1	May be Present
Mentzelia micrantha	small-flowered stick-leaf	A1	Carnegie SVRA
Nuttallanthus texanus	blue toadflax	A2	Alameda-Tesla Property
Perideridia oregana	yampah	A2	Alameda-Tesla Property
Ribes aureum var. *gracillimum*	golden currant	A2	Carnegie SVRA

Key to Ranking Codes: A1 = Species known from two or fewer botanical regions in Alameda and Contra Costa Counties, either currently or historically (includes *A1 and A1 species); A2 = Species currently known from three to five regions in the two counties, or, if more, meeting other important criteria such as rare statewide, small populations, stressed or declining populations, small geographical range, limited or threatened habitat, etc. (includes *A2 and A2 species).

7.2.4.3 Special-Status Animals

Based on a review of the USFWS and CNDDB databases, technical reports and other data sources, the biologists' knowledge of special-status species, and an assessment of the types of habitats within Carnegie SVRA, numerous special-status animal species are documented in the USGS 12-quadrangle area that encompasses the SVRA and surrounding areas. Many of the special-status animal species that are documented in the region are either present in the SVRA or have potential to occur in the SVRA based on the presence of essential habitat requirements for the species, the presence of known occurrences within the SVRA, and/or the SVRA is within the species' known range of distribution. The legal status, habitat requirements, and known presence or potential presence in the SVRA and surrounding areas are presented in Table 7-4.

Several other special-status species have been observed in Carnegie SVRA or have some potential to occur in the SVRA only as migrants or occasional visitors but are not expected to breed or make substantial use of the SVRA. These species include bank swallow (*Riparia riparia,* listed as Threatened under CESA [ST]), tricolored blackbird (*Agelaius tricolor,* ST and California Species of Special Concern [CSSC]), Vaux's swift (*Chaetura vauxi*, CSSC), olive-sided flycatcher (*Conpus cooperi*, CSSC), and bald eagle (*Haliaeetus leucocephalus*, listed as Endangered under CESA [SE], California Fully Protected [CFP]). These species are included in Table 7-4 as well.

Some special-status animals found during the database and report search are not expected to occur in Carnegie SVRA because it lacks suitable habitat, is outside the known range of the species, and/or is isolated from the nearest known extant populations by development or otherwise unsuitable habitat. Special-status animals that are known to occur in the region but not expected to occur in the SVRA for these reasons include the vernal pool fairy shrimp (*Branchinecta lynchi,* listed as Threatened under FESA [FT]), vernal pool tadpole shrimp (*Lepidurus packardi,* listed as Endangered under FESA [FE]), longhorn fairy shrimp (*Branchinecta longiantenna*, FE), and riparian brush rabbit (*Sylvilagus bachmani riparius*, FE and SE). The western bumble bee (*Bombus occidentalis*, state Candidate for Listing [SC]) and least Bell's vireo (*Vireo bellii pusillus*, FE and SE) occurred in the region historically but have both undergone range contractions and do not occur in the region any longer. The western bumble bee has not been detected in the project vicinity since the 1950s and is now considered to only occur at high elevation sites in the Sierra Nevada (Bumble Bee Watch 2024, CDFW 2026a). The least Bell's vireo formerly occurred throughout much of the state but is now restricted to southern California (USFWS 1998). Special-status animal species that are not expected to occur within or near the SVRA were excluded from this analysis.

Critical Habitat/Essential Fish Habitat (EFH). Carnegie SVRA is within designated critical habitat for the Alameda whipsnake (Unit 5a) and the California red-legged frog (Unit ALA-2). There is no EFH within the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Invertebrates			
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Adults and larvae are dependent on elderberry (*Sambucus spp.*), which occurs in riparian forests, savannah, and adjacent grassland habitats. Adults and larvae feed on elderberry foliage, and possibly flowers. Adults lay eggs in bark crevices on the plant where larva develop and grow.	**Present.** Suitable elderberry host plants are present in Carnegie SVRA, and boreholes indicating presence of the species were detected during focused surveys in the SVRA in 2021 (DPR 2021). This species is considered to be present in the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Monarch butterfly *Danaus plexippus*	FPT	Found in wide variety of habitat types but reproduction is dependent on the presence of milkweed, the sole food source of larvae. Winter roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**May be Present.** There are no CNDDB or iNaturalist records of this species in or near the Carnegie SVRA, though it is on the IPaC species list for the SVRA (USFWS 2026). There is no winter roosting habitat in the SVRA, although milkweed is present in the SVRA. Nectar sources are present in the SVRA, and this species may occur there as an occasional visitor.
Crotch's bumble bee *Bombus crotchii*	SC	Grassland and scrub habitats supporting abundant floral resources from spring through fall, and undisturbed nesting and overwintering sites. Nests are underground in abandoned holes created by small mammals, or occasionally in bird nests, but may also nest under logs and other woody debris (Xerces Society for Invertebrate Conservation 2018). Overwintering habitat is poorly understood but overwintering queens may overwinter under leaf litter and small cavities in the ground (Osborne, et al. 2008).	**May be Present.** Suitable grassland and scrub habitats that would provide suitable nesting and foraging habitat are present in Carnegie SVRA. There are no recent occurrences of this species in the SVRA, but this species was recently detected in the Tracy area in 2023 (Bumble Bee Watch 2024).
Amphibians and Reptiles			
California tiger salamander *Ambystoma californiense*	FT, ST	Vernal pools or temporarily ponded environments in annual grasslands or open woodlands. Adults occupy upland burrows during the dry season and breed in nearby seasonal ponds during the wet season.	**Present.** Carnegie SVRA supports breeding, foraging, and upland refugia and dispersal habitat, and adults and larvae have been observed in two of the nine ponds, Tyson's pond and Juniper pond during annual WHPP monitoring surveys (DPR 2024a). CTS are also well documented in the surrounding project region including the Alameda-Tesla Property to the west (DPR In preparation, CDFW 2026a),.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Western spadefoot *Spea hammondii*	FPT, CSSC	Lives in underground earth-filled burrows and breeds in shallow, natural and artificial temporary pools in mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains.	**Present.** Suitable breeding, foraging, and upland refugia and dispersal habitat for western spadefoot are present in Carnegie SVRA. Western spadefoot tadpoles have been documented in seasonal pools formed in low-lying areas along and within Corral Hollow Creek. Also, juvenile and adult spadefoots have been documented in Tyson's basin and upland areas up to 0.2 miles from Corral Hollow Creek (de Silva 2019, CDFW 2026a).
Foothill yellow-legged frog *Rana boylii*	FC, SE	Partially shaded to unshaded, rocky perennial streams and rivers, intermittent creeks, and ponds at low to moderate elevations.	**Present.** Suitable stream habitat is present in Corral Hollow Creek, which flows through Carnegie SVRA. This species was detected in 2000 and 2014 in Corral Hollow Creek on the Alameda-Tesla Property to the west (DPR 2015). However, foothill yellow-legged frogs are likely extirpated in the section of lower Corral Hollow Creek that flows through the SVRA since there are no documented occurrences since 2014. That said, the potential for this species to occupy stream habitat on the site cannot be entirely ruled out.
California red-legged frog *Rana draytonii*	FT, CSSC	Perennial and seasonal streams, freshwater pools, and ponds with emergent or overhanging vegetation. May travel up to one mile from aquatic habitat (Stebbins and McGinnis 2012).	**Present.** Carnegie SVRA supports breeding, foraging, and upland refugia and dispersal habitat for California red-legged frog. California red-legged frog have also been documented in Corral Hollow Creek, several sediment basins (ponds), ephemeral drainages, and freshwater wetlands within the project site (DPR In preparation, CDFW 2026a). California red-legged frog may also be present in upland areas of the SVRA, which may be used as refugia or dispersal habitat. The project site is located within Critical Habitat Unit ALA-2 for the California red-legged Frog (USFWS 2010).

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Pond turtle:[10] Northwestern pond turtle *Actinemys marmorata* and Southwestern pond turtle *Actinemys pallida*	FPT, CSSC	Ponds, lakes, rivers, streams, marshes, brackish lagoons and irrigation ditches with aquatic vegetation and open areas for basking. Nests and aestivates in upland areas with open in woodland, forest, grassland, and chaparral. Nests are constructed in upland habitats, in clay or silty soils in unshaded areas such as grasslands usually up to 600 feet from aquatic habitat (Jennings and Hayes 1994).	**Present.** Suitable breeding, foraging, and dispersal aquatic habitat are present in Carnegie SVRA, particularly in existing ponds (sediment basins), Corral Hollow Creek, Kiln and Carrol canyons, including the surrounding upland areas. Pond turtles are known from Corral Hollow Creek, approximately 2 miles and 3.5 miles from the SVRA, respectively (DPR 2001, CDFW 2026a). They have also been observed in Kiln Canyon within the SVRA (CDFW 2026a).
Coast horned lizard *Phrynosoma blainvillii*	CSSC	Open areas of sandy or loose soil and low vegetation in grasslands, coniferous forests, woodlands, and chaparral. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads.	**May be Present.** Suitable habitat is present in open areas with sandy soil, including grassland, scrub, and woodland vegetation communities, as well as along Corral Hollow Creek within Carnegie SVRA. The species is known from Site 300 adjacent to the SVRA and near lower Corral Creek approximately 2 miles upstream of the SVRA (ECORP Consulting, Inc. 2021a, CDFW 2026a).
Northern California legless lizard *Anniella pulchra*	CSSC	Moist warm loose soil in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks.	**May be Present.** Northern legless lizard could occur in sparsely vegetated moist areas with sandy soils in Carnegie SVRA, including along ephemeral drainages, around ponds, as well as along Corral Hollow Creek. The species has been documented between 2000 and 2003, and more recently in 2020 within 2 miles from the SVRA (ECORP Consulting, Inc. 2021a, CDFW 2026a).

[10] The area of the Central Valley between the American River drainage and the Transverse Ranges is considered a zone of intergradation between the two pond turtle species (Seeliger 1945, Spinks and Shaffer 2005). Carnegie SVRA falls within this intergradation zone, and in this EIR, "pond turtle" refers to both northwestern pond turtle and southwestern pond turtle unless otherwise stated.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
California glossy snake *Arizona elegans occidentalis*	CSSC	Spends the day in underground burrows or under rocks and uses its specialized nose to make its own burrows in arid scrub, rocky washes, grasslands, chaparral, especially open areas with soil loose enough for easy burrowing.	**Present.** Suitable habitat is present in open grassland areas, and along Corral Hollow Creek within Carnegie SVRA. There are several documented occurrences of California glossy snake along Corral Hollow Road, including within the SVRA, and the species was detected in 2021 from a skin at Site 300 adjacent to the SVRA (ECORP Consulting, Inc. 2021a, CDFW 2026a).
San Joaquin coachwhip *Masticophis flagellum ruddocki*	CSSC	Open, dry, treeless areas with little or no cover in grassland and saltbush scrub vegetation communities. Takes refuge in rodent burrows, shaded areas, and surface objects.	**May be Present.** Suitable grassland habitat is present in Carnegie SVRA. This species has been detected in the SVRA (DPR 2015). The species has also been detected at Site 300 in the 1990s, early 2000s, and during recent surveys in 2021 at Site 300 directly north of the SVRA (ECORP Consulting, Inc. 2021a, CDFW 2026a).
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT, ST	Open to partially open, low-growing shrub communities such as coastal sage scrub and chaparral with rodent burrows or rocky crevices (Stebbins and McGinnis 2012). Also occurs in grasslands, oak savanna, and oak-bay open woodlands near coastal sage scrub and chaparral.	**May be Present.** The scrub and grassland vegetation communities within Carnegie SVRA provide suitable habitat for Alameda whipsnake. The SVRA is within designated critical habitat for the species. There is one documented occurrence of the Alameda whipsnake in the SVRA from 2003 (CDFW 2026a). However, this species has not been observed recently. The species has also been documented at Site 300 to the north as recently as 2021, and on Tesla /Corral Hollow Road approximately 3 miles west of SVRA (ECORP Consulting, Inc. 2021a, CDFW 2026a). With the exception of 2021 surveys, most occurrences were described to be intercrosses with California striped racer.
Birds			
Golden eagle *Aquila chrysaetos*	CFP	Nests in a range of open habitats, including desert scrub, foothill cismontane woodlands, and annual or perennial grasslands on cliffs or in large trees, and infrequently on electrical towers.	**May be Present.** Carnegie SVRA contains suitable hilly terrain, woodland nesting habitat, and open grassland foraging habitat for golden eagles. Golden eagles are not known to nest in the SVRA, but they are known to nest in the Alameda-Tesla property, and there are numerous documented occurrences from the Diablo Range in Alameda and San Joaquin counties, including the SVRA (DPR 2016, DPR 2024a, Cornell Lab of Ornithology 2026). Based on the presence of suitable nesting and foraging habitat in the SVRA, and documented occurrence in the region, golden eagles may nest in the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Swainson's Hawk *Buteo swainsoni*	ST	Strongly associated with riparian woodlands and forest (especially in the Central Valley) that provide suitable nesting habitat (typically large trees), in proximity to high-quality foraging habitats including livestock pasture, grassland, or grain fields.	**May be Present.** Carnegie SVRA contains suitable riparian woodland and forest nesting habitat along Corral Hollow Creek, as well as suitable adjacent grassland foraging habitat for Swainson's hawk. Within the SVRA, Swainson's hawks have been observed during HMS avian point count surveys, but they have not been documented breeding in the project area (DPR 2016). The four closest CNDDB occurrences of Swainson's hawk in the project vicinity are in the Livermore and Tracy area (CDFW 2026a). The species is also well-documented in Corral Hollow and surrounding areas (Cornell Lab of Ornithology 2026). Based on presence of suitable nesting and foraging habitat and known occurrence of this species in the SVRA and in the region, this species could potentially nest in or adjacent to the SVRA.
Northern harrier *Circus hudsonius*	CSSC (nesting)	Nests in marshes and grasslands with tall vegetation and sufficient moisture to inhibit accessibility of nest sites to predators.	**Present.** Northern harriers have been regularly detected in Carnegie SVRA during HMS avian point count surveys and in the project region (DPR 2016, Cornell Lab of Ornithology 2026). Due to the presence of grassland habitat and documented occurrences of the species in the SVRA and project vicinity, the northern harrier may forage and nest in the SVRA.
White-tailed kite *Elanus leucurus*	CFP	Occurs in grasslands, agricultural fields, woodlands, and other open habitats, and nests in snags, shrubs, trees, or other similar nesting substrates.	**Present.** Carnegie SVRA contains suitable woodland and forest nesting and grassland foraging habitat for white-tailed kite. There are numerous documented occurrences of white-tailed kite from the Diablo Range in Alameda and San Joaquin counties (Cornell Lab of Ornithology 2026, CDFW 2026a), and they have been detected in the SVRA during HMS avian point count surveys in 2011 and 2015 (DPR 2016). Based on documented occurrences in the SVRA and region, and the presence of suitable nesting and foraging habitat in the SVRA, white-tailed kite may nest and forage in the SVRA.
Bald eagle *Haliaeetus leucocephalus*	SE, CFP	Nests in tall, sturdy trees at sites that are close to aquatic foraging areas and isolated from human activities, though nesting has occurred on large trees in urban parks.	**Absent as Breeder.** There is no suitable nesting or foraging habitat for bald eagles in Carnegie SVRA, but they have been observed flying over the SVRA during HMS point count surveys and more generally in the project region (DPR 2016, Cornell Lab of Ornithology 2026). Therefore, bald eagles are not expected to nest or otherwise make substantial use of habitats within the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Long-eared owl *Asio otus*	CSSC (nesting)	Nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. Require dense cover for nesting and roosting. Typically build nests in old corvid or hawk nests, but also in arboreal woodrat nests and mistletoe amongst dense cover. May also nest on the ground. Forage in open areas such as grassland.	**May be Present.** Carnegie SVRA contains suitable woodland and forest nesting and grassland foraging habitat for long-eared owl. Based on documented occurrences in Alameda and San Joaquin counties (Audubon 1997, Cornell Lab of Ornithology 2026), and the presence of suitable nesting and foraging habitat in the SVRA, long-eared owl may nest in the SVRA.
Burrowing owl *Athene cunicularia*	SC	Nests and roosts in open grasslands and open habitats with suitable burrows, usually those made by California ground squirrels (*Spermophilus beecheyi*).	**Present.** Grassland habitat in Carnegie SVRA provides suitable nesting, foraging, and roosting habitat for burrowing owl. There are many documented occurrences of burrowing owl from the Diablo Range in Alameda and San Joaquin Counties, including three occurrences in the SVRA during HMS avian point count surveys in 2014, 2015, and 2024 (DPR 2016). Burrowing owls are also well documented on LLNL Site 300 lands to the north (CDFW 2026a). Additionally, burrows of the California ground squirrel are common and widespread in the grassland vegetation communities within the SVRA. Based on the availability of suitable burrowing owl habitat in the SVRA and adjacent areas, burrowing owl may occur within the SVRA at any time during the year.
Vaux's swift *Chaetura vauxi*	CSSC (nesting)	Nests in cavities in a variety of trees, most commonly in burned-out and hollow coast redwood snags or stumps; less frequently in artificial structures, particularly chimneys.	**Absent as Breeder.** No suitable nesting habitat is present within Carnegie SVRA. Vaux's swifts are occasionally observed in the project region and have been observed in the SVRA during HMS avian point count surveys (DPR 2016). Due to the absence of suitable nesting habitat, this species is expected to occur in the SVRA as an infrequent visitor.
Olive-sided flycatcher *Contopus cooperi*	CSSC	This species breeds primarily in late-successional coniferous forests and forages mostly in openings or at forest edges.	**Absent as Breeder.** Olive-sided flycatcher was observed in Carnegie SVRA during HMS surveys in 2011 (DPR 2016), but the SVRA does not contain the species' preferred breeding habitat, so it is not expected to nest in the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Loggerhead shrike *Lanius ludovicianus*	CSSC (nesting)	Occurs in open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt. Nests in densely foliated shrubs or trees.	**Present.** There is suitable nesting and foraging grassland, open shrubland, and open woodland habitats in Carnegie SVRA. There are numerous documented observations of loggerhead shrikes in the SVRA during HMS avian point count surveys between 2010 and 2015 (DPR 2016), as well as other areas in Kiln Canyon in 2025 (Cornell Lab of Ornithology 2026). Based on documented occurrences in the SVRA and the presence of suitable nesting and foraging habitat in the SVRA, loggerhead shrike may nest in the SVRA.
Bank swallow *Riparia riparia*	ST	Nests in colonies in burrows of eroding vertical banks and bluffs of rivers and streams.	**Present.** Bank swallows are regularly observed during HMS avian point count surveys (DPR 2016). Suitable nesting habitat is present, and bank swallows have nested along the banks of a historic stock pond in Carnegie SVRA, but the exact location is unknown (DPR 2015). However, no breeding colonies are currently known to occur in the SVRA.
Grasshopper Sparrow *Ammodramus savannarum*	CSSC (nesting)	Occurs in extensive moderately open grasslands with few or no shrubs. Also breeds and forages in meadows, fallow fields, and pastures.	**Present.** Carnegie SVRA contains large areas of suitable grassland nesting and foraging habitat for grasshopper sparrows. Grasshopper sparrows have been detected during HMS avian point count surveys in 2011, 2012, 2014, and 2015 (DPR 2016). They have been detected within the Diablo Range in Alameda and San Joaquin Counties (CDFW 2026a, Cornell Lab of Ornithology 2026). This species may breed in the SVRA.
Yellow-breasted chat *Icteria virens*	CSSC (nesting)	Breeds in early successional riparian habitat with a well-developed, dense shrub layer and open canopy	**Present.** There is suitable nesting riparian habitat in Carnegie SVRA, particularly along Kiln and Carrol canyons. The SVRA is just outside of the known breeding range for yellow-breasted chat. The species has been detected in Kiln Canyon in 1995, 2010, and 2020 (Cornell Lab of Ornithology 2026). They have also been documented in the broader region in the Diablo Range in Alameda and San Joaquin counties (Cornell Lab of Ornithology 2026). Based on documented occurrences in the SVRA and in the region, the yellow-breasted chat could potentially nest in areas of suitable habitat in the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Tricolored blackbird *Agelaius tricolor*	ST, CSSC	Nests in tall, dense stands of cattails or tules, but also nests in blackberry (*Rubus sp*.), wild rose (*Rosa sp*.) bushes, and tall herbs usually near fresh water. Outside the breeding season forages in open grasslands and agricultural lands.	**Absent as breeder.** Carnegie SVRA contains ostensibly suitable breeding and foraging habitat, primarily along Corral Hollow Creek and adjacent uplands, but breeding colonies have not been observed in the SVRA. A small flock of 21 birds was observed in 2018 and a single bird was observed in 1995 (Cornell Lab of Ornithology 2026). Annual HMS avian point count surveys have not detected individuals or breeding colonies (DPR 2016). A breeding colony is known from Elk Creek approximately 2 miles north at Site 300 (Paterson and Woollett 2014). However, based on the available data, tricolored blackbirds are an infrequent visitor in the SVRA but are not expected to breed there.
Yellow warbler *Setophaga petechia*	CSSC (nesting)	Nests in dense, shrubby understory and open canopy in riparian corridors.	**Present.** Suitable riparian nesting habitat is present in Carnegie SVRA. This species was detected during HMS avian point count surveys in 2010, 2011, 2013, 2014, and 2015 (DPR 2016). The species is also well documented in the region (Cornell Lab of Ornithology 2026). Thus, this species could nest in the SVRA.
Mammals			
Pallid bat *Antrozous pallidus*	CSSC	Roosts in caves, rock outcrops, buildings, bridges, and tree hollows, cavities, and crevices. Forages over a variety of habitats.	**Present.** Suitable roosting habitat is present in Carnegie SVRA in Lime Kiln Cave, and potentially in rock outcrops and large-diameter trees with suitably large crevices or cavities. Pallid bats have been observed night-roosting outside restroom facilities in the SVRA, and they have been detected acoustically at Lime Kiln Cave and Tyson's Pond in 2014 and 2016 (The Wildlife Project 2014, 2016). This species was also detected acoustically during ongoing acoustic surveys in 2023 at the Tesla Mine area to the west (MIG, Inc. 2024).

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
Townsend's big-eared bat *Corynorhinus townsendii*	CSSC	Roosts in caves, lava tubes, mine tunnels, and occasionally in large basal hollows of trees such as redwoods, abandoned buildings, bridges with cave-like in a variety of habitats. Large foraging range and typically forages over open scrub and grassland habitats	**Present.** Townsend's big-eared bats have not been detected during acoustic or visual encounter surveys in Carnegie SVRA in 2014 (The Wildlife Project 2014) or 2016 (The Wildlife Project 2016). The species is known to occur historically and currently at the Tesla Mine area to the west (The Wildlife Project 2014, MIG, Inc. 2024). Suitable roosting habitat is present in the SVRA in Lime Kiln Cave, and potentially in rock outcrops with suitably large cavities. Based on their known occurrence in the project area and the presence of suitable roosting habitat, this species may breed in the SVRA.
Western red bat *Lasiurus frantzii* (Previously known as *L. blossevilli*)	CSSC	Non-colonial species roosts in tree foliage in forests and woodlands, especially in and near mature stands of cottonwood and sycamore riparian habitat (Pierson et al. 2006).	**Present.** The western red bat was detected in Carnegie SVRA during acoustic surveys in 2016 (The Wildlife Project 2016). This species has also been acoustically detected to the north on the LLNL Site 300 property (Garcia and Associates 2017, Pierson, Rainey and Corben 2004, Wyatt 2021). Suitable foliage roosting habitat is present along Corral Hollow Creek and near the Franciscan Loop Trail in the Dead Cow Canyon area. Breeding believed to be concentrated in the Central Valley (Pierson, Rainey and Corben 2004). The species may breed in riparian habitat associated with Corral Hollow Creek in the SVRA.
Western mastiff bat *Eumops perotis*	CSSC	Roosts and forms small maternity colonies in steep rocky habitats such as exfoliating rock slabs (e.g., granite, sandstone or columnar basalt and crevices in rock outcrops. Also roosts in rock quarries and buildings high above the ground. Forages over open areas such as grassland and scrub habitats.	**Present.** This species was detected in Carnegie SVRA during acoustic monitoring in 2016 (The Wildlife Project 2016). The mastiff bat has also been recently detected to the north on the LLNL Site 300 property (Wyatt 2021), and in the early 1990s on Site 300 property to the east (CDFW 2026a). Rocky outcrop habitat in the SVRA may support maternity colonies and this species may forage over the SVRA.

Table 7-4. Special-Status Animals Present or Potentially Present in Carnegie SVRA Proposed RMA Program Activities Sites

Species	Listing Status	Habitat	Comments
San Joaquin kit fox *Vulpes macrotis mutica*	FE, ST	Found in a variety of habitats including low-lying swamps and wetlands, arid deserts, high-elevation coniferous forests, and equatorial rainforests	**May be Present.** There is one 2002 occurrence of the San Joaquin kit fox near the southern boundary of Carnegie SVRA near the Los Osos Trail (CDFW 2026a). This observation was incidental in nature. This species has also been detected in the project region within 5 miles of the site; however, these observations are more than 29 years old.. Additionally, a trail camera study in the adjacent Alameda-Tesla Property did not detect kit fox in over 70,000 videos (MIG, Inc. 2021b). Likewise, ongoing scat detection studies since 2002 at Lawrence Livermore Lab's Site 300 immediately north of the site, have not detected kit fox (Working Dogs for Conservation 2021). However, based on historical observations, potential presence of the San Joaquin kit fox at Carnegie SVRA cannot be ruled out.
American badger *Taxidea taxus*	CSSC	Occur in open habitats including annual grasslands, oak woodland savannas, semi-arid shrub/scrublands with friable soils. Infrequently found in disked agricultural areas.	**Present.** American badgers have been detected in Carnegie SVRA during ongoing HMS monitoring (CDFW 2026a, DPR 2024b). They have also been detected to the north at the LLNL Site 300 and private land to the east (Ecorp Consulting, Inc. 2021b, CDFW 2026a).
Mountain lion *Puma concolor*	SC	Occurs in a wide variety of habitats including coniferous forests, riparian and oak woodlands, streams, chaparral, grasslands, and desert habitats.	**Present.** Mountain lions have been detected in the southern portion of Carnegie SVRA and on the Alameda-Tesla Property to the east during camera trap studies (MIG, Inc. 2021b). Thus, they are present in the SVRA.

Listing Status Codes: FE = federally listed as endangered; FT = federally listed as threatened; FPT: federally proposed as threatened; FC = federal candidate for listing; SE = state listed as endangered; ST = state listed as threatened; SC = state candidate for listing; CSSC = California species of special concern.

7.2.5 Sensitive Vegetation Communities

Natural communities have been considered part of the Natural Heritage Conservation triad, along with plants and animals of conservation significance, since the state inception of the Natural Heritage Program in 1979. CDFW determines the level of rarity and imperilment of vegetation types and tracks sensitive communities in its Rarefind database (CDFW 2026a). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings reflect the condition of a habitat within California. Natural communities are defined using NatureServe's standard heritage program methodology as follows (CNPS 2026b):

- G1/S1: Less than 6 viable occurrences or less than 2,000 acres.
- G2/S2: Between 6 and 20 occurrences or 2,000 to 10,000 acres.
- G3/S3: Between 21 and 100 occurrences or 10,000 to 50,000 acres.
- G4/S4: The community is apparently secure, but factors and threats exist to cause some concern.
- G5/S4: The community is demonstrably secure to ineradicable due to being common throughout the world (for global rank) or the state of California (for state rank).

State rankings are further described by the following threat code extensions:

- S1.1: Very threatened
- S1.2: Threatened
- S1.3: No current threats known

In addition to tracking sensitive natural communities, CDFW also ranks vegetation alliances, defined by repeating patterns of plants across a landscape that reflect climate, soil, water, disturbance, and other environmental factors (CNPS 2026b). Additionally, if a vegetation alliance or association is marked S1-S3, then it is classified as sensitive by CDFW and at risk of extirpation in California. CDFW provides a list of vegetation alliances and associations through their Vegetation Classification and Mapping Program (VegCAMP). This list is regularly updated (CDFW 2026b).

Natural Communities of Special Concern. There are no CDFW classified sensitive natural communities within Carnegie SVRA.

Sensitive Vegetation Alliances. There are five sensitive vegetation communities identified by CDFW within Carnegie SVRA (CDFW 2026b):

- California Buckeye Groves. This vegetation community is classified by CDFW as G3 S3, which means that this community has a moderate risk of extirpation throughout its range in California.
- Fremont Cottonwood Forest and Woodland. This vegetation community is classified by CDFW as G4 S3, which means that this community has a moderate risk of extirpation throughout its range in California.
- Basket Bush – River Hawthorn – Desert Olive Patches, *Forestiera pubescens* Provisional Association (Desert Olive). Because desert olive is the dominant species in this alliance, this vegetation community has been provisionally classified as G1 S1 or G2 S2, which means this community has a very high or high risk of extirpation throughout its range in California.
- Black Sage Scrub, *Salvia mellifera – Malacothamnus fasciculatus* Association (Black Sage-Bush Mallow). Although the Black Sage Scrub Alliance is not listed as sensitive by CDFW, the *Salvia mellifera – Malacothamnus fasciculatus* Association (Black Sage-Bush Mallow) is classified by CDFW as G3 S3, which means that this community has a moderate risk of extirpation throughout its range in California.
- Needle Grass – Melic Grass Grassland, *Nassella pulchra – Avena* spp. – *Bromus* spp. Association. This vegetation community is classified by CDFW as G3 S3, which

means that this community has a moderate risk of extirpation throughout its range in California.

7.2.6 Jurisdictional Waters and Habitats

Carnegie SVRA has 1 intermittent stream (Corral Hollow Creek), 17 ephemeral streams, 6 freshwater ponds, and 3 freshwater wetlands that meet the definition of waters of the U.S./state[11] Each of these features are described in more detail below and shown in Figure 7-3 USACE and RWQCB Jurisdictional Map.

Intermittent Stream (Corral Hollow Creek). Corral Hollow Creek is an intermittent stream that runs through Carnegie SVRA and is a tributary of the San Joaquin River. Intermittent streams have flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from precipitation is a supplemental source of water for stream flow. Corral Hollow Creek generally does not have surface flow during the summer months, but sub-surface flow may be present along with a high-water table. Within the SVRA, Corral Hollow Creek has a well-defined flood plain that supports Fremont Cottonwood Forest and Woodland and Mulefat Thickets. The entire RMA Program area (existing and proposed new RMAs) is outside the Corral Hollow Creek flood plain (Figure 7-4).

Ephemeral Streams. There are 17 ephemeral streams within Carnegie SVRA, and 14 of these streams drain the local watersheds formed by Waterfall Canyon, Kiln Canyon, Carrol Canyon, and Dead Cow Canyon (Tyson's Basin; see Figure 10-1). The other three are relatively short and located in the western portion of the SVRA. Ephemeral streams generally only flow during or immediately after rain events and receive runoff from surrounding upland areas. Sections of ephemeral streams may retain moisture longer than the surrounding upland areas, and some areas may be mesic, especially in spring. All but four of the streams flow into sediment basins before flowing into Corral Hollow Creek. The other four drain directly into Corral Hollow Creek west of the Hillclimb Facility. The proposed RMA Program area occurs in Carrol Canyon and Tyson's Basin local watersheds and in the three drainage areas flowing directly into Corral Hollow Creek from the south side of the creek (Figure 7-3 and Figure 7-4).

Freshwater Ponds. There are six freshwater ponds within Carnegie SVRA. All the ponds are impoundments used as sediment basins. The basins intercept and retain sediment-laden runoff and allow most of the sediment to settle out prior to the water being released from the pond. The ponds are seasonally inundated and usually dry up by summer. However, depending on seasonal variations in precipitation, some of the ponds may retain water through the summer months. There are two basins within Carrol Canyon: Lower Juniper Basin and Carol Basin; three basins in Dead Cow/Tyson's Basin watershed: Franciscan Basin, Clear Basin, and Tyson's Basin; and one basin in Kiln Canyon: Kiln Basin. The proposed RMA Program area includes the watersheds of the Carrol Canyon and Dead Cow/Tyson's Basin; however the proposed RMA Program activities do not include the specific freshwater pond locations (Figure 7-3 and Figure 7-4).

[11] "Waters of the U.S." include territorial seas, tidal waters, and non-tidal waters in addition to wetlands and drainages that support wetland vegetation, exhibit ponding or scouring, show obvious signs of channeling, or have discernible banks and high-water marks (see Section 10.1 Regulatory Setting of Chapter 10. Hydrology and Water Quality for more information). Waters of the state means any surface or groundwater (including saline waters) within the boundaries of the state of California.

Freshwater Wetlands. There are three freshwater wetlands within Carnegie SVRA: one in Kiln Canyon, one off Juniper Trail near Tyson's Basin, and one adjacent to the SVRA office on Tesla Road (Figure 7-3). The wetland in Kiln Canyon is perennial and is likely fed by a natural spring. The dominant emergent vegetation present includes broadleaf cattail (*Typha latifolia*) and Mexican rush (*Juncus mexicanus*). The wetland near Juniper Trail is seasonally inundated and the dominant vegetation present includes Goodding's black willow (*Salix gooddingii*), mulefat, and common gumplant (*Grindelia camporum*). The wetland adjacent to the SVRA office is also seasonally inundated, and the dominant vegetation present includes valley oak (*Quercus lobata*), Fremont cottonwood, mulefat, Goodding's black willow, and broadleaf cattail. The proposed RMA Program area includes the wetland near Tyson's Basin; however, the proposed RMA Program activities do not include the specific jurisdictional wetland (Figure 7-3 and Figure 7-4).

7.2.7 Wildlife Movement and Nursery Sites

The Diablo Range is a relatively undeveloped mountain range that extends for approximately 200 miles from near the Carquinez Strait in Contra Costa County south to Orchard Peak near Cholame in San Luis Obispo County. Carnegie SVRA is situated within undeveloped ranchlands and open space in the Diablo Range. At a regional landscape scale, Carnegie SVRA is part of a contiguous open space landscape that connects to protected open space areas, including the Ohlone and Sunol Regional Wilderness areas to the west, and the Blue Oak Ranch Reserve and Henry W. Coe State Park to the south.

Contiguous open space provides wildlife corridors, which are an important component of ecosystems because they are crucial to long-term viability of wildlife populations. Wildlife use habitat corridors for different purposes, in different patterns, and at different scales, depending on the species. Wildlife use corridors for daily foraging among local resource patches, seasonal migrations between summer and winter ranges, and dispersal to new areas.

Wildlife corridors are important for biodiversity conservation since corridors allow for genetic exchange between populations and may allow for range shifts in response to climate change. For example, The Critical Linkages Project identified the western portion of Carnegie SVRA as part of a wildlife corridor that provides a critical linkage for mountain lion movement in the Diablo Range, allowing for gene flow and habitat connectivity within the Southern California/Central Coast Evolutionary Significant Unit (ESU) genetically distinct mountain lion population (Penrod, et al. 2013, Gustafson, et al. 2018). A recent camera trap study also demonstrated Carnegie SVRA is likely used as a habitat corridor, finding that mountain lions regularly occupy areas within Carnegie SVRA (MIG, Inc. 2021b).

Additionally, Corral Hollow Creek and the associated riparian corridor provides foraging and dispersal habitat for amphibians and reptiles, including California red-legged frog and pond turtle. Corral Hollow Creek also provides connectivity among several ponds (sediment basins), which provide breeding habitat for California red-legged frog and California tiger salamander.

Nursery sites are locations within the range of the species where the conditions are favorable for wildlife to successfully raise young each year and maintain population levels. Carnegie SVRA provides nursery sites for a variety of common and special-status species. Aquatic sites, particularly freshwater ponds and wetlands provide nursery sites for many amphibians such as California red-legged frog, chorus frog, and California newt. Grassland, woodland, and scrub/shrub habitats support nesting sites for small mammals, reptiles, birds, and invertebrates. Grasslands surrounding aquatic sites are particularly important nursery sites for pond turtle young, which spend more than half the year in subterranean nests where they rest and grow.

Mature trees, buildings, and cave habitat may support nursery sites for common and special-status bats.

7.3 PROJECT IMPACTS

7.3.1 Thresholds of Significance

Consistent with the CEQA Guidelines Appendix G Checklist, the project would have a significant impact 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 CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- 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, hydrologic interruption, or other means;
- 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;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan (NCCP), or other approved local, regional, or state HCP.

7.3.1.1 Issues Not Discussed Further in this EIR

Conflict with any local policies or ordinances protecting biological resources. The proposed RMA Program would take place on DPR land and therefore is not subject to local policies and ordinances such as a tree preservation policy ordinance. For this reason, this issue is not discussed further in this EIR.

Conflict with adopted HCP, NCCP, or other approved HCP. Most of the Carnegie SVRA overlaps with the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) (San Joaquin Council of Governments 2000). The SJMSCP provides a framework to balance the county's need for both open space and development and other needs of the growing county. The plan recognizes that the county needs to preserve landowner property rights and accommodate a growing population which includes school expansion, urban development, transportation projects, and utility installation. San Joaquin County plans to provide compensation for conversions of open space in accordance with ESA Section 10(a)(1)(B) and CESA Section 2081(b) Incidental Take Permits. However, the plan also covers providing and maintaining open spaces as well as providing long-term management for listed plants and wildlife species. The proposed RMA Program is not a covered project under the SJMSCP; thus, it is not subject to the SJMSCP. The SVRA is not within the area covered by any other HCP or NCCP. Accordingly, this issue is not discussed further in this EIR.

7.3.2 Special-Status Species

Direct take of a federally or state listed species is considered a significant impact. Temporary and/or permanent habitat loss is not considered a significant impact on sensitive species (other than for listed or candidate species under the FESA and CESA), unless a significant percentage of total suitable habitat throughout the species' range is degraded or somehow made unsuitable, or areas supporting a large proportion of the species' population are substantially and adversely impacted. Potential impacts on nesting bird species and bat colonies would be considered significant due to their protection under the California Fish and Game Code.

7.3.2.1 Special-Status Plants

Chaparral harebell (CRPR 1B.2), Hospital Canyon larkspur (CRPR 1B.2), Jepson's woolly sunflower (CRPR 4.3), stinkbells (CRPR 4.2), and Sylvan microseris (CRPR 4.2) are known to be present in Carnegie SVRA. Ten other special-status plant species may be present in the SVRA, including large-flowered fiddleneck (1B.1), listed as endangered under FESA and CESA, and nine other CRPR plants (see Table 7-2 in section 7.2.4.1). There are also locally rare plant species in the SVRA (see Table 7-3 in section 7.2.4.1).

The proposed RMA Program is expected to benefit special-status and locally rare plants and their habitat over the long term by reducing trail density, increasing vegetation cover, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. This would increase the available habitat for special-status plants and reduce impacts on existing populations in the new RMAs.

The project could cause short-term localized impacts on special-status and locally rare plants plants and their habitat during construction, particularly during the trail removal and hillside rehabilitation and new or redesigned trail construction phases of creating new RMAs. Trail removal and hillside rehabilitation sometimes involves discing, grading, or ripping the work site; spreading imported soil over the site; the use of heavy equipment such as a bulldozer to eliminate trails; and new temporary roads to provide access for heavy equipment. The new or redesigned trail construction phase can also involve the use of heavy equipment such as a trail dozer, excavator, and bulldozer to build new trails. The erosion control and repair, revegetation, and trail inspections and evaluations phases of the work would ensure that any special-status plant habitat impacted during construction would be restored to equal or better conditions than preconstruction conditions. However, special-status plants could still be impacted by construction. SPRs to protect special-status and locally rare plant species include avoidance of known occurrences of these species with flagging or fencing, dust control within 100 feet of these species, and pre-activity surveys for special-status and locally rare plants that could occur in project work areas (see Appendix B). General biological resources SPRs also include measures to limit the spread of invasive plant species (Appendix B). All potential impacts on special-status plants are ***less than significant*** with incorporation of the SPRs.

7.3.2.2 Special-Status Invertebrates

Valley elderberry longhorn beetle (FT) is assumed to be present in Carnegie SVRA based on bore holes indicative of the species detected in elderberry host plants during focused surveys in 2021 (see Table 7-4 in section 7.2.4.3). Crotch's bumble bee (SC) may be present in the SVRA based on the presence of suitable grassland and scrub habitat and availability of nectar plants. Monarch butterfly (FPT) is assumed to occur only as a transient or occasional visitor due to a lack of suitable breeding and winter roosting habitat in the SVRA, and therefore the proposed project is not expected to impact this species.

The proposed RMA Program is expected to benefit special-status invertebrates and their habitat over the long term by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. This would increase the amount of habitat available to special-status invertebrates and reduce disturbance from OHV recreation in distributed riding areas that will be converted to trails-only riding areas.

The project could temporarily impact valley elderberry longhorn beetles or their host plants during construction of the new RMAs. SPRs (general and wildlife) include a worker environmental training including information on special-status species that may occur in the work area, a biological monitor present during construction as needed, and avoidance measures if a special-status species is encountered during work. (Appendix B). In addition, no work would take place along Corral Hollow Creek where most elderberry host plants are located. However, if any elderberry host plants do occur in the new RMAs, Mitigation Measure BIO-1 would prevent any impacts on this species (see section 7.5). Mitigation Measure BIO-1 is based on the USFWS Valley Elderberry Longhorn Beetle Framework (USFWS 2017) and is compatible with Wildlife Guideline 1.3 of the General Plan Update.

The project could also temporarily impact Crotch's bumblebee or its habitat during construction activities. If individuals are present during project activities, they would be able to fly away; thus, no direct impacts on flying/foraging individuals are expected. However, if project activities occur during the nesting season (generally late February to September) project construction activities could result in the destruction/collapse of active nests of Crotch's bumble bee, and result in the injury or death of adults, eggs, and larvae. Additionally, if a work site is occupied by Crotch's bumble bee, the project activities may also result in the loss of nesting and foraging habitat. Mitigation Measures BIO-2a and BIO-2b would reduce potential impacts on the Crotch's bumble bee to less-than-significant levels (see section 7.5). Therefore, all potential impacts on special-status invertebrates are ***less than significant with mitigation incorporated.***

7.3.2.3 Special-Status Amphibians and Reptiles

As described in Table 7-4, several special-status amphibians and reptiles are present or may be present in Carnegie SVRA. Of the amphibians, California tiger salamander (FT and ST), California red-legged frog (FT and CSSC), foothill yellow-legged frog – central coast DPS (FT and SE), and western spadefoot (FPT and CSSC) are present in Carnegie SVRA. Of the reptiles, pond turtle (FPT[12] and CSSC), Alameda whipsnake (FT and ST), and California glossy snake (CSSC) are present in Carnegie SVRA; and Northern California legless lizard (CSSC), coast horned lizard (CSSC), and San Joaquin coachwhip (CSSC) may be present in the SVRA.

The proposed project is expected to benefit special-status amphibians and reptiles and their habitat over the long term by reducing erosion and available sediment load in aquatic habitat in the SVRA and increasing the area of available upland habitat in the proposed trails-only riding areas of the new RMAs due to reduced trail density and increased vegetation in those areas. In addition, the new RMAs are outside of the Corral Hollow Creek riparian corridor.

[12] USFWS has proposed listing northwestern pond turtle (*Actinemys marmorata*) and southwestern pond turtle (*Actinemys pallida*) as threatened under FESA. CDFW classifies both species as species of special concern. Both species are referred to collectively as "pond turtle" in this EIR.

The project could have short-term impacts on special-status amphibians and reptiles during construction, either directly by crushing burrows where these species are aestivating or running them over when they are dispersing, or indirectly by causing sediment or pollutants to runoff into aquatic habitats. Although the new RMAs are outside of the Corral Hollow Creek riparian corridor, ephemeral streams, sediment basins (ponds), and one wetland are within the area covered by the new or existing RMAs. General biological resource SPRs and wildlife SPRs include a worker environmental training including information on special-status species that may occur in the work area, a biological monitor present during construction as needed, avoidance measures if a special-status species is encountered during work, and covering and inspecting all holes and trenches to prevent animals from becoming trapped (Appendix B). Direct impacts on special-status amphibians and reptiles from project activities would be further avoided by implementation of Mitigation Measure BIO-3 (see section 7.5). Mitigation Measure BIO-3 is compatible with Wildlife Guidelines 1.2, 1.4, and 1.7 from the General Plan Update.

Indirect impacts on aquatic habitat would be avoided by incorporation of sediment and erosion control BMPs from the OHV BMP Manual (see Table 2-9 in Chapter 2. Project Description), and no work would occur during wet weather. Mitigation Measure BIO-3 would further reduce potential impacts on special-status amphibians to less than significant levels. Therefore, all potential impacts on special-status amphibians and reptiles are ***less than significant with mitigation incorporated.***

7.3.2.4 Special-Status and Nesting Birds

As described in Table 7-4, bank swallow (ST), grasshopper Sparrow (CSSC), burrowing owl (SC), Northern harrier (CSSC), white-tailed kite (CFP), yellow-breasted chat (CSSC), loggerhead shrike (CSSC), and yellow warbler (CSSC) are present in Carnegie SVRA, and golden eagle (CFP), long-eared owl (CSSC), and Swainson's hawk (ST) may be present in the SVRA. Tricolored blackbird (ST and CSSC), Vaux's swift (CSSC), olive-sided flycatcher (CSSC), and bald eagle (SE and CFP) have been observed in Carnegie SVRA but do not nest there. In addition, all native birds and their nests are protected by the MBTA and California Fish and Game Code.

The proposed project is expected to benefit special-status and nesting birds and their habitat over the long term by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. These changes would increase the area of available nesting and foraging habitat and reduce disturbance from OHV recreation in these new habitat areas.

The project could have short-term impacts on special-status and nesting birds during construction, either directly by removing nests or burrows (burrowing owls) resulting in injury or mortality, or indirectly by disturbing nesting birds and/or wintering burrowing owls. Wildlife SPRs include initiating work outside of the nesting bird season if possible, a preconstruction survey for nesting birds if work occurs in the nesting bird season, and no construction buffers around active nests identified during the survey (Appendix B). General biological resources SPRs also include a worker environmental training including information on special-status species that may occur in the work area and a biological monitor present during construction as needed (Appendix B). Direct impacts on burrowing owls from project work would be avoided by implementation of Mitigation Measure BIO-4 (see section 7.5). Therefore, all potential impacts on special-status and nesting birds are ***less than significant with mitigation incorporated.***

7.3.2.5 Special-Status Mammals and Roosting Bats

As described in Table 7-4, Pallid bat (CSSC), Townsend's big-eared bat (CSSC), western mastiff bat (CSSC), western red bat (CSSC), mountain lion (SC), and American badger (CSSC) are present in Carnegie SVRA, and San Joaquin kit fox (FE, ST) may be present. In addition, roosting bats are protected by the California Fish and Game Code.

The proposed project is expected to benefit special-status mammals and roosting bats and their habitat over the long term by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. These changes would increase the area of available habitat for these species and reduce disturbance from OHV recreation in these new habitat areas.

Project activities could have short-term impacts on special-status mammals and roosting bats during construction, either directly by removing dens or roosts resulting in injury or mortality, or indirectly by disturbing special-status mammals or roosting bats. General biological resources and wildlife SPRs include a worker environmental training including information on special-status species that may occur in the work area, a biological monitor present during construction as needed, avoidance measures if a special-status species is encountered during work, and no removal of trees over 4-inches DBH without a DPR-approved biologist inspecting it for roosting bat habitat (Appendix B). Direct impacts on special-status mammals and roosting bats from project activities would be further avoided by implementation of Mitigation Measures BIO-5 through BIO-8 (see section 7.5). Therefore, all potential impacts on special-status mammals are ***less than significant with mitigation incorporated.***

7.3.3 Sensitive Natural Communities

As described in section 7.2.5, sensitive natural communities in Carnegie SVRA include California Buckeye Groves (G3 S3), Fremont Cottonwood Forest and Woodland (G4 S3), Basket Bush – River Hawthorn – Desert Olive Patches, *Forestiera pubescens* Provisional Association (Desert Olive, G1 S1 or G2 S2), Black Sage Scrub, *Salvia mellifera – Malacothamnus fasciculatus* Association (Black Sage-Bush Mallow, G3 S3), and Needle Grass – Melic Grass Grassland, *Nassella pulchra – Avena* spp. *– Bromus* spp. Association (G3 S3). The new RMAs overlap with all of these sensitive natural communities except for Fremont Cottonwood Forest and Woodland, which occurs only along Corral Hollow Creek outside of the new RMAs.

The proposed project is expected to benefit sensitive natural communities over the long term by reducing trail density, increasing vegetation cover, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. These changes would increase the area available for natural vegetation communities and reduce indirect impacts on sensitive natural communities from OHV recreation, such as erosion and sedimentation.

The project could have short-term localized impacts on sensitive natural communities during construction of the new RMAs, such as removal of areas of sensitive natural communities if they are within RMA work areas. Indirect impacts could result from accidental release of construction fuels or fluids or erosion and sedimentation caused by construction in or near sensitive natural communities. Plant SPRs include avoiding sensitive natural communities with a 100-foot buffer (Appendix B). Mitigation Measure BIO-9 would address direct impacts on sensitive natural communities if they cannot be avoided (see section 7.5). Indirect impacts would be prevented with implementation of SPRs and storm water runoff management plan BMPs to control potential erosion, sedimentation, and other pollutants from construction sites. In addition,

construction would not occur during rain, and trash would be removed from the work area daily (see Table 2-8 in Chapter 2. Project Description). Therefore, all potential impacts on sensitive natural communities are ***less than significant with mitigation incorporated.***

7.3.4 Jurisdictional Waters and Habitats

The new RMAs overlap with ephemeral drainages, freshwater ponds, and one wetland (see section 7.2.6 for more information on jurisdictional waters and habitats in Carnegie SVRA, Figure 7-3 for the locations of jurisdictional waters, and Figure 7-4 for RMA work areas near aquatic features in the SVRA).

The project is expected to benefit jurisdictional waters and habitats over the long term by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. Under existing conditions, OHVs may be driving through ephemeral drainages or other aquatic features or affecting jurisdictional waters and habitats indirectly by causing sediment to enter the waters from erosion or storm water runoff. One of the project objectives is to reduce sedimentation of drainages and discharge to Corral Hollow Creek (see Project Description section 2.2.2).

The project could have short-term impacts on non-wetland jurisdictional waters and habitats during construction if new or rerouted trail segments or rehabilitation work site areas overlap with ephemeral drainages. Prior to initiation of project activities, DPR would determine if ephemeral drainages occur in the project work site area and would flag and avoid ephemeral drainages or other jurisdictional waters in the work site with a 100-foot buffer (see Plant SPRs in Appendix B). If jurisdictional waters cannot be avoided, DPR would contact USACE, RWQCB, and CDFW to determine permitting requirements for regulatory compliance. Mitigation Measure BIO-10 requires regulatory approvals to be obtained prior to commencement of construction activities within the identified jurisdictional areas as determined necessary by the permitting agencies: USACE CWA Section 404 Permit; Regional Board CWA Section 401 Water Quality Certification; and CDFW Section 1602 Streambed Alteration Agreement. Preservation, enhancement, and management, if required by a permit, would be implemented on-site. California state law (AB2875) requires “no net loss” of wetlands, and the RWQCB requires compensatory mitigation for any permanent impacts to wetlands or other jurisdictional waters to ensure compliance with state law.

No direct disturbance to freshwater ponds or wetlands would occur under the proposed project activities. Indirect impacts could result from accidental release of construction fuels or fluids or erosion and sedimentation caused by construction in or near jurisdictional waters and habitats. Indirect impacts would be prevented with implementation of SPRs (Appendix B) and storm water runoff management plan BMPs to control potential erosion, sedimentation, and other pollutants from construction sites (see Table 2-10). In addition, construction would not occur during rain and trash would be removed from the work area daily (see Table 2-9). Therefore, all potential impacts on jurisdictional waters and habitats are ***less than significant with mitigation incorporated.***

7.3.5 Wildlife Corridors and Nursery Sites

Carnegie SVRA is situated within undeveloped ranchlands and open space in the Diablo Range. At a regional landscape scale, Carnegie SVRA is part of a contiguous open space landscape that connects to protected open space areas, including the Ohlone and Sunol Regional Wilderness areas to the west, and the Blue Oak Ranch Reserve and Henry W. Coe State Park to the south.

The Critical Linkages Project identified the western portion of Carnegie SVRA as part of a wildlife corridor that provides a critical linkage for the movement of mountain lions in the Diablo Range. Additionally, Corral Hollow Creek and the associated riparian corridor provide foraging and dispersal habitat for amphibians and reptiles, including California red-legged frog and pond turtle. Carnegie SVRA also provides nursery sites for a variety of common and special-status species. Aquatic sites, particularly freshwater ponds and wetlands provide nursery sites for many amphibians such as California red-legged frog, chorus frog, and California newt. Grassland, woodland, and scrub/shrub habitats support nesting sites for small mammals, reptiles, birds, and invertebrates. Mature trees, buildings, and cave habitat may support nursery sites for common and special-status bats. See section 7.2.7 for more detailed information about wildlife corridors and nursery sites in Carnegie SVRA.

The proposed RMA Program is expected to benefit wildlife corridors and nursery sites over the long term by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. These actions would increase the amount of vegetated area in the new RMAs, increasing the movement opportunities for terrestrial wildlife and potential habitat for use as nursery sites.

The project could have short-term impacts on wildlife corridors and nursery sites during construction of the new RMAs. Although RMA perimeter fencing is designed to allow for wildlife passage, construction noise and disturbance could pose a temporary wildlife movement barrier in and near the work sites. Short-term impacts on wildlife movement would be minimized because not all the work would occur at the same time but instead would be implemented gradually over a 10-year period. As discussed in Project Description section 2.4.3, 47 individual rehabilitation projects are identified, potentially affecting 175 acres. Based on the known scale of projects and the 10-year implementation period, it is estimated that rehabilitation projects would not disturb more than 20 acres in any given year. Potential impacts on wildlife nursery sites would be avoided or reduced to less-than-significant levels with implementation of general biological resource and wildlife SPRs (Appendix B) and Mitigation Measures BIO-1 through BIO-11. Therefore, all potential impacts on wildlife corridors and nursery sites are ***less than significant with mitigation incorporated.***

7.3.6 Native Trees

RMA Program activities such as new trail construction, re-routed trail segments, or gully erosion repairs may occur in woodland or other vegetation communities containing native trees. Project activities could result in the removal of individual native trees or encroachment upon adjacent trees, which could cause damage to the tree structure or its root zone. Carnegie SVRA General Plan Update Plant Guideline 1.6 directs DPR to limit removal of native trees, replace removed trees, and protect against indirect effects on native trees from root compaction and physical damage (Table 4-3 and Appendix C). Plant SPRs would protect retained trees from damage during construction (Appendix B). Mitigation Measure BIO-11 requires that removed native trees be replaced with native trees at a ratio that maintains the natural plant community composition and structure based on the habitat functions affected by tree removal, and a Tree Mitigation and Monitoring Plan be prepared specifying the species, the monitoring period, minimum survival criteria, and irrigation (if needed) following replanting. With implementation of SPRs and Measure BIO-11, potential impacts on native trees and associated habitat values would be avoided or reduced to less than significant levels. Therefore, the potential impact on native tree vegetation is ***less than significant with mitigation incorporated***.

7.4 CUMULATIVE IMPACTS

Like the proposed project RMA implementation, the General Plan Update projects (see Table 3-1 in Chapter 3. Impact Analysis Methodology) would be implemented over a period of several years and not all at the same time. There is also minimal spatial overlap between the proposed new RMAs and the proposed General Plan Update projects; only facilities for communication or technology support could be in any of the SVRA use areas (except for limited recreation areas). The remaining General Plan Update projects would all be in the Corral Hollow Creek Management Unit, which does not overlap with any of the new RMAs. It is possible that a General Plan Update project could be implemented at the same time as an RMA project; however, such effects would be short-term, and the long-term effects of the proposed project on biological resources would be positive. All potential biological resources impacts from the proposed RMA Program were found to be less than significant with incorporation of SPRs and Mitigation Measures BIO-1 through BIO-8, and all potential biological resources impacts from the General Plan Update were found to be less than significant with implementation of the General Plan Update goals and guidelines (DPR 2024b). Therefore, the potential impacts on biological resources of the project when combined with General Plan Update projects are not expected to be cumulatively significant.

Likewise, there is no spatial overlap between the proposed new RMAs and trail maintenance operations in existing RMAs (see Table 3-1 and Figure 2-5). Implementation of the new RMAs and trail maintenance operations may sometimes overlap temporally, but trail maintenance operations activities are generally minor such as fence installation, trail redesign, or rehabilitation of closed routes. All potential biological resources impacts from the proposed RMA Program would be less than significant with incorporation of SPRs and Mitigation Measures BIO-1 through BIO-8. In addition, DPR staff routinely implement worker environmental awareness training, pre-activity surveys for special-status species, avoidance of animal burrows, and biological monitoring of work as needed for trail maintenance work. Therefore, the potential impacts on biological resources of the project when combined with trail maintenance operations are not expected to be cumulatively significant.

The exact future use of the Alameda-Tesla property is currently unknown, but it will be protected land either with limited public access or open to passive recreation. If passive recreational facilities are installed at the Alameda-Tesla property at some future point, it is not expected to result in cumulatively significant impacts when combined with the proposed project because the facilities would likely be small-scale and compatible with natural resources protection and therefore, they would be unlikely to result in significant impacts on biological resources. The likelihood that installation of facilities in the Alameda-Tesla property would occur during the same time period as implementation of the proposed RMAs is low.

For the reasons described above, the proposed RMA Program would have ***no cumulative impact*** on biological resources.

7.5 MITIGATION MEASURES

Mitigation Measures BIO-1 through BIO-11, listed below, would reduce potential impacts on biological resources from the proposed project to less-than-significant levels. For all Biological Resources mitigation, an Environmental Scientist meeting the specified qualified biologist requirements would be appropriate to conduct the mitigation.

Impact BIO-1: Project activities could disturb individual elderberry shrubs and potentially impact valley elderberry longhorn beetle.

Mitigation Measure BIO-1: Valley Elderberry Longhorn Beetle Protection. Consistent with the USFWS Valley Elderberry Longhorn Beetle Framework (USFWS 2017), a biologist who can identify elderberry shrubs shall survey proposed work sites plus a 165-foot (50 meter) buffer for elderberry shrubs prior to the start of any ground disturbing activities in the project sites (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading). The results of the surveys shall be documented in writing, and the location of any occupied elderberry shrubs shall be recorded by GPS. Any elderberry shrubs found during the survey shall be fenced or flagged and avoided with a minimum 20-foot (6 meter) buffer from the dripline. Activities that may damage or kill an elderberry shrub (e.g., use of heavy equipment, etc.) shall have an avoidance area of at least 20 feet (6 meter) from the dripline, depending on the type of activity. All construction activities that could occur within 165 feet of an elderberry shrub will be conducted outside of the flight season of the valley elderberry longhorn beetle (March - July). If trimming of an elderberry shrub is required, trimming will occur between November and February and will avoid the removal of any branches or stems that are ≥ 1 inch in diameter to prevent impacts on valley elderberry longhorn beetles.

Impact BIO-2: Project activities could disturb Crotch's bumble bee if present within the project activity site.

Mitigation Measure BIO-2a: Pre-construction Survey for Crotch's Bumble Bee. Within one year prior to vegetation removal or ground disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading), a qualified biologist shall conduct pre-construction surveys for Crotch's bumble bee nests. Pre-construction surveys shall be consistent with CDFW's Survey Considerations for CESA Candidate Bumble Bees (CDFW 2023). These surveys shall include a habitat assessment as well as focused surveys for foraging and nesting bumble bees. Surveys should be conducted during the height of the active flight season (April - August), when the probability of detection is highest, and in the same year that project activities are planned to start. These surveys shall be spaced 2 - 4 weeks apart to account for variability in resource use and availability. Surveys shall be conducted during dry conditions (i.e., when it is not raining, foggy, or drizzling), when temperatures are above 70° Fahrenheit, and during low wind speeds (i.e., less than 8 miles per hour). If the pre-construction surveys do not identify Crotch's bumble bee nests, no additional surveys and mitigation are required. If Crotch's bumble bee nests are observed, then Mitigation Measure 2b shall be implemented. The results of the surveys shall be documented in writing, and the location of any Crotch's bumblebee nests shall be recorded by GPS.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; knowledge of the life history and ecology of Crotch's bumble bee and locally common bumble bees and their identification; and has a minimum of two field seasons of experience conducting focused surveys with positive identification of Crotch's bumble bee and other common bumble bee species.

Mitigation Measure BIO-2b: Prepare a Crotch's Bumble Bee Protection and Habitat Enhancement Plan. If Crotch's bumble bee nests are found on a work site, the qualified biologist shall prepare a plan to protect active nests and surrounding foraging areas, protect potential overwintering habitat, and enhance foraging habitat within the site. The plan shall be

implemented as part of the project. The plan shall include, but not be limited to, the following measures:

- Specification of timing and sequencing requirements to avoid impacts on nesting and hibernating bumble bees.
- Pre-construction surveys within 30 days of ground disturbance consistent with CDFW survey considerations (CDFW 2023).
- Fencing or flagging to delineate no-disturbance buffers around active nest sites. The buffer area shall be 50 feet or as determined by a qualified biologist.
- Construction monitoring during initial ground disturbance activities in conjunction with SPRs.
- Avoidance of initial ground disturbance between November and January to protect potential overwintering queen Crotch's bumble bees.
- Retaining existing woody debris, if present, to support overwintering queen bumble bees.
- Where erosion control and/or slope stabilization are required, prescription of seed mix composed of locally native flower species, known to be visited by Crotch's bumble bee, that bloom from March through September.

Impact BIO-3: Project activities could result in the temporary loss of listed/proposed amphibian and reptile dispersal habitat or harm special-status amphibians and reptiles (i.e., California tiger salamander, California red-legged frog, foothill yellow-legged frog – central coast DPS, western spadefoot, pond turtle, Alameda whipsnake, California glossy snake, Northern California legless lizard, Blainville's horned lizard, and San Joaquin coachwhip) if present in the work site during construction.

Mitigation Measure BIO-3a: Protection of Suitable Habitat for Listed/Proposed Amphibians and Reptiles. No new facilities (i.e., new or re-routed OHV trails, trail improvements, or managed hillclimbs) in the RMA Program area shall be sited within 150 feet of aquatic habitat currently known or later identified to support California red-legged frog, California tiger salamander, western spadefoot, or pond turtle. No new facilities in the new or existing RMAs shall be sited within 150 feet of preferred Alameda whipsnake habitat, particularly scrub vegetation types.

Mitigation Measure BIO-3b: Evaluation and Avoidance of Suitable Special-Status Amphibian and Reptile Habitat. Within 14 days prior to the commencement of all ground-disturbing project activities (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading), a qualified biologist shall conduct a habitat assessment of the project site and a minimum 500-foot radius surrounding the site for the following special-status amphibian and reptile species: California tiger salamander, California red-legged frog, foothill yellow-legged frog-central coast DPS, western spadefoot, pond turtle, Alameda whipsnake, California glossy snake, Northern California legless lizard, coast horned lizard, and San Joaquin coachwhip. The biologist shall look for habitat features, including aquatic habitat such as ponds, streams or drainages, and terrestrial habitat such as outcrops or burrows, with the results of the assessment documented in a written report prior to starting project activities. Habitat features shall be flagged for avoidance. Work in such habitat areas may only occur as provided by Mitigation Measure BIO-3c.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; knowledge in the life history and ecology of the special-status amphibian and reptile species listed in this measure and locally common amphibians and reptiles and their identification; and a minimum of two field seasons of experience conducting focused surveys with positive identification of special-status and common amphibian and reptile species in the project region.

Mitigation Measure BIO-3c: Protection of Special-Status Amphibians and Reptiles. If suitable habitat is identified for any of the special-status amphibians or reptiles in the habitat assessment or the work site is within the dispersal distance of known occurrences of any of these species, a preconstruction survey for these special-status amphibian and reptile species shall be conducted by a qualified biologist prior to the start of ground-disturbing project activities per SPRs. The results of the survey shall be documented in writing with GPS locations of any species found recorded for internal tracking. If any of these species are encountered in or near the work site during the habitat assessment or survey, a qualified biologist shall monitor all ground-disturbing work in the work site. If an individual of these species is found during such work, and the qualified biologist determines that the project activities may disturb or harm the individual, the work shall be adjusted or postponed until the animal has been allowed to leave the work site on its own or the qualified biologist determines the work can proceed with no risk to the safety of the individual. The project may also employ protective fencing, rescheduled work times or locations, or other measures determined by the qualified biologist to avoid harm to the individual. Work shall be conducted in a manner that avoids all forms of take of amphibian or reptile species that are listed or proposed for listing under CESA or FESA or candidates under CESA. The qualified biologist may relocate an amphibian or reptile that is not listed or proposed for listing or a CESA candidate species to suitable similar habitat outside of the work site.

Impact BIO-4: Project activities could have short-term impacts on burrowing owl during construction, either directly by removing burrows resulting in injury or mortality, or indirectly by disturbing wintering burrowing owls.

Mitigation Measure BIO-4: Burrowing Owl Protection. Prior to the start of work in a new or existing RMA, an Environmental Scientist shall conduct an initial assessment for burrowing owl habitat consistent with CDFG (2012) to evaluate if habitat is present.

If burrowing owl habitat is determined to be present, a qualified biologist shall follow the California Department of Fish and Game (now CDFW) 2012 Staff Report on Burrowing Owl Mitigation (CDFG 2012) habitat assessment and survey methodology or subsequent CDFW guidance prior to implementation of project activities. Because burrowing owls can be present throughout the year, this survey methodology can be implemented in suitable burrowing owl habitat regardless of the time period for initiation of construction. The habitat assessment and surveys shall encompass a sufficient buffer zone to detect owls nearby that may be impacted, which shall be a minimum of 492 feet (150 meters) in accordance with the CDFW 2012 Staff Report or in accordance with subsequent CDFW guidance. Time lapses between surveys or project activities shall trigger subsequent surveys, as determined by a qualified biologist, including, but not limited to, a final survey within 24 hours prior to ground disturbance and before construction equipment mobilizes to the project area. The results of the surveys shall be documented in writing, and the location of any occupied burrows found shall be recorded by GPS for internal tracking.

Occupied burrowing owl burrows shall be avoided pursuant to the buffer zone prescribed in the CDFW 2012 Staff Report or subsequent CDFW guidance.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; and has a minimum of two years of experience implementing the CDFW 2012 Staff Report survey methodology or subsequent CDFW guidance resulting in detections.

Impact BIO-5: Project activities could impact special-status and roosting bats.

Mitigation Measure BIO-5: Special-Status and Roosting Bat Protection. Not more than 30 days before the start of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in a new or existing RMA, an Environmental Scientist shall survey the work site and a 50-foot buffer for bat roosting habitat (large trees with cavities, rock outcrops, caves, mines). If no roosting bat habitat and/or signs of bats are present, no additional surveys are required.

If bat roosting habitat and/or signs of bats (e.g., guano pellets or urine staining) are identified in the survey, a follow-up dusk emergence survey shall be conducted by a qualified biologist prior to the start of construction activities. A dusk survey will determine the number of bats present and shall also include the use of acoustic equipment to determine species of bats present.

If roosting bats are detected, they shall be avoided with roost avoidance buffers, seasonal activity restrictions, or monitoring of roost locations as determined by a qualified biologist. The results of the surveys shall be documented with GPS coordinates of any occupied bat roosts recorded for internal tracking.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has at least two years of experience conducting bat surveys that resulted in detections for the relevant species; and is familiar with the types of equipment used to conduct surveys.

Impact BIO-6: Project activities could harm mountain lions if active mountain lion dens are present in the RMA Program work sites.

Mitigation Measure BIO-6a: Evaluate Potential for Mountain Lion Nursery Sites. No more than 14 days prior to the beginning of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in a new or existing RMA, an Environmental Scientist will evaluate the project site plus a 500-foot buffer for suitable mountain lion nursery habitat. Nursery habitat suitable for the species will be determined through field surveys and knowledge of site conditions, including the results of any ongoing mountain lion studies or monitoring in vicinity of the project work area. Potential mountain lion nursery dens could include large natural cavities within rocky areas or thickets deemed appropriate for use by mountain lions based on size and other characteristics (e.g., proximity to heavily disturbed areas, surrounding habitat).

If suitable nursery habitat is present, a qualified biologist will survey for signs of mountain lion (e.g., tracks, scat, prey items, signs of recent kills) in the vicinity of potential nursery habitat to help determine whether an area may contain a mountain lion nursery. If a mountain lion nursery is suspected to be present, Mitigation Measure 6b will be implemented.

In the event that a DPR Environmental Scientist does not have experience to survey for or identify potential mountain lion nursery habitat, a qualified biologist may be hired to conduct mountain lion nursery surveys. A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for mountain lions, can identify suitable dens for this species, and is familiar with identification and habitat requirements of this species.

Mitigation Measure BIO-6b: Determine Presence of Mountain Lion Nursery. If signs of a mountain lion nursery are found during the initial evaluation, further investigation will be required to determine if a mountain lion nursery is present. No ground disturbance or other noise generating RMA Program activities will occur within 2,000 feet (Wilmers, et al. 2013) of the potential nursery site while the investigation is being conducted. Survey methods will include the use of trail cameras, hair snares, and/or other noninvasive methods, as well as coordination with other local experts tracking the species (if available). Surveys using these noninvasive methods will be conducted for 3 days and 3 nights to determine whether a nursery may be present. If a mountain lion den is detected or assumed to be present, Mitigation Measure 6c will be implemented.

Mitigation Measure BIO-6c: Avoid Disturbing Mountain Lion Nursery. If a nursery is known in the activity area or further signs of a nursery are detected based on the surveys described in Mitigation Measure BIO-6b (e.g., lactating adult female or cubs on camera, repeated detections of an adult female in the area, growls or calls from cubs), DPR will implement a no-disturbance buffer of at least 2,000 feet (Wilmers, et al. 2013) for a minimum of 10 weeks. Project activities will not occur within this buffer during this time to avoid disturbance, injury, or mortality of the mountain lion nursery.

Impact BIO-7: Project activities could harm American badgers if active badger burrows are present in the project work sites.

Mitigation Measure BIO-7: American Badger Protection. An Environmental Scientist shall conduct a preconstruction survey for American badger no more than 14 days prior to the beginning of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in the new or existing RMAs. The Environmental Scientist shall search the work site plus a 500-foot buffer for potential American badger dens. If there are no potential American badger dens in the work site or buffer area, no further mitigation is necessary. If potential American badger dens are located within the work site and cannot be avoided, a qualified biologist shall determine if the dens are occupied. If unoccupied, a den can be collapsed in on itself by the qualified biologist if it cannot be avoided by project activities. If occupied, the den shall be avoided with a minimum 100-foot buffer.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for American badger, can identify suitable dens for this species, and is familiar with identification and habitat requirements of this species.

Impact BIO-8: Project activities could harm San Joaquin kit fox if active kit fox dens are present in the project work sites.

Mitigation Measure BIO-8: San Joaquin Kit Fox Protection. An Environmental Scientist shall conduct a preconstruction survey for San Joaquin kit fox no more than 14 days prior to the beginning of ground-disturbing activities (including but not limited to mobilization and staging, clearing, grubbing, tree removal, vegetation removal, fence installation, demolition, and grading) in the new RMAs. The Environmental Scientist shall search the work site plus a 500-foot buffer for potential kit fox dens. If there are no potential San Joaquin kit fox dens in the work site or buffer area, no further mitigation is necessary. If potential San Joaquin kit fox dens are located within the work site and cannot be avoided, a qualified biologist shall determine if the dens are occupied. If unoccupied, a den can be collapsed in on itself by the qualified biologist if it cannot

be avoided by project activities. If occupied, the den shall be avoided with a minimum 500-foot buffer. The biologist shall notify the USFWS and CDFW if an occupied San Joaquin kit fox den is found. The results of the survey shall be documented.

A qualified biologist is defined as a biologist that has a degree in biological sciences, or similar degree; has a minimum of two years of experience surveying for San Joaquin kit fox, can identify suitable dens for these species, and is familiar with identification and habitat requirements of these species. In addition, the biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount.

Impact BIO-9: Project activities could result in the removal of sensitive natural communities if they are within project work areas and cannot be avoided.

Mitigation Measure BIO-9: Replacement of Sensitive Natural Communities. If sensitive natural communities cannot be avoided, they shall be replaced at a minimum 1:1 ratio outside of the work site in an area that will not be disturbed in the future. A Habitat Mitigation and Monitoring Plan (HMMP) shall be prepared specifying the planting palette, the monitoring period, minimum survival criteria, invasive species control, and irrigation (if needed) following replanting. The planting palette shall consist of locally native species the same or similar as those removed during construction and consistent with the sensitive natural community being replaced.

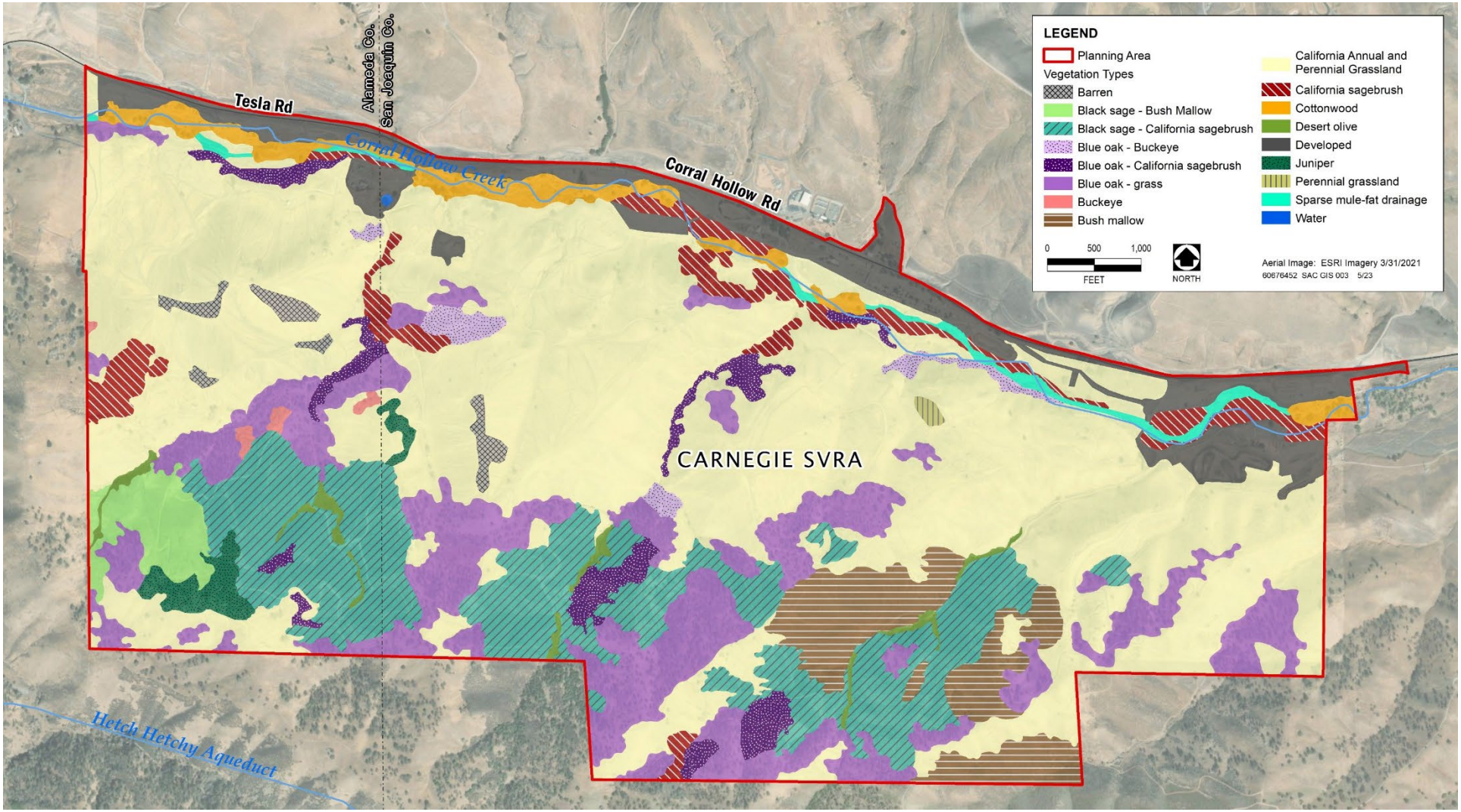
Impact BIO-10: Project activities such as gully erosion repair or trail crossings over drainages could occur in ephemeral drainages and potentially impact non-wetland jurisdictional waters of the U.S. under the Clean Water Act, the waters of the state under the Porter-Cologne Water Quality Control Act, or drainages subject to state regulation under the California Fish and Game Code section 1600.

Mitigation Measure BIO-10: Protection of Jurisdictional Waters and Habitats. If jurisdictional waters and habitats cannot be avoided, the OHMVR Division shall obtain permits from the agencies with jurisdiction over the waters and/or habitats, which may include the USACE, RWQCB, and/or CDFW. Required permits may include a CWA Section 404 Permit from the USACE and a CWA Section 401 Water Quality Certification from the RWQCB, or compliance with Porter-Cologne Waste Discharge Requirements (WDRs) under the RWQCB, and/or a Lake or Streambed Alteration Agreement with CDFW. Work within jurisdictional waters and/or habitats shall follow all measures and compensatory mitigation requirements (if applicable) in the required permits.

Impact BIO-11: Project activities such as new trail construction, trail reroutes, or gully erosion repairs could result in loss of native trees and associated habitat values.

Mitigation Measure BIO-11: Tree Replacement. Individual native trees removed by project construction shall be replaced, with the specific number of trees to be replaced determined during project-level planning. Locally native species such as blue oak shall be used as replacement trees. Seed shall be collected and grown to saplings on site or saplings shall be purchased from a nursery with seed collected within a 100-mile radius of Carnegie SVRA. Locally collected acorns can be planted directly. All replacement trees used shall be healthy and sourced from a reputable nursery, guaranteed to be pathogen free. A Tree Mitigation and Monitoring Plan shall be prepared specifying the species, replanting ratio, the monitoring period, minimum survival criteria, and irrigation (if needed) following replanting. Removed native trees will be replaced with native trees at a ratio that maintains the natural plant community composition and structure based on the habitat functions affected by tree removal. Tree replacement ratios will be determined based on the value of habitat affected by tree removal and

may include strategic planting to account for variations in soil, space, or climate, as well as to maintain the ecological and visual quality of the area. The Tree Mitigation and Monitoring Plan will document considerations made for tree removal in the construction area based on habitat loss, soil erosion, carbon sequestration, and air quality. If irrigation is required for plant establishment, temporary irrigation methods that allow a gradual tapering off of watering over a 3- to 5-year period shall be used.



Source: Carnegie General Plan Update 2024

Figure 7-1 Vegetation Communities, Habitats, and Land Cover Types

Carnegie SVRA Resource Management Area Program EIR

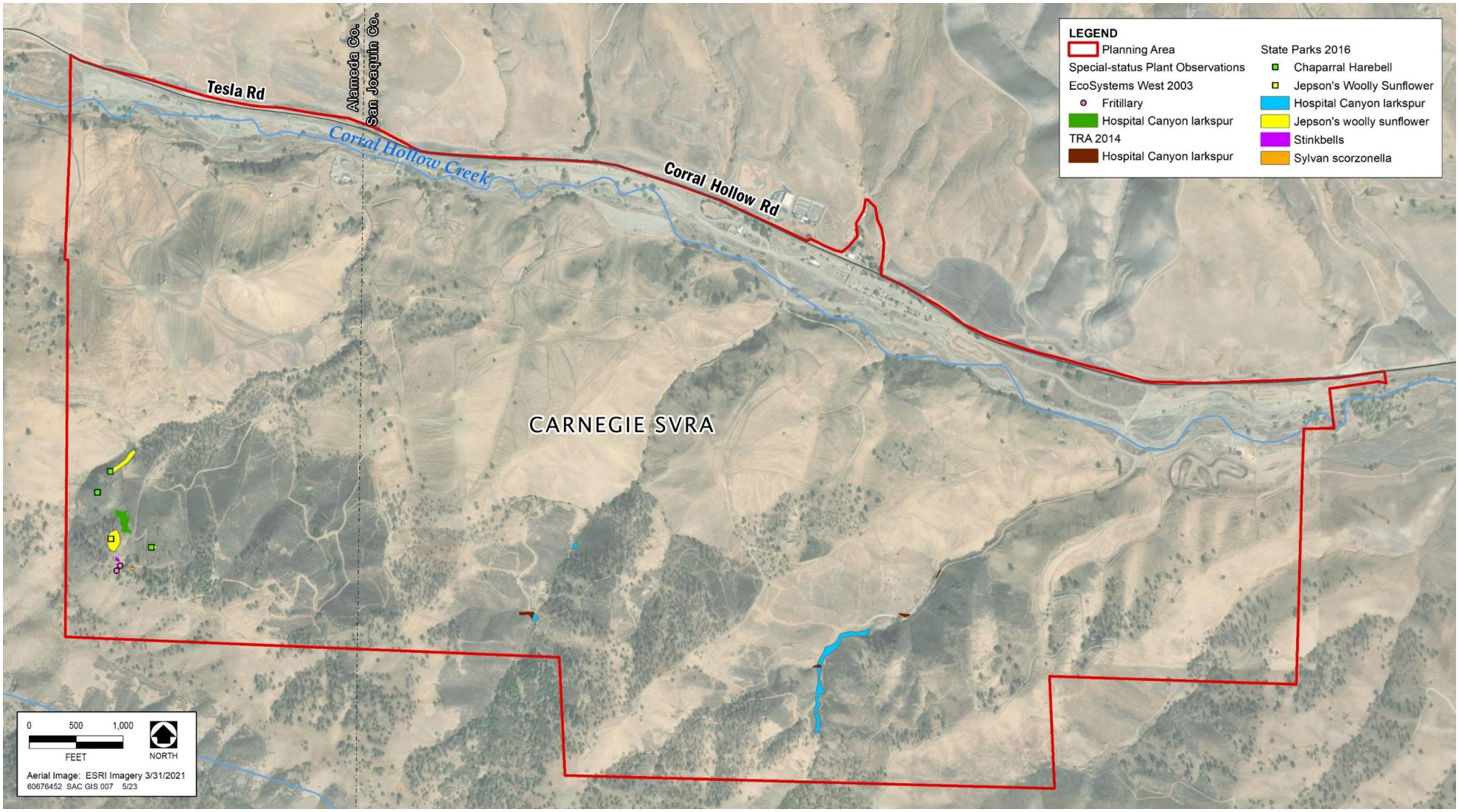
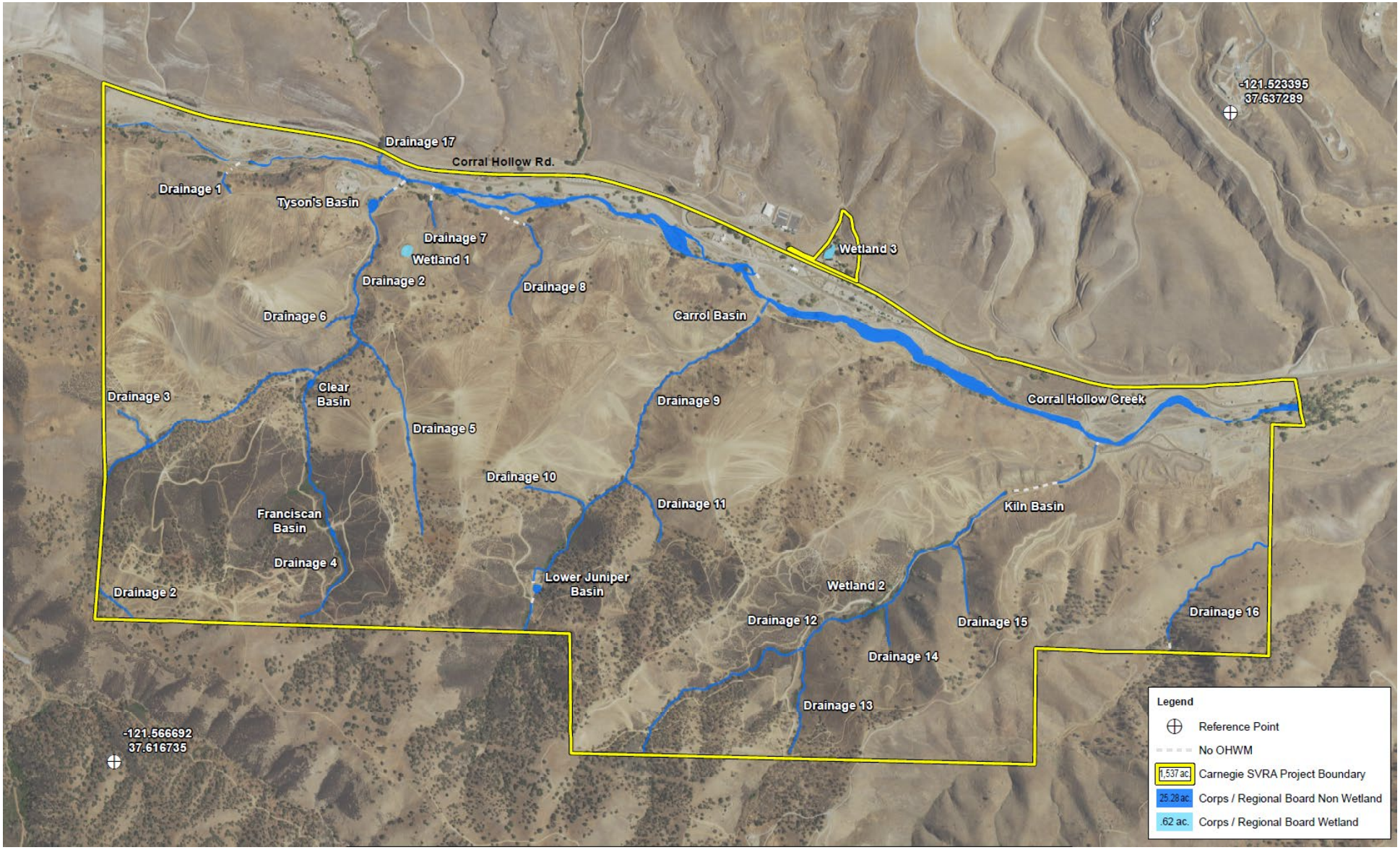


Figure 7-2 Special Status Plant Occurrences in the SVRA

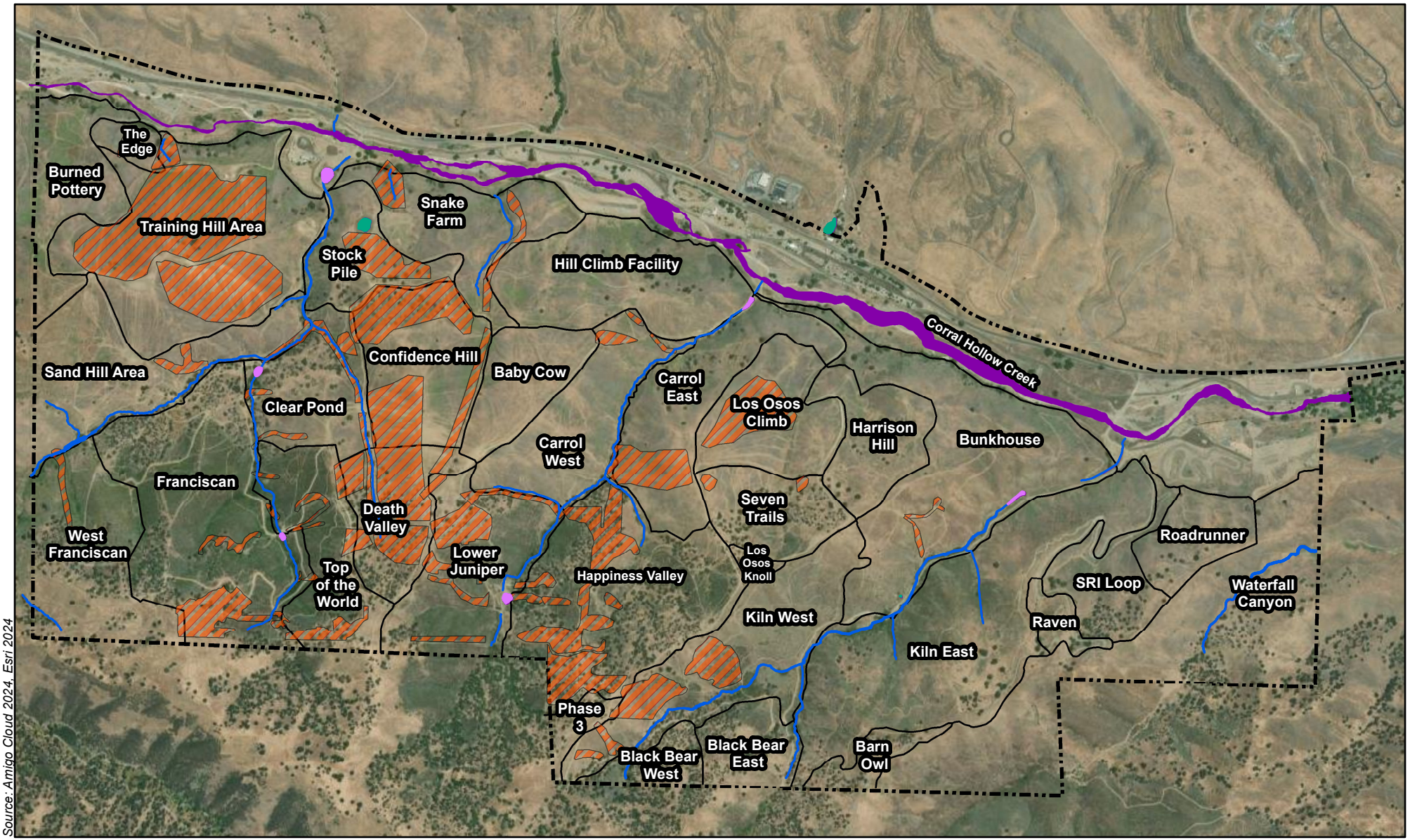
Carnegie State Vehicular Recreation Area RMA Program EIR

MIG



Source: Michael Baker International 2016

Figure 7-3 USACE and RWQCB Jurisdictional Map



Source: Amigo Cloud 2024, Esri 2024

Note: New RMA boundaries are approximate and may not represent exact location

0 0.075 0.15 0.3 0.45 0.6 Miles

N

Legend

- SVRA Boundary
- Resource Management Area
- Work Area
- Riverine Intermittent
- Ephemeral Drainage
- Pond
- Wetland

Figure 7-4 Aquatic Features

Carnegie State Vehicular Recreation Area RMA Program EIR

MIG

CHAPTER 8. CULTURAL AND TRIBAL CULTURAL RESOURCES

8.1 REGULATORY SETTING

8.1.1 Federal Laws and Regulations

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 CFR 800, as amended in 1999) require federal agencies to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP).

The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and culture. The regulations provided in 36 CFR 60.4 describe the criteria used to evaluate cultural resources for inclusion in the NRHP. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and (36 CFR 60.4):

a. are associated with events that have made a significant contribution to the broad patterns of our history;

b. are associated with the lives of persons significant in our past;

c. embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or

d. have yielded, or may be likely to yield, information important in prehistory or history.

To determine whether an undertaking could affect historic properties, cultural resources (including archaeological, historical, and architectural properties) must be identified, inventoried, and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, the work necessary to comply can be undertaken by others. The Section 106 review process involves a four-step procedure:

1. Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.

2. Identify historic properties by determining the scope of efforts, identifying cultural resources, and evaluating their eligibility for inclusion in the NRHP.

3. Assess adverse effects by applying the criteria of adverse effect on historic properties (resources that are eligible for inclusion in the NRHP).

4. Resolve adverse effects by consulting with the State Historic Preservation Officer (SHPO) and other consulting agencies, including the Advisory Council on Historic Preservation if necessary, to develop an agreement that addresses the treatment of historic properties.

If implementation of the proposed RMA Program involves projects requiring a federal permit (e.g., CWA Section 404 permit from USACE), or if any federal funding is used to implement certain aspects of the project, compliance with Section 106 would be required.

8.1.2 State Laws and Regulations

CEQA offers directives regarding impacts on historical resources and unique archaeological resources. CEQA states generally that if implementing a project would result in significant environmental impacts, then public agencies should determine whether implementing feasible mitigation measures or feasible alternatives can substantially lessen or avoid such impacts.

Only significant cultural resources (e.g., "historical resources" and "unique archaeological resources") need to be addressed. The CEQA Guidelines define a "historical resource" as, among other things, "a resource listed or eligible for listing on the California Register of Historical Resources" (CRHR) (CEQA Guidelines, section 15064.5[a][1]; see also PRC sections 5024.1 and 21084.1). A historical resource may be eligible for inclusion in the CRHR, as determined by the State Historical Resources Commission or the lead agency, if the resource meets any of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
2. Is associated with the lives of persons important in our past; or
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory[13] or history.

In addition, a resource is presumed to constitute a "historical resource" if it is included in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (CEQA Guidelines, section 15064.5[a][2]). The CEQA Guidelines require consideration of unique archaeological sites (section 15064.5). (See also PRC section 21083.2.)

A "unique archaeological resource" is defined in PRC section 21083.2(g) as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that the resource:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type, or
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site does not meet the criteria for inclusion in the CRHR but does meet the definition of a unique archaeological resource as outlined in PRC section 21083.2, it is entitled to special protection or attention under CEQA. Treatment options under section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under section 21083.2 include excavation and curation or study in place without

[13] Although "precontact" is the preferred term, this EIR uses "prehistory" or "prehistoric" when directly citing law or regulation.

excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Section 15064.5(e) of the CEQA Guidelines requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. Section 15064.5(d) of the CEQA Guidelines directs the lead agency to consult with the appropriate Native Americans as identified by the NAHC and directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

8.1.2.1 California Public Resources Code

Activities in Carnegie SVRA are subject to PRC requirements related to historical resources and archaeological resources, as described below.

Section 5024

PRC section 5024 requires state agencies to make a good-faith effort to protect and preserve all state-owned historical resources under their jurisdiction. Each state agency must submit to the SHPO an inventory of all state-owned historical resources exceeding 50 years of age that are under its jurisdiction. PRC section 5024.5 gives the SHPO the authority to review all efforts made by state agencies, to protect and preserve those resources from development and maintenance projects. The SHPO has a Memorandum of Understanding (MOU), and is currently renegotiating renewal, with State Parks to streamline Section 5024 reviews of all projects that could adversely affect significant historical resources. Under PRC 5024(f), a cultural resource is considered significant, and placed on the master list of state-owned of historical resources, if

- it meets one of the significance criteria for the NRHP, or
- it meets one of the criteria for a state historic landmark.

Under section 5024.5, no state agency shall alter the original or significant historical features or fabric, or transfer, relocate, or demolish historical resources on the master list. For projects that have potential to alter significant resources placed on the master list, state agencies are required to provide the SHPO 30 days to review and comment on the project. State agencies shall also adopt feasible and prudent measures to avoid adverse effects. To prevent adverse effects, State Parks uses the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*. The following basic concepts underlie all treatments:

- Keep good documentation, because it is essential to good management.
- Repair and retain historic fabric instead of replacing it.
- Replace with only "like-kind" materials, styles, finishes, colors, and craftsmanship.
- Avoid the false historicity that is created by using features that are undocumented or period styles that never were there.
- Make treatments reversible whenever possible.
- Protect archaeological resources.

To determine whether a project will affect a significant cultural resource, an OHMVR Division project manager prepares a project evaluation form and submits it to OHMVR Division archaeologists for review. Division archaeologists consult the most recent cultural resource

geodatabase and cultural resource inventory prepared for the subject SVRA and then prepare a Section 5024 report documenting the results of the investigation. The cultural resource is evaluated for significance according to NRHP and state historic landmark criteria. The Section 5024 report assesses potential impacts on the resource and describes mitigation measures. If the archaeologists determine that a project may have an adverse impact on significant cultural resources, project managers direct staff members to redesign the project, to avoid or mitigate those impacts.

Section 5097

PRC section 5097 addresses archaeological resources. Archaeological resources that are not "historical resources" may be "unique archaeological resources" as defined in PRC section 21083.2, which also generally provides that "nonunique archaeological resources" do not receive any protection under CEQA. PRC section 21083.2(g) defines a "unique archaeological resource" as an archaeological artifact, object, or site that does not merely add to the current body of knowledge but has a high probability of meeting any of the criteria identified there. If an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource are not considered to be a significant impact.

PRC section 5097.5 states that unauthorized removal or destruction of archaeological or paleontological resources on sites located on public lands is a misdemeanor. In this case, "public lands" means lands owned by or under the jurisdiction of the state or any city, county, district, authority, or public corporation or its agent.

PRC sections 5097.9 through 5097.991 (the California Native American Historic Resource Protection Act) establish the NAHC and its responsibilities with respect to Native American resources. State and local agencies are required to cooperate with the NAHC in carrying out those duties. The NAHC identifies and catalogs places that are of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands. It also performs other duties to preserve and maintain the accessibility of sacred sites and burials and properly dispose of Native American human remains and burial items. If human remains of Native American origin are discovered, the NAHC is responsible for identifying the person(s) it believes to be the most likely descendant of the deceased Native American.

PRC section 5097.98 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for such actions.

8.1.2.2 California Health and Safety Code

Activities in Carnegie SVRA are subject to several sections of the California Health and Safety Code pertaining to the discovery and treatment of human remains.

Section 7050.5

Section 7050.5 of the Health and Safety Code includes the following requirements:

- It is a misdemeanor to knowingly mutilate or disinter, wantonly disturb, or willfully remove human remains, whether the remains are in a dedicated cemetery or elsewhere.
- If human remains are discovered outside of a dedicated cemetery, the site and nearby areas potentially overlying adjacent remains may not be excavated or disturbed further until the county coroner has:

- found that the remains are not subject to legal provisions governing investigation of the circumstances, manner, and cause of the death; and
- made recommendations to the person responsible for excavation (or a representative) about how to dispose of the remains.

The coroner must make a determination within two working days after being notified of the discovery or recognition of the human remains.

- If the remains are not subject to the coroner's authority, but the coroner believes or has reason to believe that the human remains are those of a Native American, the coroner must contact the NAHC by telephone within 24 hours.

Section 8010-8011

Sections 8010–8011 of the Health and Safety Code establish a state repatriation policy and facilitate implementation of the federal Native American Graves Protection and Repatriation Act. The policy requires that all Native American physical remains and cultural items be treated with dignity and respect and encourages publicly funded agencies and museums in California to voluntarily disclose and return such remains and cultural items. The policy provides for mechanisms to aid Native American tribes, including those that are not federally recognized, in filing repatriation claims and obtaining responses to those claims.

8.1.2.3 California Government Code

Section 6254.10

Section 6254.10 of the California Government Code requires state and local agencies to keep confidential all records related to archaeological site descriptions, locations, reports, and records that are obtained through consultation with a Native American tribe.

8.1.2.4 Assembly Bill 52 / Tribal Cultural Resources

AB52 creates a formal role for California Native American tribes by creating a formal consultation process and establishing that a substantial adverse change to a tribal cultural resource has a significant effect on the environment. Tribal cultural resources are defined as:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    a. Included or determined to be eligible for inclusion in the CRHR
    b. Included in a local register of historical resources as defined in PRC section 5020.1(k)
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC section 5024.1 (c). In applying the criteria set forth in PRC section 5024.1 (c) the lead agency shall consider the significance of the resource to a California Native American tribe.

A cultural landscape that meets the criteria above may also be a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape. In addition, a historical resource described in PRC section 21084.1, a unique archaeological resource as defined in PRC section 21083.2(g), or a "non-unique archaeological resource" as defined in PRC section 21083.2(h) may also be a tribal cultural resource if it conforms to the above criteria.

AB52 requires a lead agency, prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a project, to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if: (1) the California Native American tribe requested to the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribe, and (2) the California Native American tribe responds, in writing, within 30 days of receipt of the formal notification and requests the consultation. AB52 states: "To expedite the requirements of this section, NAHC shall assist the lead agency in identifying the California Native American tribes that are traditionally and culturally affiliated with the project area" (PRC § 21080.3.1).

8.1.2.5 DPR Native American Consultation Policy

It is DPR policy to involve Native California Indian groups in all plans and practices that have impacts on the cultural resources under DPR's stewardship (DPR 2007). Prior to implementing projects or policies that may have impacts on Native American sites within the State Park System, DPR will actively consult with local Native California Indian groups regarding the protection, preservation, and/or mitigation of cultural sites and sacred places in the State Park System. Departmental Notice 2007 *Native American Consultation Policy and Implementation Procedures* (DPR 2007) identifies the following nine areas of activity where consultation between local Native California Indian groups and DPR is required:

- Acquisition of properties where cultural sites are present
- During the General Plan process and/or development of Management Plans
- Planning, design, and implementation of capital outlay projects
- Issues of concern identified by the tribes
- Plant and mineral gathering by Native people
- Access to Native California Indian ceremonial sites
- Archaeological permitting
- Mitigation of vandalism and development of protective measures at Native American sites
- When using the Native voice in presenting the story of California native Indian people in park units

8.1.3 Executive Order B-10-11

Executive Order B-10-11 acknowledges the important relationship that many Native American California Tribes have with their native home of California. As described in the Executive Order, the term "Tribes" includes all Federally Recognized Tribes and additional California Native Americans. The Executive Order affirms that the State of California recognizes and reaffirms the inherent right of these Tribes to exercise sovereign authority over their members and territory. Most importantly, it is ordered that it is the policy of this Administration that every state agency and department subject to the Governor's control shall encourage communication and consultation with California Indian Tribes.

8.1.4 SPRs for Cultural Resources

DPR implements SPRs (see Appendix B) for activities occurring in culturally sensitive areas. As a general SPR, prior to the start of on-site construction, all resources that must be protected are identified and construction workers are trained in resource identification and protection procedures. Protective measures include coordination with an archaeologist or Cultural Resources Specialist to determine avoidance measures and provide monitoring during project activity if needed. Archaeologist SPRs address inadvertent discovery of cultural resources or human remains.

If an undocumented cultural resource is discovered, work would be temporarily halted and the appropriate DPR representatives would be contacted to further evaluate the resource and determine the appropriate treatment and disposition of the cultural resource.

In the event that human remains are encountered on the project site, work would cease immediately. The County Coroner would be notified in accordance with the requirements of CCR section 15064.5(e) and State Health and Safety Code section 7050.5. If the County Coroner determines that the human remains are of Native American origin, the NAHC or tribal representative would be contacted and no work at the site would resume until proper disposition is complete (PRC section 5097.98).

8.1.5 Diablo Range District Tribal Cultural Resources Standard Practices

The Diablo Range District regularly consults with Native American Tribes to identify resources and address potential adverse impacts to tribal cultural resources. It is the District's standard practice during the project pre-planning process to identify, through consultation with Native American Tribe(s), areas of the park that contain tribal cultural resources. If a project is proposed in that area, the District will work with the tribe(s) to resolve concerns through a variety of measures that may include avoidance, minor redesigns to the proposed project, and monitoring during ground disturbing activities. If requested, a Native American monitor will be on site during ground disturbing activities to potentially identify undiscovered resources and to ensure that known resources are protected. If there is an unanticipated discovery during project activities, the procedures outlined in the SPRs are followed and the District further consults with the Native American Tribe to avoid, preserve, and design an appropriate treatment strategy to protect the resource if needed.

8.1.6 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Cultural Resource Management (CR) Goals and Guidelines to protect cultural resources and tribal cultural resources. CR Goal 2 and CR Guidelines 2.4, 2.8, and 2.10 are relevant to the RMA Program. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

8.2 ENVIRONMENTAL SETTING

8.2.1 Ethnography

A brief overview of the Native American people inhabiting the Carnegie SVRA region is presented below based on information presented in the Carnegie SVRA General Plan Update (DPR 2024a).

Carnegie SVRA is located in the Diablo Range, which is generally considered the approximate boundary between the Native American people of the Northern Valley Yokuts and the Ohlone.

Northern Valley Yokuts. The territory of the Northern Valley Yokuts spanned from Mendota to the Mokelumne River and from the Diablo Range foothills to the Sierra Nevada foothills. They established tribelet centers in the western part of their territory, relying on exchange with larger villages along the San Joaquin River. Key resources included acorns, buckeye nuts, and game like deer, antelope, rabbits, and waterfowl. Evidence of their presence, such as milling features, has been found near Carnegie SVRA, and a village site was identified near the Edward B. Carrell house, immediately west of Carnegie SVRA.

Ohlone. The territory of the Ohlone extended from San Francisco Bay to the Livermore Valley and south to Point Sur. The Ohlone lived in approximately 50 separate, autonomous tribelets, speaking distinct dialects of the Costanoan language. They had abundant natural resources, including acorns, nuts, and berries, and engaged in the gathering and roasting of seeds. Their villages featured thatched structures and semi-subterranean sweathouses. They traded mainly with neighboring tribes like the Plains Miwok and Northern Yokuts. The Ohlone were displaced by Spanish colonization, with many sent to Mission San Jose, where missionization, disease, and displacement greatly impacted their way of life.

These two groups -- Northern Valley Yokuts and Ohlone – played significant roles in the region's historical and cultural landscape before European contact.

8.2.2 Historic-Era

The Carnegie SVRA General Plan Update (DPR 2024a) presents a historical overview of Corral Hollow Canyon and the land use patterns based on the work of Dan Mosier and Earle Williams in *History of Tesla: A California Coal Mining Town* (Mosier and Williams 2002) as cited in (DPR 2024a). A brief summary of the historic land use pattern in Corral Hollow Canyon is presented below.

Spanish and Early Settlement (Before 1800 - 1850s-1860s)

- Corral Hollow Canyon was traversed by explorer Juan Bautista de Anza in 1776. The Zink House, built around 1850 House at the mouth of Corral Hollow Canyon east of the project area, marked an early settlement along the historic El Camino Viejo route.
- The Edward B. Carrell House was a notable landmark, and the area saw the passage of settlers and the 49ers during the Gold Rush.

Mining (1856 - Mid 20th Century)

- **Early Coal Mining (1856-1860s):** Coal seams were first discovered during a railroad survey in 1856. Several mining ventures, such as the Pacific Coal Mining Company and Eureka Coal Mining Company, were established but failed due to economic challenges.
- **Late 19th- and 20th-Century Operations:** John Treadwell revived the mines in 1890, expanding into clay, coal, sand, and glass production. His operations included the Carnegie Brick and Pottery Works and the Pacific Window Glass Company, both significant industrial ventures.
- **Supporting Communities:** Treadwell developed several communities (Tesla, Jimtown, Harrietville, etc.) to support workers, with social stratification. Carnegie, named after Andrew Carnegie, housed the industrial operations and had a population of about 350 at its peak.

Collapse of Operations (1902-1911)

- A series of disasters, including floods, fires, and explosions, led to the collapse of Treadwell's operations by 1911. Subsequent attempts to revive mining were unsuccessful, and the towns were abandoned.

Water and Power Generation (1920s-1930s)

- The San Francisco Public Utilities Commission began constructing the Coast Range Tunnel in the late 1920s to bring water from Hetch Hetchy Valley to San Francisco, passing through the southern boundary of what is now Carnegie SVRA.

Ranching (1846 - Present)

- Ranching began in 1846 with Charles Imus corralling mustangs. The area was later used for sheep and cattle ranching. After Treadwell's operations ended, the Tesla Cattle Company took over, and ranching continues on the surrounding lands.

Off-Highway Vehicle (OHV) Recreation (1940s - Present)

- In the 1940s, OHV enthusiasts began using the area, and in 1970, Carnegie Cycle Park was established. The State of California acquired the area in 1979, and it remains an OHV recreation center today.

8.2.3 Historical Resources

DPR contracted with the Anthropological Studies Center (ASC) at Sonoma State University to conduct a cultural resource inventory of the existing SVRA and adjacent Alameda-Tesla property (ASC 2025). This investigation resulted in the identification and recordation of 25 cultural resources within the SVRA boundaries. Of these resources, 1 reflects precontact land use and 24 are the results of historic-era themes relating to transportation, pottery and brick works, and mining activities (DPR 2024a). The cultural resource inventory of Carnegie SVRA included the survey, recordation, and evaluation of historic-era sites, features, and artifacts to learn more about the brick and pottery industrial undertakings and company town sites within Corral Hollow between 1855 and the 1960s. All historic-era sites are located on the valley floor and are protected within areas closed to visitor recreation.

Carnegie is listed as a California Historical Landmark Number 740 for its industrial history and settlement. The original 1961 historical marker was replaced in 2021 in commemoration of the California State Parks 50th anniversary of the OHMVR Program. The 2021 plaque reads as follows:

> **California Registered Historical Landmark No. 740** - In a town named for industrialist Andrew Carnegie, John and James Treadwell owned and operated the Carnegie Brick and Pottery Company from 1902 to 1912. Using clay mined at Tesla, four miles to the west of Carnegie, the factory produced over seventy million bricks and architectural Terra Cotta products, used in prominent buildings throughout California and the west, many of which stand today. The factory included numerous large buildings, twenty-six kilns, and four tall smokestacks. At its height, 350 people lived in Carnegie where one could find a company store, hotel, saloon, butcher shop, school, two bunk houses, and family cabins. Two boiler explosions and financial difficulties beginning in 1909 led to the factory closing in 1912.

8.2.4 Tribal Cultural Resources

PRC Section 21074 defines "Tribal cultural resources" as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that are listed or determined eligible for listing in the CRHR, listed in a local register of historical resources, or otherwise determined by the lead agency to be a Tribal cultural resource. For the purposes of this impact discussion, "historical resource" is used to describe historic-period, built-environment resources. Tribal cultural resources, which may qualify as "historical resources" pursuant to CEQA, are analyzed separately from built-environment historical resources.

DPR contracted with ASC in 2024 to update information on tribal resources present within Carnegie SVRA (DPR 2024a). ASC was contracted to:

- Incorporate traditional tribal knowledge into the survey and reporting process;
- Conduct a reconnaissance survey using 15-meter transects through the entire property;
- Record previously recorded sites using Geographic Information System (GIS) and current scientific standards and record cultural sites important to Tribal Partners;
- Evaluate sites for inclusion in the National Register of Historic Places and California Register of Historic Places.

ASC conducted field surveys on June 20-25, July 22-26, and September 3-4, 2024. State Parks Tribal Liaisons met with the Northern Valley Yokut/Ohlone Tribe at Carnegie SVRA on June 27 and September 9, 2024, to discuss the project scope, a survey strategy, and identification of tribal cultural resources. State Parks and Northern Valley Yokut/Ohlone Tribe also communicated weekly on survey status and recordings. ASC worked with Diablo Range District's Associate State Archaeologist, Cultural Resources Supervisor, the Northern Valley Yokut/Costanoan Tribal Chairperson, Confederated Villages of Lisjan Tribal Chairperson, and Tribal monitors throughout the archaeological survey. During this survey, three new tribal cultural resources were recorded, bringing the total number of formally identified cribal cultural resources to four in the SVRA.

DPR consultation with Native American tribal groups included sending formal AB52 consultation letters and emails to all Tribes identified on the NAHC contact list for Alameda and San Joaquin counties. Of all the Tribes that were contacted, three responded. One Tribal response was to notify DPR that Carnegie SVRA was not in their ancestral territory and their decline of consultation. Northern Valley Yokuts (NVYT) and Confederated Villages of Lisjan (CVL) responded and expressed their interest in formal consultation for this project. Preliminary Tribal meetings were held on April 2, 2025, with CVL and with NVYT on April 24, 2025. Subsequent follow up meetings were held on May 7, 2025, and June 4, 2025, with CVL representatives, who did not provide comment on the project scope but did indicate that they wanted to continue to consult for this project. At the April 24, 2025, meeting with NVYT, Chairperson Perez did not have comments on the project scope but wanted to be consulted as the individual project level. DPR will continue consultation for each individual project.

8.3 PROJECT IMPACTS

8.3.1 Thresholds of Significance

Consistent with CEQA Guidelines Appendix G, the project would have a significant impact on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5;
- Disturb any human remains, including those interred outside of formal cemeteries;
- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
    - Listed or eligible for listing in the CRHR or in a local register of historical resources as defined in PRC section 5020.1(k); or
    - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC section 5024.1. In applying the criteria set forth in subdivision (c) of PRC section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

8.3.2 Historical Resources pursuant to § 15064.5

Pursuant to CEQA Guidelines section 5064.5(b), a substantial adverse change in the significance of a historical resource is defined as "the demolition, destruction, relocation, or alteration of a resource or its immediate surroundings such that its significance is materially impaired." In general, a historical resource's significance is materially impaired when it can no longer convey its historical significance and therefore can no longer justify its inclusion in, or eligibility for inclusion in, the CRHR, the local register of historical resources pursuant to PRC section 5020.1(k), or its identification in a historical resources survey meeting the requirements of PRC section 5024.1(g).

Implementation of the proposed project would not impact known existing historical resources. The remnants of the Carnegie brick and pottery company site are entirely located on the valley floor of the SVRA and outside the boundaries of the RMA Program area. The area is bounded by the main park road on either side and fenced off and would not be affected by the proposed project activities. Future maintenance actions that may occur in yet undetermined locations would be screened for their potential to intersect with known cultural resources. If a potential for impact exists, the project activity would be designed to avoid impact. Consistent with DPR policy, an archaeological monitor may be present as needed to ensure impacts are avoided. As a result, impacts on historical, resources would be ***less than significant.***

8.3.3 Archaeological Resources pursuant to § 15064.5

Pursuant to PRC § 21083.2(g) an impact is defined as anything that would disturb or destroy a unique archaeological resource or would cause a substantial adverse change in unique archaeological resources.

Previous cultural inventories done in 1984 (S-6547) and 2010 (ASC 2010) recorded 15 archaeological sites; 13of these sites are historic, one is tribal cultural, and one is multicomponent (Table 8-1). During the 2024 Cultural Inventory Survey updates (ASC 2025), Anthropological Study Center (ASC) located 13 new sites (Table 8-2). Nine of these new sites are historic-era, and four are natural or areas that have or may have been Native American culturally significant locations. All known archaeological sites are located in protected areas and implementation of the proposed project would not impact these archaeological resources.

Table 8-1. Identified Sites in the 2010 Cultural Inventory Study

Primary Trinomial	Other ID	Period	Status	Eligibility
P-01-000067	none available	Historic	Updated	Noncontributing
P-01-000165	CA-ALA-443	Native American	No Update	Yes
P-39-000290	ASC-34-08-01	Historic	No Update	Noncontributing
P-39-004598	CA-SJO-311H	Historic	No Update	Yes
P-39-005026	CA-SJO-000329H, ASC-34-08-07	Historic	No Update	Yes
P-39-005028	CA-SJO-331H, ASC-34-08-41	Historic	No Update	Yes
P-39-005057	CA-SJO-000333H, ASC-34-08-45	Historic	No Update	Noncontributing
P-39-005058	CA-SJO-000334H, ASC-34-08-55	Historic	No Update	Yes
P-39-005059	CA-SJO-000335H, ASC-34-08-61	Historic	Updated	Noncontributing
P-39-005066	CA-SJO-000336H, ASC-34-08-65	Historic	No Update	Yes
P-39-005067	CA-SJO-000337H, ASC-34-08-64	Historic	Updated	Noncontributing
P-01-011065	ASC-34-08-15	Historic	No Update	Yes
P-01-011067	ASC-34-08-17	Historic	Updates	Yes
P-01-011094	ASC-34-08-50	Historic	No Update	Yes
P-01-011106	ASC-34-08-63	Historic	No Update	Yes

Table 8-2. Sites Identified in the 2024 Cultural Inventory Study

Primary Trinomial	Other ID	Period	Status	Eligibility
No Primary Assigned	ASC-2024-02	Historic	New Site Location	No
No Primary Assigned	ASC-2024-09	Historic	New Site Location	No
No Primary Assigned	ASC-2024-10	Historic	New Site Location	Isolate
No Primary Assigned	ASC-2024-11	Historic	New Site Location	Isolate
No Primary Assigned	ASC-2024-12	Historic	New Site Location	No
No Primary Assigned	ASC-2024-13	Native American	New Site Location	Potentially Contributing
No Primary Assigned	ASC-2024-14	Native American	New Site Location	Potentially Contributing
No Primary Assigned	ASC-2024-16	Historic	New Site Location	No
No Primary Assigned	ASC-2024-26	Historic	New Site Location	Isolate
No Primary Assigned	ASC-2024-27	Historic	New Site Location	No
No Primary Assigned	ASC-2024-28	Historic	New Site Location	No
No Primary Assigned	ASC-2024-29	Native American	New Site Location	Potentially Contributing
No Primary Assigned	ASC-2024-30	Native American	New Site Location	Potentially Contributing

Potential impacts that the RMA project could have on archaeological resources include surface impacts such as trampling, breaking of artifacts, looting, and loss of contextual integrity. Ground disturbance impacts from this project include excavation of resources, destruction of buried resources, loss of contextual integrity, or complete loss of the archaeological resource.

The proposed RMA Program activities would not disturb known cultural resource locations. Future maintenance actions that may occur in yet undetermined locations would be screened for their potential to intersect with known cultural resources. If a potential for impact exists, the project activity would be designed to avoid impact. Consistent with DPR policy, an archaeologist or tribal community monitor may be present as needed to ensure impacts are avoided. As a result, implementation of SPR's for this project would reduce impacts on archaeological, and tribal resources would be ***less than significant.***

8.3.4 Disturbance of Human Remains

Native American human remains have been identified at one location in Carnegie SVRA. The potential exists for additional remains to be discovered, either in the vicinity of this location or in other previously undisturbed contexts (DPR 2024b). Should human remains be discovered, DPR will follow the procedure as outlined in California Health and Safety Code section 7050.5 and the NAHC to determine the appropriate course of action for dealing with the find. Compliance with these requirements is included in SPRs for cultural resources. As a result, the potential impact of project activities on human remains is ***less than significant***.

8.3.5 Tribal Cultural Resources defined in PRC section 21074

The proposed project would have a significant impact on a tribal cultural resource if it caused a substantial adverse change in the significance of the tribal cultural resource Potential impacts that the RMA Program could have on tribal cultural resources include surface impacts such as trampling, breaking of artifacts, looting, and loss of contextual integrity. Ground disturbance impacts from this project include excavation of resources, destruction of buried resources, loss of contextual integrity, or complete loss of the archaeological resource. Indirect impacts for tribal cultural resources include disturbance of spiritual or ceremonial areas, visual and auditory impacts to ceremonial or cultural areas, and changes in erosion or drainage patterns that could cause future impacts to tribal cultural resources.

In consultation with tribes, the project area has been identified as a tribal cultural landscape and there is potential for the discovery of buried Native American tribal resources that do not meet the criteria to be considered unique archaeological resources under the normal CEQA guidelines. However, it is possible for a lead agency to determine that an artifact is considered significant to a local tribe and thus make it a significant resource under CEQA. SPRs for cultural resources would be enacted to help protect and safeguard buried archaeological resources, including TCRs, in the case of accidental discovery. The mitigation measure includes language that all Native American finds are to be considered significant until the lead agency has enough evidence to consider an artifact, or other find that is not eligible for listing, not significant. The impact would be ***less than significant***.

8.4 CUMULATIVE IMPACTS

There are known archaeological resources in the RMA Program project area and the state archaeologist has indicated that the SVRA is sensitive in terms of tribal cultural resources. Therefore, excavation and ground moving activities associated with the RMA program activities have the potential to uncover archaeological resources. However, the potential construction-related impacts on unknown historical, archaeological, and tribal cultural resources and/or unknown human remains would be less than significant with implementation of SPRs for cultural resources.

The projects shown in Figure 3-1 could have potentially significant impacts on unknown historical, archaeological, and tribal cultural resources and/or unknown human remains similar to the proposed project, which could result in cumulative impacts on such resources However, these projects will be responsible for implementing protective measures consistent with General Plan Update Goals and Guidelines to protect undiscovered cultural resources as well as comply with state regulations regarding discovery of human remains. Therefore, the proposed project is not expected to result in cumulatively considerable impacts on undiscovered cultural resources when combined with other projects in the SVRA. The project would have a ***less than significant cumulative impact***.

8.5 MITIGATION MEASURES

No significant impacts on cultural and tribal resources have been identified for the project based on the analysis contained in sections 8.3 and 8.4 above. No mitigation is required.

CHAPTER 9. GEOLOGY AND SOILS

The information in the regulatory and environmental setting sections below is derived from the General Plan Update (DPR 2024a) and references therein, though it has been abbreviated to the information most relevant to the proposed project.

9.1 REGULATORY SETTING

9.1.1 Federal Regulations and Laws

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program. The program's mission is to improve understanding, characterization, and prediction of hazards and vulnerabilities; improve building codes and land use practices; reduce risk through post-earthquake investigations and education; develop and improve design and construction techniques; improve mitigation capacity; and accelerate application of research results.

The National Earthquake Hazards Reduction Program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act, which refined the description of agency responsibilities, program goals, and objectives. This law designates the Federal Emergency Management Agency (FEMA) as the program's lead agency and assigns several planning, coordinating, and reporting responsibilities. The National Earthquake Hazards Reduction Program was amended again in 2018 by the National Earthquake Hazards Reduction Program Reauthorization Act of 2018 to expand the activities of the Program. Other National Earthquake Hazards Reduction Program Act agencies are the National Institute of Standards and Technology, National Science Foundation, and the United States Geologic Survey (USGS).

9.1.2 State Regulations and Laws

9.1.2.1 Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (PRC sections 2621–2630) was enacted in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent buildings used for human occupancy from being constructed on the surface trace of active faults, where future displacement is expected to occur. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as "earthquake fault zones" around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require the completion of a geologic investigation demonstrating that proposed buildings would not be constructed across active faults.

9.1.2.2 Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (PRC §§ 2690-2699.6) addresses earthquake hazards from non-surface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake-related and geologic hazards. The act also specifies that the lead agency for a project may withhold development permits until geologic or soils

investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce the hazards associated with seismicity and unstable soils.

9.1.2.3 Landslide Hazard Mapping Act

Following the 1982 El Niño storms in the San Francisco Bay area, the Landslide Hazard Mapping Act mandated the creation of new maps showing landslides and landslide hazards. Landslide hazard identification maps were prepared from 1986 to 1995 by the California Geological Survey for use by local government planners. A set of three to four maps was prepared for each map study area, usually encompassing a USGS 7.5-minute topographic quadrangle map. The set of maps typically consisted of a geologic map, a landslide inventory map (showing the location and distribution of existing landslides), and one or two maps showing relative susceptibility to landslides. The Landslide Hazard Identification Program has been repealed, but the maps produced under that program have been incorporated into the current Seismic Hazards Zonation Program. Landslide inventory maps prepared for seismic hazards zonation are available as part of the California Geological Survey's Landslide Inventory Map Series.

9.1.2.4 California Public Resources Code Section 5090.35

The PRC requires management and protection of soil resources specific to SVRAs. Section 5090.35(a) states:

> The protection of public safety, the appropriate utilization of lands, and the conservation of land resources are of the highest priority in the management of the state vehicular recreation areas; and, accordingly, the division shall promptly repair and continuously maintain areas and trails, anticipate and prevent accelerated and unnatural erosion, and restore lands damaged by erosion to the extent possible.

9.1.2.5 Off-Highway Motor Vehicle Recreation Division Soil Conservation Standard and Guidelines

The 2020 *Soil Conservation Standard and Guidelines* (Soil Standard) (DPR 2020) requires that the OHMVR Division manage OHV recreation facilities to meet the following standard:

> OHV recreation facilities shall be managed for sustainable long-term prescribed use without generating soil loss that exceeds restorability, and without causing erosion or sedimentation which significantly affects resource values beyond the facilities. Management of OHV facilities shall occur in accordance with Public Resources Code, Sections 5090.2, 5090.35, and 5090.53.

The Soil Standard's guidelines provide tools and techniques that may be used to meet this standard and includes measures to maintain trails to a standard that allows for feasible rehabilitation by natural resource managers. The Soil Standard also provides measures to help anticipate and prevent accelerated and unnatural erosion, and to guide the maintenance and repair of trails. Other tools and techniques that are more applicable to specific facility conditions and organizational protocols also may be used for compliance as appropriate.

9.1.2.6 California Public Resources Code Section 5097.5

Unauthorized collection of fossils on land under state ownership or jurisdiction is considered a misdemeanor, punishable by fine and/or imprisonment. PRC section 5097.5 states:

> A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate

paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.

9.1.3 BMPs and SPRs for Erosion and Sediment Control

The OHV BMP Manual (Salix Applied Earthcare and Geosyntec Consultants 2007b) provides guidance on selecting, implementing, and maintaining BMPs for OHV-type facilities and construction activities. BMPs detailed in the manual address erosion control (e.g., blankets, mulches, hydroseeding techniques), scour control (e.g., check dams and armoring as in upland swales and ditches), dust control, sediment traps, and waste management. BMPs from the OHV BMP Manual that are applicable to and incorporated into the proposed RMA Program project are listed in Table 2-10 in Project Description section 2.5. Additionally, the SPRs for geology and soils include measures to control erosion on decommissioned trails and the SPRs for hydrology includes measures to reduce the discharge of soil into surface water runoff (Appendix B).

9.1.4 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Geology (Geo) and Soils Goals and Guidelines for the protection of soils and paleontological resources. Geo Goal 2 and Geo Guidelines 2.2 and 2.3 and Soils Goal 1 and Soils Guidelines 1.1, 1.3 through 1.5 are relevant to the RMA Program. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

9.2 ENVIRONMENTAL SETTING

9.2.1 Geology

9.2.1.1 Regional Geology

Carnegie SVRA is located in the Coast Range Geomorphic Province, which is characterized by northwest-southeast trending ridges separated by parallel river valleys. The Coast Ranges were created by folds and faults that resulted from the collision of the Pacific and North American Plates and subsequent strike-slip faulting along the San Andreas Fault zone.

More specifically, Carnegie SVRA is located within the Diablo Range, a prominent mountain range extending approximately 180 miles from Mt. Diablo in the north to Cholame in the south. Average elevations in the Diablo Range are 2,000–3,000 feet above mean sea level. The Diablo Range generally consists of rolling grassland and plateaus, with occasional peaks. Boundaries between ridges and valleys are often defined by faults, which separate rocks that are more resistant to weathering and landslides, from weaker rocks.

Rocks in the Diablo Range consist primarily of metamorphic and igneous rocks associated with the Franciscan Complex (described in more detail below in section 9.2.1.2). These rocks are adjacent to, and locally overlain tectonically by, sequences of oceanic crustal and marine sedimentary rocks of late Mesozoic through Tertiary ages. Regional geology is controlled by faults and folds from older inactive and more recent active fault zones.

9.2.1.2 Local Geology

Carnegie SVRA is located within the USGS Cedar Mountain and Midway 7.5-minute quadrangles. The area's topography ranges in elevation from approximately 600 to 1,700 feet

above mean sea level; hills with moderate to steep slopes yield to more gently sloping and flat land along Corral Hollow Creek, and rock outcroppings are present.

Based on descriptions provided by Throckmorton (1988) and Carpenter et al. (1984) as cited in the Carnegie SVRA General Plan Update (DPR 2024a), rock formations in the vicinity of Carnegie SVRA range in age from Jurassic to upper Miocene and are found within a complex structure of faults and folds.

A review of the *Geologic Map of the San Francisco–San Jose Quadrangle* (Wagner et al. 1991 as cited in DPR 2024a) indicates that the SVRA is composed of a variety of geologic formations as described below and mapped in the General Plan Update (DPR 2024a Figures 2-3 and 2-4). Geologic formations are shown Figure 9-1.

Quaternary alluvium—Holocene-age deposits composed of unconsolidated stream and basin deposits from clay to boulder size.

Contra Costa Group—late Miocene–age nonmarine deposits composed of sandstone, conglomerate, shale, and minor amounts of claystone, limestone, and tuff. The Contra Costa Group includes the Orinda and Moraga Formations.

San Pablo Group—late Miocene–age marine deposits composed of sandstone, mudstone, siltstone, and shale with minor amounts of tuff. The San Pablo Group includes the Neroly Sandstone, Cierbo Sandstone, and Briones Sandstone Formations.

Tesla Formation—late Eocene– and early Paleocene–age deposits composed of quartzose sandstone interbedded with siltstone, mudstone, and carbonaceous shales. The Tesla Formation includes the Laguna Seca Formation.

Moreno Formation—Cretaceous-age marine deposits composed of shale and sandstone.

Panoche Formation—Cretaceous-age marine deposits composed of shale, siltstone, and sandstone.

Franciscan Complex Mélange Terrane—a chaotic mixture of Jurassic- and Cretaceous-age fragmented rock masses in a sheared matrix. Coherent masses large enough to be shown on geologic maps consist of sandstone, shale, limestone, chert, greenstone, serpentinized ultramafic rocks, and metagraywacke.

Franciscan Complex Chert—the Jurassic- to Cretaceous-age chert member of the Franciscan Complex. Most of the chert in the Franciscan Complex consists of fine-grained, hard, highly siliceous rocks. Most have a high iron oxide or hydroxide content and thus are red, reddish, brown, or green. Many of the Franciscan chert outcrops are interbedded with shale. About 10 percent of the chert in the Franciscan Complex consists of the skeletons of tiny marine organisms called radiolaria (Bailey et al. 1964 as cited in DPR 2024a).

9.2.2 Regional Seismicity and Fault Zones

Potential seismic hazards resulting from a nearby moderate to major earthquake generally can be classified as primary or secondary. The primary effect is fault ground rupture, also called surface faulting. Common secondary seismic hazards are ground shaking, liquefaction, and subsidence. Each of these potential hazards is discussed below.

9.2.2.1 Fault Ground Rupture

Surface rupture is the actual cracking or breaking of the ground along a fault during an earthquake. Structures built over an active fault can be torn apart if the ground ruptures. Surface

ground rupture along a fault generally is limited to a linear zone a few yards wide. The Alquist-Priolo Earthquake Fault Zoning Act was enacted to prohibit structures designed for human occupancy from being built across the traces of active faults, and thus to reduce the loss of life and property from an earthquake. The Greenville Fault is the closest fault to Carnegie SVRA and is located approximately 3 miles west of the area (see Figure 2-4 in DPR (2024a)). This fault is located within an Alquist-Priolo Earthquake Fault Zone (CDOC 2021; as cited in DPR 2024a).

9.2.2.2 Seismic Ground Shaking

Ground shaking is the motion that occurs as energy is released during faulting and has the potential to result in damage to or collapse of buildings, and to cause landslides, subsidence, liquefaction, or seiches. The effects of ground shaking depend on the magnitude of the earthquake, location of the epicenter, character and duration of the ground motion, and type of soil and/or rock formation.

9.2.2.3 Faults in the Project Region.

Seven major active faults extend through the San Francisco Bay region in a northwesterly direction and have produced at least 12 large-magnitude (greater than 6.0) earthquakes in the last 200 years. The faults on which these earthquakes occurred are part of a fault located along the boundary of the Pacific oceanic plate and the North American continental plate. The two plates are sliding past one another, forming a transform boundary.

The Greenville Fault, which is active and is considered by the Working Group on California Earthquake Probabilities (2003) to be one of the seven major faults in the San Francisco Bay Area, is located 3 miles west of Carnegie SVRA. Table 9-1 below identifies the major regional faults, their approximate distances from the SVRA, and the estimated maximum moment magnitude and slip rate of reach fault.

In addition to these regional faults, there are five smaller faults in the project area including the Corral Hollow, Tesla, and Carnegie Faults which pass through Carnegie SVRA, and the Las Positas and Patterson Pass Faults which are near the SVRA (see DPR 2024a; Figure 2-4). All these faults may be active except for perhaps the Tesla Fault. Faults passing through Carnegie SVRA are also shown in Figure 9-1 Geologic Formations in Carnegie SVRA.

Table 9-1. Major Faults in the Project Region

Fault Name	Approx. Distance from Project Site (miles)	Maximum Moment Magnitude	Slip Rate (mm/yr)	Fault Data
Greenville	3	6.9	2.0	Dextral strike-slip fault that extends from the eastern flank of Mt. Diablo south to the San Antonio Valley, with an estimated length of 14–38 miles. Two historic earthquakes measuring M 5.8 and 5.4 occurred in 1980 in the Livermore Valley.

Table 9-1. Major Faults in the Project Region

Fault Name	Approx. Distance from Project Site (miles)	Maximum Moment Magnitude	Slip Rate (mm/yr)	Fault Data
Calaveras	20	6.92	6.0	Dextral strike-slip fault linked to the San Andreas Fault zone along the subparallel Paicines Fault. Composed of numerous strands that form a zone 30–1,600 feet wide. Fault zone extends from the San Ramon Valley southeast to approximately 19 miles south of Hollister. Historic earthquakes measuring Mw 5.8, 5.8, and 6.3, respectively, occurred in 1861 in the San Ramon Valley, in 1979 at Coyote Lake, and in 1984 at Morgan Hill.
Hayward–Rodgers Creek	25	7.26	9.0	Dextral strike-slip faults that extend from near Healdsburg 86 miles south to Fremont. The Rodgers Creek Fault extends from Healdsburg to a 3-mile-wide zone underneath San Pablo Bay. A 3.7-mile-wide stepover occurs from the southern end of the Rodgers Creek Fault to the northern end of the Hayward Fault. One historic earthquake measuring M 6.8 occurred in 1868.
San Andreas	40	7.9	17.0	Dextral strike-slip fault divided into four segments for a total length of approximately 293 miles, from the northern end of the 1906 earthquake to San Juan Bautista. Historic earthquakes with M greater than 6.7 occurred in 1838, 1906, and 1989.
Concord-Green Valley	55	6.71	4.0 to 5.0	Dextral strike-slip fault that extends from Walnut Creek 34 miles north to Wooden Valley. The Concord portion of the fault begins at a 5-degree change in fault strike beneath Suisun Bay and ends in the intersection with the Mt. Diablo blind-thrust fault. One historic earthquake with a surface wave magnitude of 5.4 occurred in 1955.
San Gregorio	60	7.4	7.0	Dextral and reverse segments. Begins offshore of the Golden Gate Bridge at the intersection with San Andreas Fault and follows the western edge of the San Francisco peninsula to the south end of Monterey Bay, for a total length of approximately 108 miles. Much of the fault is offshore. Two historic earthquakes measuring M 6.1 occurred in 1926.

Notes: M = moment magnitude; mm/yr = millimeters per year; Mw = maximum moment magnitude
Source: General Plan Update (DPR 2024a)

9.2.2.4 Landslides

A landslide is the downhill movement of masses of earth material under the force of gravity. Steep slopes, unstable terrain, proximity to earthquake faults, and rainfall ground saturation all contribute to landslide potential. Landsliding typically involves the surface soil and an upper portion of the underlying bedrock. Movement may be very rapid, or so slow that a change of position can be noted only over a period of weeks or years. This slow change is known as "creep."

Nilsen (1972; as cited in DPR 2024a) conducted a landslide analysis within the Alameda County portion of the SVRA by analyzing aerial photographs. The results of Nilsen's analysis indicated that most of the portion of Carnegie SVRA that is within Alameda County consists of small to large landslides (as shown in DPR 2024a Figure 2-5). A large landslide deposit is also located

just east of the Alameda County portion of the SVRA, within San Joaquin County, south of Corral Hollow Creek (Dibblee 1980 as cited in DPR 2024a). Nilsen confirmed that the larger slides were older and deep-seated; however, the smaller slides could be recent, shallow failures. Younger, shallower landslides have a greater potential to be reactivated by changes in watershed hydrology, stream erosion, or seismically induced ground shaking, among other causes.

9.2.2.5 Liquefaction

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. The factors that determine liquefaction potential are the soil type, distance from an active seismic source, intensity and duration of seismic ground motions, and depth to groundwater. Loose sands, peat deposits, and uncompacted fill and other water-saturated Holocene deposits within 40 feet of the ground surface are the most susceptible to liquefaction. Liquefaction poses a hazard to engineered structures such as bridges, roads, buildings, and underground utility pipelines. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining walls, and slope instability.

9.2.2.6 Seismic Seiches

Earthquakes may affect open bodies of water by creating seismic sea waves and seiches. Seismic sea waves (often called “tidal waves”) are caused by abrupt, usually vertical ground movements on the ocean floor in connection with a major earthquake. Because of the long distance from the Pacific Ocean and the intervening mountainous topography, seismic sea waves are not considered at risk at Carnegie SVRA.

A seiche is a sloshing of water in an enclosed or restricted water body, such as a basin, river, or lake, that is caused by earthquake motion. The sloshing can occur for a few minutes or several hours. No bodies of water that are large enough for destructive seiche action to occur are located either within or adjacent to Carnegie SVRA.

9.2.3 Soils

Figure 9-2 shows the locations of the various soil types present in Carnegie SVRA. Table 9-2 summarizes relevant general characteristics of these soils.

Table 9-2. Alameda and San Joaquin County Soil Types in Carnegie SVRA

Soil Map Unit Name	Surface Texture	Depth to Bedrock (inches)	Drainage Class	Saturated Hydraulic Conductivity (Ksat)[1]	Hydrologic Soil Group[2]	Runoff Rate Class	Shrink-Swell Potential[3]	Wind Erodibility Group[4]	Off-Trail Erosion Hazard	Soil Suitability for Septic Systems
Alameda County Soil Types										
Altamont clay, moderately deep, 30–45% slopes, eroded	Clay	28-32	Well drained	Very low	D	Very high	High	4	-	Very limited
Linne clay loam, 30–45% slopes, eroded	Clay loam	36–40	Well drained	Very low	C	High	Moderate	4L	Severe	Very limited
Los Gatos–Los Osos Complex, 30-45% slopes, eroded	Loam	12–48	Well drained	Very low	C	High	Moderate	7	Severe	Very limited
Riverwash	Sand	>60	Somewhat poorly drained	Very high	A	Very low	NA	3	Very severe	NR
Rock land	Rock	10–20	Excessively drained	Very low	D	Very high	NA	8	Slight	NR
Vallecitos loam, 30-75% slopes, eroded	Loam	12–24	Well drained	Very low	D	High	Low to moderate	-	-	Very limited
Vallecitos rocky loam, 30-45% slopes, eroded	Gravelly loam	12–36	Well drained	Very low	D	High	Low to moderate	6	-	Very limited
San Joaquin County Soil Types										
Alo-Vaquero Complex, 30–50% slopes	Clay	>80	Well drained	Moderately low	D	Moderate	High	7	Severe	Very limited
Calla-Carbona Complex, 8–30% slopes	Clay loam	>80	Well drained	Moderately high	B	Moderate	Moderate	4L	Moderate	Very limited
Carbona clay loam, 2–8% slopes	Clay loam	>80	Well drained	Moderately low	D	Moderate	High	4	Slight	Very limited
Cogna loam, 0–2% slopes overwash	Loam	>80	Well drained	High	B	Moderate	Moderate	5	-	Very limited
Gonzaga-Honker-Franciscan Complex, 30–50% slopes	Loam	29	Well drained	Moderately high	D	Moderate	Moderate	6	Severe	Very limited

Table 9-2. Alameda and San Joaquin County Soil Types in Carnegie SVRA

Soil Map Unit Name	Surface Texture	Depth to Bedrock (inches)	Drainage Class	Saturated Hydraulic Conductivity (Ksat)[1]	Hydrologic Soil Group[2]	Runoff Rate Class	Shrink-Swell Potential[3]	Wind Erodibility Group[4]	Off-Trail Erosion Hazard	Soil Suitability for Septic Systems
Honker-Vallecitos-Gonzaga Complex, 30–50% slopes	Loam	20	Well drained	Moderately high	D	Moderate	High	6	Severe	Very limited
Honker-Vallecitos-Honker Eroded Complex, 30–50% slopes	Gravelly loam	33	Well drained	Moderately high	D	Moderate	High	7	Severe	Very limited
Wisflat–Arburua–San Timoteo Complex, 30–50% slopes	Sandy loam	10	Well drained	High	D	Moderate	Low	3	Severe	Very limited
Wisflat–Arburua–San Timoteo Complex, 50–75% slopes	Sandy loam	10	Well drained	High	D	Moderate	Low	3	Very severe	Very limited
Xerofluvents-Xerorthents Complex, 1–8% slopes occasionally flooded	Gravelly sandy loam	>80	Well drained	High	A	NR	Low	5	Slight	Very limited

Notes: NA = not available; NR = not rated; SVRA = State Vehicular Recreation Area; > = greater than.
[1] "Ksat" is a measure of soil permeability; it refers to the ease with which water travels through the soil pores under saturated conditions.
[2] Hydrologic soil groups are based on runoff characteristics: Group A = low runoff potential, Group B = low to moderate runoff potential, Group C = moderate to high runoff potential, Group D = high runoff potential.
[3] Based on linear extensibility. Ratings of "moderate" to "very high" can result in damage to buildings, roads, and other structures.
[4] The soils assigned to Group 1 are the most susceptible to wind erosion, and those assigned to Group 8 are the least susceptible.
Sources: General Plan Update (DPR 2024a; Table 2-3)

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9.2.3.1 Erosion

As shown in Table 9-2, data from soil surveys conducted by the U.S. Natural Resources Conservation Service (NRCS 2022; as cited in DPR 2024a) indicate that most soils in Carnegie SVRA have relatively low susceptibility to wind erosion, but also have high runoff rates and are susceptible to water erosion. NRCS has rated nearly all soils in the SVRA with either a severe or very severe off-trail erosion hazard. However, as noted in the Corral Hollow Watershed Assessment (DPR 2007):

> The hazard classification system ranges from slight to very severe and is based on soil properties that influence erodibility, vegetation establishment, and dust mobilization potential.
>
> The system assumes that the trails were not compacted or surfaced, and that all vegetation was removed. It does not account for trail management and construction techniques that have been or will be imposed at the existing Carnegie SVRA. This hazard rating system is only intended to present the erodibility potential of the trails and should be interpreted cautiously as it represents a worst-case scenario.

9.2.3.2 Expansive Soils

Expansive soils are composed largely of clays, which greatly increase in volume when saturated with water and shrink when dried. Because of this effect, structural foundations may rise during the rainy season and fall during the dry season. If this expansive movement varies beneath different parts of a structure, the foundation may crack, and portions of the structure may become distorted. Retaining walls and underground utilities may be damaged for the same reasons. Most of the soil types in Carnegie SVRA have a moderate to high shrink-swell potential with high clay content (Table 9-2). Because the soils have high clay content, they are likely to undergo substantial volume changes as soil moisture content increases or decreases.

9.2.4 Paleontological Resources

A stratigraphic inventory and a record search were completed to develop a baseline paleontological resource inventory of Carnegie SVRA and vicinity by rock unit and to assess the potential paleontological productivity of each rock unit. Geologic maps and reports covering the geology of the project area and vicinity were reviewed to determine the exposed rock units and to delineate their respective distributions in the project area. The literature review was supplemented by an archival search conducted at the University of California Museum of Paleontology (UCMP) on February 24, 2013 (UCMP 2013; as cited in DPR 2024a).

The potential paleontological importance of the project area can be assessed by identifying the paleontological importance of rock units that are exposed there. Because topographic maps can easily delineate the distribution of a rock unit, this method is conducive to determining the parts of the project area that are of higher and lower sensitivity for paleontological resources.

A paleontologically important rock unit is one that is rated high for potential paleontological productivity and is known to have produced unique, scientifically important fossils. The paleontological sensitivity rating of a rock unit exposed in the project area refers to the abundance and densities of fossil specimens, previously recorded fossil sites, or both in exposures of the unit in and near the project area. Exposures of a specific rock unit in the project area are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project area.

Geologic formations within the proposed RMA Program work area include Franciscan Complex chert (fc) and sandstone (fs) occurring along the southern area of SVRA south of Tesla Fault; the Panoche Formation (Kps) and Moreno shale (Km) running through the middle of the SVRA; the Tesla Formation (Tts) occurring on the hills fronting Corral Hollow Creek; and landslide deposits (Qls). Other geologic formations present within Carnegie SVRA including Quaternary Alluvium (Qa) along Corral Hollow Creek and Neroly Formation (tn) occurring in the Waterfall Canyon closure area are located outside of the RMA Program project area (Figure 9-1). Table 9-3 lists each formation present in the RMA Program project area and the formation's age and basic composition and summarizes the results of the records search performed at the UCMP on February 26, 2013. The table also presents the paleontological sensitivity of each rock unit.

Table 9-3. Paleontological Inventory and Assessment of Carnegie SVRA

Formation Name	Age/ Composition	Summary of Records Search Results	Paleontological Sensitivity
Tesla	Paleocene-Eocene marine sandstone, siltstone, mudstone, shale	No vertebrate fossil localities have been reported to UCMP (2013). However, locality P-22613 (also listed as P-3925) in the vicinity of the former Tesla Coal Mine yielded unidentified Paleocene plant remains. A total of 25 invertebrate fossil localities have been reported to UCMP (2013) in this formation from Alameda, San Joaquin, and Stanislaus Counties. Localities D-8147, D-8148, D-8151, D-8152, D-8153, D-8156, D-8158, and D-8159, all recovered in the vicinity of Tesla Road, yielded eight unidentified Eocene specimens of marine invertebrates. Throckmorton (1988:46) identified 18 genera of pelecypods and one scaphopod genus (marine mollusks), 13 genera of gastropods (slugs and snails), as well as coral, hearth urchin (a small sea urchin), an elasmobranch (the class of sharks, rays, and skates), and crab claws west of Carnegie SVRA and along Tesla Road. Throckmorton also reported similar fossil remains near the project area from other researchers, some of which encompass the UCMP localities listed above.	High
Moreno	Cretaceous marine shale and sandstone	More than 100 vertebrate fossil localities have been reported to UCMP (2013) from this formation, primarily in Fresno and Merced Counties, but stretching as far north as Siskiyou County. A wide variety of vertebrate fossil specimens have been recovered including *Plotosaurus* (a large "swimming lizard"), *Morenosaurus* (a very large marine reptile named for the Moreno formation), bony fish, and unidentified fish and reptile remains. In addition, 95 invertebrate fossil localities have been recovered from this formation, including 12 from Alameda County and one from San Joaquin County.	High
Panoche	Cretaceous marine shale, siltstone, sandstone	Only one vertebrate fossil locality has been reported from the Panoche formation, and that locality (which yielded an unidentified reptile specimen) is in Contra Costa County. More than 100 invertebrate fossil localities have been reported from several counties in central California. However, the only reported invertebrate localities in San Joaquin County consist of B-5818, B-7311, and B-7312, which yielded unidentified marine invertebrates. No localities have been reported in Alameda County. (UCMP 2013 as cited in DPR 2024a)	Moderate

Table 9-3. Paleontological Inventory and Assessment of Carnegie SVRA

Formation Name	Age/ Composition	Summary of Records Search Results	Paleontological Sensitivity
Franciscan Melange	Cretaceous-Jurassic fragmented rocks	There are only two reports of vertebrate fossils in the Franciscan Complex from California; however, one of them (a Jurassic-age marine reptile) was recovered from Corral Hollow locality V-3531. This fossil, consisting of a partial skull of *Ichthyosaurus franciscanus* (named for the Franciscan formation), is the type specimen for this species. Ichthyosaurs were generally about 6 feet long and may have weighed 200 pounds; in appearance, they were similar to dolphins. Seventeen invertebrate fossil localities have been reported in California, but none from Alameda or San Joaquin County. (Bailey et al. 1964; UCMP 2013 as cited in DPR 2024a)	High because of type location for *Ichthyosaurus franciscanus*
Franciscan Chert	Cretaceous-Jurassic chert	Approximately 10% of the chert found within the Franciscan Complex is composed of the skeletons of tiny marine organisms called radiolarians (amoeboid protozoans). Where present, these fossilized organisms can be observed with a hand lens. (Bailey et al. 1964.) It is unknown whether the project area contains any chert with radiolarian remains. However, radiolarians exist today in marine environments throughout the world; they are abundant and common and have been well studied.	Low

Source: General Plan Update (DPR 2024a)

9.3 PROJECT IMPACTS

9.3.1 Thresholds of Significance

Based on CEQA Guidelines Appendix G, the implementation of the project or its alternatives would have a significant environmental impact related to geology and soils if it would:

(a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

  (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

  (ii) Strong seismic ground shaking.

  (iii) Seismic-related ground failure, including liquefaction.

  (iv) Landslides.

(b) Result in substantial soil erosion or the loss of topsoil.

(c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

(d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

(e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

(f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

9.3.1.1 Issues Not Discussed Further in this EIR

Rupture of a Known Earthquake Fault (ai). There are no faults within the SVRA that have been delineated under the Alquist-Priolo Earthquake Fault Zoning Act. The Greenville Fault is the closest fault zoned under the Alquist-Priolo Act and is located approximately 3 miles west of the SVRA. The Corral Hollow, Tesla, and Carnegie Faults pass through Carnegie SVRA and all three may be active faults. Active faults are more likely to result in surface fault rupture and thus may have a potential to cause surface rupture. However, the proposed RMA project would not include housing or other structures for human occupation, and thus would not result in risk of loss, injury, or death involving rupture of a known fault. This issue is not discussed further in this EIR.

Strong Seismic Ground Shaking (aii). Carnegie SVRA and the entire project region are in a seismically active area subject to strong seismic ground shaking. Seven major active faults occur within the greater project region (see Table 9-1), with the closest being the Greenville Fault is the closest fault located approximately 3 miles west of the SVRA, and three local faults cross through Carnegie SVRA. However, the proposed project is not expected to increase visitation to Carnegie SVRA and would not include any housing or structures for human occupation. Therefore the project would not exacerbate existing risks in the project area related to ground shaking or result in loss, injury, or death involving ground shaking. This issue is not discussed further in this EIR.

Seismic-Related Ground Failure (aiii). Liquefaction potential is determined by the soil type, distance from an active seismic source, level and duration of seismic ground motions, and depth to groundwater. The Corral Hollow, Tesla, and Carnegie Faults are present within the SVRA, and these faults may be active. Most rock formations in the SVRA consist of older sedimentary and metamorphic rocks (Wagner et al. 1991; as cited in DPR 2024a), which are not expected to liquefy during an earthquake. The Holocene-age alluvium (recent stream deposits found along the bed of Corral Hollow Creek in the SVRA (see Figure 9-2) has a high liquefaction potential because of the unconsolidated nature of the soil, the shallow depth to groundwater, and the short distance to known seismic sources. None of the proposed new RMAs are located on Holocene-age alluvium, and the RMA Program project does not include construction of buildings or structures that could pose a public safety risk if damaged. Therefore, the proposed RMA project would not result in loss, injury, or death involving seismic-related ground failure. This issue is not discussed further in this EIR.

Risk Related to Expansive Soils (d). Most of the soil types in Carnegie SVRA have a moderate to high shrink-swell potential with high clay content (Table 9-2). Because the soils have high clay content, they are likely to undergo substantial volume changes as soil moisture content increases or decreases. However, the proposed project does not include any buildings or structures that require foundations, retaining walls, or underground utilities. Therefore, the project would not create any direct or indirect risks to life or property from expansive soils. This issue is not discussed further in this EIR.

Septic Tanks or Alternative Wastewater Disposal Systems (e). No septic tanks or alternative wastewater disposal systems are proposed as part of the RMA Program. Therefore, there would be no project-related impacts on soils from these systems. This issue is not discussed further in this EIR.

Unique Geologic Features (f). A unique geologic feature consists of a major natural element that stands out in the landscape, such as a large and scenic river, gorge, major waterfall, unique rock formation, volcanic cinder cone, lava field, or glacier. There are no unique geologic features in Carnegie SVRA or within the project viewshed. This issue is not discussed further in this EIR.

9.3.2 Potential Direct or Indirect Substantial Adverse Effects Involving Landslides

As described in section 9.2 above, most of the portion of Carnegie SVRA that is within Alameda County consists of small to large landslides. A large landslide deposit is also located just east of the Alameda County portion of the SVRA, within San Joaquin County, south of Corral Hollow Creek. The proposed new RMAs overlap with most of this landslide hazard area; however, the proposed project would not include any buildings or structures that could be at risk of damage from landslide. Proposed new projects such as trails or erosion repair would be designed with BMPs incorporated to prevent erosion and sedimentation (see Table 2-10 in Project Description). In addition, the project would comply with all applicable regulations described in section 9.1, including meeting the current OHMVR Division *Soil Conservation Standard and Guidelines* and incorporating the guidance provided in the OHV BMP Manual. The project would have a beneficial effect on stabilizing hillsides in the long term by reducing erosion and sedimentation, increasing vegetation, and establishing a sustainable and well managed trail system. Therefore, the project would not cause direct or indirect substantial adverse effects involving landslides; this impact would be ***less than significant***.

9.3.3 Soil Erosion or Loss of Topsoil

One of the main purposes of the proposed RMA Program is to effectively control sediment loss and erosion by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated. Therefore, the project would have a beneficial effect on reducing soil erosion and loss of topsoil over the long term.

The project could cause a short-term increase in soil erosion and loss of topsoil during construction; however, as indicated in section 9.3.2 above, BMPs and SPRs incorporated in the project would prevent erosion and sedimentation (see section 9.1.3), and the project would comply with all applicable regulations described above in section 9.1. In addition, no work would occur during wet weather, and DPR and/or its contractor would implement stormwater runoff management plan BMPs to control potential erosion, sedimentation, and other pollutants from construction sites (see Table 2-9 in Project Description).

As described in section 9.2, most soils in Carnegie SVRA have relatively low susceptibility to wind erosion but also have high runoff rates and are susceptible to water erosion. The NRCS has rated nearly all soils in the SVRA with either a severe or very severe off-trail erosion hazard. According to the Corral Hollow Watershed Assessment, this rating represents a worst-case scenario and does not account for trail management and construction techniques that have been or will be imposed at the existing Carnegie SVRA (DPR 2007). The BMPs incorporated into the project summarized above along with compliance with applicable regulations are expected to prevent a worst-case scenario and avoid or minimize soil erosion and loss of topsoil during

implementation of the RMAs. For the reasons described above, the proposed RMA Program is expected to have a ***less than significant*** impact on soil erosion and loss of topsoil.

9.3.4 Unstable Geologic Unit or Soil

Liquefaction and landslide hazards were discussed previously in sections 9.3.1.1 and 9.3.2, respectively. Lateral spread is a type of liquefaction-induced ground failure that occurs on gentle slopes or near free-faces, such as river channels. Since the project would not result in any impacts related to liquefaction, it also would not have impacts related to lateral spreading.

Land subsidence is a gradual settling or sudden sinking of the Earth's surface due to removal or displacement of subsurface earth materials. The principal causes include aquifer-system compaction associated with groundwater withdrawals, drainage of organic soils, underground mining, and natural compaction or collapse, such as with sinkholes or thawing permafrost (USGS 2019; as cited in (DPR 2024a)). The project would not include groundwater withdrawals and there is no permafrost at Carnegie SVRA or other sources of natural compaction or collapse. Carnegie SVRA contains areas historically used for mining with mine openings gated or sealed shut to prevent visitor entry. These areas could be potentially unstable; however, these mining areas are located in the eastern portion of the SVRA and are outside of the proposed RMA Program project area. The proposed RMA Program project would not affect the closed mines and would not exacerbate the risk of subsidence from closed mine pits or shafts.

For the reasons described above, the proposed RMA Program is not expected to result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. All potential impacts related to unstable geologic units or soils would be ***less than significant***.

9.3.5 Paleontological Resources

Project sites are located mainly on geologic formations with high paleontological sensitivity including the Franciscan Complex, Moreno Formation, and Tesla Formation. They also overlap with the Panoche Formation (moderate sensitivity) and the Franciscan Complex-chert (low sensitivity). See Table 9-3 for descriptions of the paleontological resources found in each of these formations and Figure 9-1 for the location of each of these formations.

Grading required for project implementation would involve minimal cutting and fill as needed to rehabilitate hillsides or gullies and restore natural landform (see Project Description section 2.4.2). Excavation depths may be greater in areas of new or rerouted trail segment construction. Though not expected, project construction activity could uncover buried paleontological resources. Implementation of Mitigation Measure GEO-1 would ensure protection of paleontological resources if they are discovered during project activities. Mitigation Measure GEO-1 requires training SVRA staff on paleontological resources prior to start of project construction, ceasing construction activities within and in the vicinity of any fossil uncovered during construction, consulting an OHMVR Division archaeologist or other qualified paleontological resource professional to determine the potential significance of the find, then developing and implementing a recovery plan if the fossil is determined to be a unique paleontological resource. Mitigation Measure GEO-1 is similar to and consistent with Geo Guidelines 2.2 and 2.3 of the General Plan Update (DPR 2024a). Therefore, the proposed RMA Program would not directly or indirectly destroy a unique paleontological resource, and all impacts on paleontological resources would be ***less than significant with mitigation incorporated***.

9.4 CUMULATIVE IMPACTS

The proposed RMA Program would comply with applicable regulations and would implement Mitigation Measure GEO-1 to prevent any significant impacts related to geology, soils, and paleontological resources. All potential impacts from the General Plan projects related to geology, soils, and paleontological resources were found to be less than significant in the General Plan Update EIR with implementation of the General Plan Update goals and guidelines (DPR 2024b). Likewise, existing trail maintenance operations would comply with applicable regulations and would follow a similar protocol to those outlined in Mitigation Measure GEO-1 if any paleontological resources are found.

There is also very little geographic overlap between the proposed RMA Program activities and the General Plan Update projects. As a result, there would be no combined cumulative effect on paleontological resources. Although new RMAs could be implemented at the same time as General Plan Update projects and/or ongoing existing trail maintenance operations, the RMA Program, General Plan Update projects, and trail maintenance projects would all follow BMPs incorporated in the projects to avoid or minimize construction-related impacts.

The exact future use of the Alameda-Tesla property is currently unknown, but it will be protected land either with limited public access or open to passive recreation. If passive recreational facilities are installed at the Alameda-Tesla property at some future point, it is not expected to result in cumulatively significant impacts when combined with the proposed project because the facilities would likely be small-scale and compatible with natural resources protection and therefore, they would be unlikely to result in significant impacts.

For the reasons described above, the proposed RMA Program would have ***no cumulative impact*** on geology, soils, or paleontological resources.

9.5 MITIGATION MEASURES

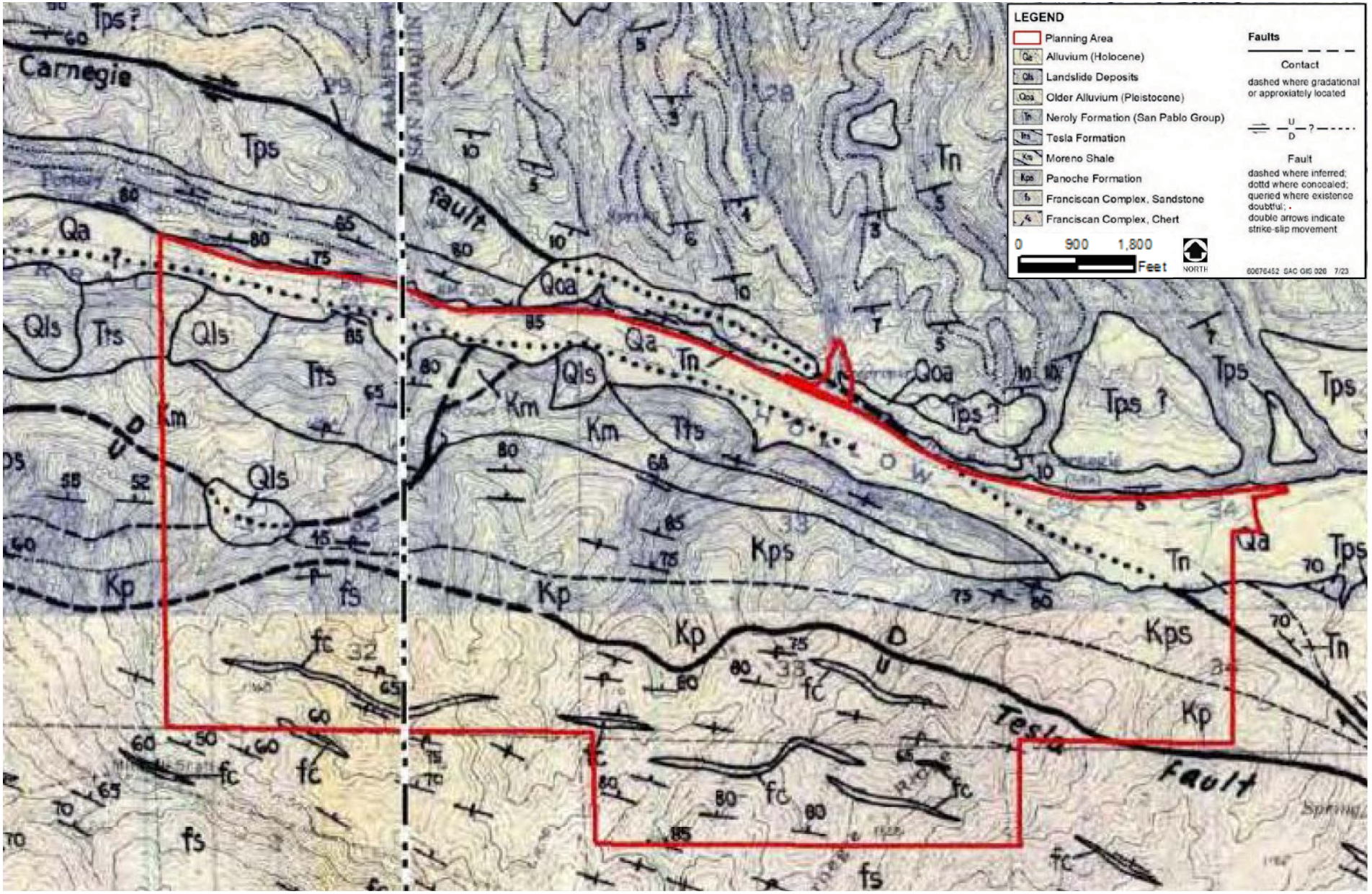
Implementation of Mitigation Measure GEO-1 would reduce potential impacts from the proposed RMA Program to paleontological resources to less-than-significant levels. There would be no or less-than-significant impacts from the proposed project to geology and soils.

Impact GEO-1: Project activities are located on geologic formations with moderate and high paleontological sensitivity. Project construction activities could uncover buried paleontological resources.

Mitigation Measure GEO-1: Protection of Paleontological Resources. The Project Manager shall determine if the project activity is located in a geological formation with paleontological sensitivity during the project planning process. As needed, prior to the start of each project activity, SVRA field staff such as maintenance and trails team members shall be educated on what to do if paleontological resources are inadvertently discovered during a project. All SVRA staff members shall be educated on what to do if they find a paleontological object.

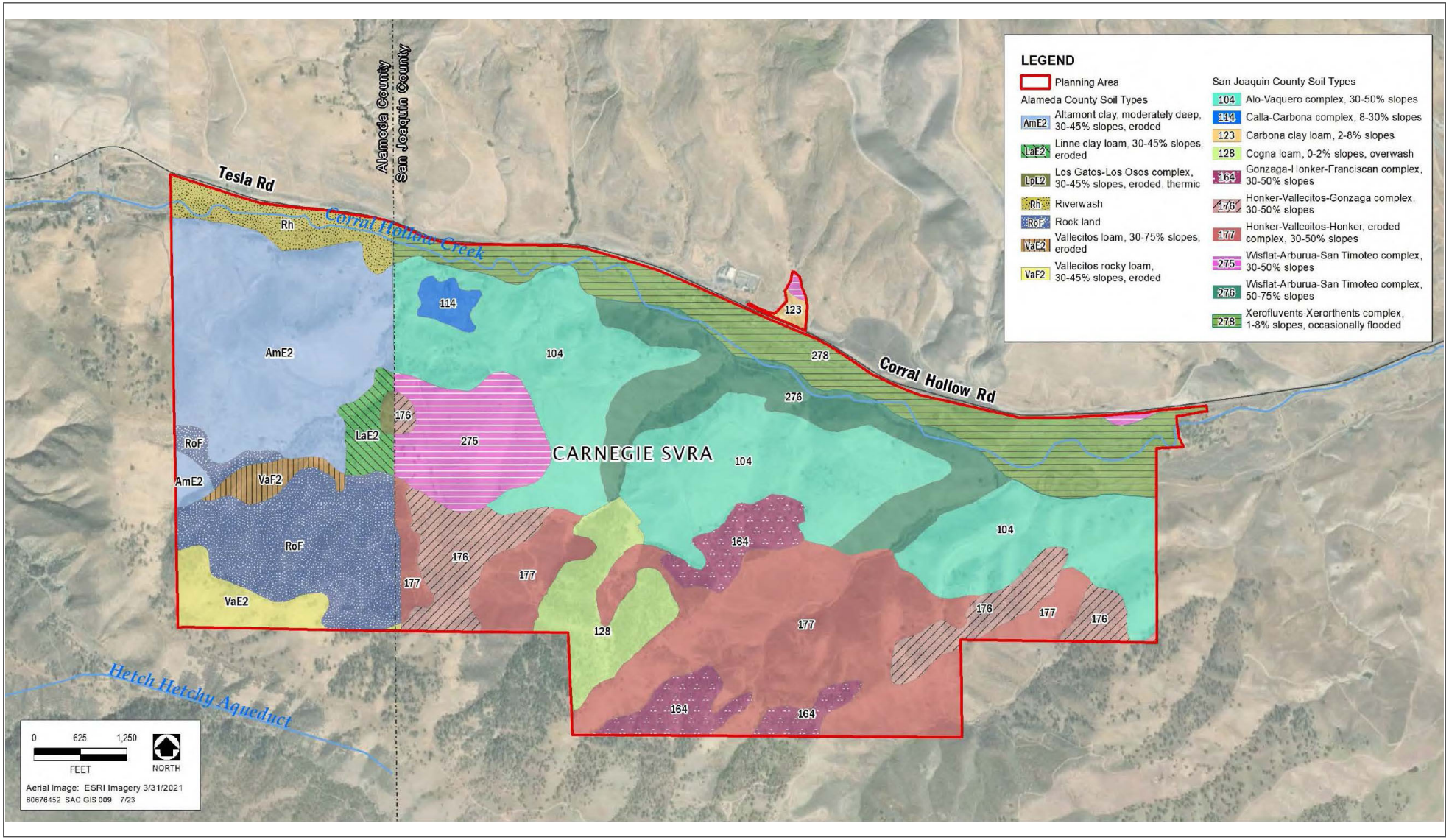
If paleontological resources are discovered inadvertently during project activities, all work shall cease within and in the immediate vicinity of the fossil and an OHMVR Division archaeologist or other qualified paleontological resource professional shall be consulted to determine the potential significance of the find. If the fossil is determined to be a unique paleontological resource, a recovery plan consistent with Society of Vertebrate Paleontology (SVP 2025) criteria shall be developed and implemented. The recovery plan may include but is not limited to a field

survey, construction monitoring, sampling and data recovery procedures, curation for any specimen recovered, and a report of findings.



Source: Carnegie General Plan Update 2024

Figure 9-1 Geologic Formations and Faults in Carnegie SVRA



Source: Soil Survey Geographical Survey 2019; AECOM January 2024

Figure 9-2 Soil Types in Carnegie SVRA

Carnegie State Vehicular Recreation Area RMA Program EIR

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CHAPTER 10. HYDROLOGY AND WATER QUALITY

10.1 REGULATORY SETTING

The information below is adapted from the Carnegie SVRA General Plan Update (DPR 2024a).

10.1.1 Federal Clean Water Act of 1972

The CWA is the primary federal law authorizing the EPA and individual states to implement water quality control activities and govern such activities. The EPA has delegated authority to the State of California to implement and oversee most programs authorized or adopted for CWA compliance through the Porter-Cologne Act, described below.

10.1.1.1 Clean Water Act

The CWA is the primary federal law regulating water quality. The implementation of the CWA is the responsibility of the EPA. However, the EPA depends on other agencies, such as the individual states and the U.S. Army Corps of Engineers (USACE), to assist in implementing the CWA. The objective of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 404 and 401 of the CWA apply to activities that would impact waters of the U.S. The USACE enforces Section 404 of the CWA and the California State Water Resources Control Board (SWRCB) enforces Section 401.

Section 404. As part of its mandate under Section 404 of the CWA, the EPA regulates the discharge of dredged or fill material into "waters of the U.S." "Waters of the U.S." include 1) waters currently, historically, or susceptible for used in interstate or foreign commerce; territorial seas; interstate waters; 2) impoundments of such waters; 3) tributaries of such waters that are relatively permanent, standing or continuously flowing bodies of water; 4) wetlands adjacent to waters identified in 1) or adjacent to waters that are relatively permanent, standing, or continuously flowing bodies of water identified in paragraph 2) or 3); and 5) certain intrastate lakes and ponds. Adjacent means having a continuous surface connection (33 CFR § 328.3). Wetlands are defined as those areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(c)). The discharge of dredged or fill material into waters of the U.S. is prohibited under the CWA except when it is in compliance with Section 404 of the CWA. Enforcement authority for Section 404 was given to the USACE, which it accomplishes under its regulatory branch. The EPA has veto authority over the USACE's administration of the Section 404 program and may override a USACE decision with respect to permitting.

Substantial impacts on waters of the U.S. may require an Individual Permit. Projects that only minimally affect waters of the U.S. may meet the conditions of one of the existing Nationwide Permits, provided that such permits' other respective conditions are satisfied. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions (see below).

Section 401. Any applicant for a federal permit to impact waters of the U.S. under Section 404 of the CWA, including Nationwide Permits where pre-construction notification is required, must also provide to the USACE a certification or waiver from the State of California. The "401 Certification" is provided by the SWRCB through the local RWQCB.

The RWQCB issues and enforces permits for discharge of treated water, landfills, storm-water runoff, filling of any surface waters or wetlands, dredging, agricultural activities and wastewater recycling. The RWQCB recommends the "401 Certification" application be made at the same time that any applications are provided to other agencies, such as the USACE, USFWS, or NOAA Fisheries. The application is not final until completion of environmental review under the CEQA. The application to the RWQCB is similar to the pre-construction notification that is required by the USACE. It must include a description of the habitat that is being impacted, a description of how the impact is proposed to be minimized and proposed mitigation measures with goals, schedules, and performance standards. Mitigation must include a replacement of functions and values, and replacement of wetland at a minimum ratio of 2:1, or twice as many acres of wetlands provided as are removed. The RWQCB looks for mitigation that is on site and in-kind, with functions and values as good as or better than the water-based habitat that is being removed.

10.1.1.2 National Pollutant Discharge Elimination System Permit Program

The National Pollutant Discharge Elimination System (NPDES) permit program was established in the CWA to regulate municipal and industrial discharges to surface waters of the United States. In California, the nine RWQCBs implement the NPDES permit system. A discharge from a point source is unlawful unless the discharge complies with an NPDES permit. "Point-source" pollution is discharged from a distinct, identifiable source, such as a pipe or ditch, while "nonpoint-source" pollution occurs when runoff washes off a wide land area, such as a plowed field or city street. NPDES permits generally identify limits on allowable concentrations or mass emissions of pollutants contained in discharges; prohibit discharges not specifically allowed by the permit; and describe actions that the discharger must take, such as conducting industrial pretreatment, pollution prevention, and self-monitoring activities.

The EPA maintains regulations that establish NPDES permit requirements for municipal and industrial storm water discharges. An NPDES permit for general construction activity is required for projects that would disturb 1 acre or more. The NPDES General Permit for Small Municipal Separate Storm Sewer Systems, referred to as the "MS4 General Permit" requires small municipal areas of fewer than 100,000 persons to develop storm water management programs.

DPR is covered under the Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit (Phase II Permit) as a Non-Traditional Permittee for storm water discharges occurring at Carnegie SVRA (DPR 2022a).

10.1.2 State Regulations and Laws

In California, the SWRCB has broad authority over water quality control issues for the state. The SWRCB develops statewide policy on water quality and exercises the powers delegated to the state by the federal government under the CWA. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The Central Valley RWQCB is responsible for the regional area in which the Carnegie SVRA is located.

10.1.2.1 Porter Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) is California's statutory authority for the protection of water quality. This law requires the state to adopt water quality policies, plans, and objectives that protect the state's waters. The Porter-Cologne Act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update basin plans,

regional water quality control plans that also are required by the CWA. Basin plans establish beneficial uses, water quality objectives (or "criteria" under the CWA), and implementation.

The Porter-Cologne Act also requires waste dischargers to notify the RWQCBs of their activities by filing reports of waste discharge. The SWRCB and RWQCBs are authorized to issue and enforce waste discharge requirements (WDRs), NPDES permits, CWA Section 401 water quality certifications, or other approvals. The RWQCBs also may issue waivers to reports of waste discharge and/or WDRs for broad categories of "low threat" discharge activities that have minimal potential to adversely affect water quality when implemented according to prescribed terms and conditions.

10.1.2.2 Central Valley Basin Plan

Both the federal CWA and the Porter-Cologne Act mandate basin plans. The basin plan issued by the Central Valley RWQCB (2019) sets forth water quality standards for the surface waters and groundwater of the region. Those standards include both designated beneficial uses of the water, and the narrative and numeric objectives that must be maintained or attained to protect those uses. Generally, narrative criteria require that water quality not be degraded as a result of increases in pollutant loads that will adversely affect a water body's designated beneficial uses.

The Central Valley RWQCB's Basin Plan (Central Valley RWQCB 2019) does not specify beneficial uses or specific water quality objectives for Corral Hollow Creek. According to the tributary rule, the beneficial uses assigned to any downstream water body would also apply to the creek. However, the flows in the creek completely infiltrate in the Central Valley before discharging to any other surface water bodies. Thus, no downstream water bodies are directly affected by Corral Hollow Creek. The Basin Plan does specify general water quality objectives for all water bodies within the Sacramento and San Joaquin River Basins, and those objectives would apply to Corral Hollow Creek.

10.1.2.3 NPDES Municipal Storm Water Permitting Program

The SWRCB's Municipal Storm Water Permitting Program regulates storm water discharges from MS4s. An MS4 is defined in 40 CFR 122.26(b)(8) as:

… a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- Owned or operated by a state, city, town, borough, or county… having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes… or a designated and approved management agency under Section 208 of the CWA that discharges to waters of the United States;
- Designed or used for collecting or conveying storm water;
- Which is not a combined sewer; and
- Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

The SWRCB adopted the MS4 General Permit (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities. The MS4 permits require the discharger to develop and implement a storm water management plan/program intended to reduce the discharge of pollutants to the maximum extent practicable. ("Maximum extent practicable" is the performance standard specified in Section 402[p] of the CWA.) The management plan specifies what BMPs

will be used to address certain program areas: public education and outreach, detection and elimination of illicit discharges, construction and postconstruction, and municipal operations. In general, medium and large municipalities are required to conduct water quality monitoring, and small municipalities are not.

There are two types of small-MS4 permittees: regular and non-traditional. A nontraditional small MS4 is a storm water system that serves public campuses, municipalities, military bases, prisons, or hospitals and is located within or discharges to a permitted MS4, or that poses a "significant threat" to receiving water quality. The SWRCB and Central Valley RWQCB have not officially designated any MS4s as nontraditional. However, the SWRCB has developed an extensive list of operators that may be designated at any time. It is the position of the OHMVR Division that Carnegie SVRA fits within the nontraditional small MS4 program. Carnegie SVRA storm water discharges from the park to Corral Hollow Creek are regulated by the RWQCB under an MS4 Permit.

10.1.2.4 NPDES Permit System and Waste Discharge Requirements for Construction

The SWRCB and Central Valley RWQCB have adopted specific NPDES permits for activities that have the potential to discharge waste to waters of the state. The SWRCB's statewide storm water general permit for construction activity (Order WQ 2022-0057-DWQ) is applicable to all land-disturbing construction activities that would disturb 1 acre or more, with the exception of regular maintenance activities performed to restore the original line, grade, or capacity of the facility. Because all proposed project activities, including future specialized maintenance projects, would restore the original line, grade, or capacity of the SVRA consistent with the exception, an NPDES permit would not be required.

10.1.3 Carnegie SVRA Storm Water Management Plan

The Storm Water Management Plan for Carnegie SVRA (SWMP) was prepared by DPR in 2012 and has been continuously implemented since that time. The purpose of the SWMP is to reduce or eliminate pollutant discharges from the Carnegie SVRA by using site-specific structural and nonstructural BMPs to protect and improve water quality, while also providing high-quality OHV recreational opportunities. The Carnegie SWMP is designed to meet the requirements set forth in SWRCB Water Quality Order No. 2013-0001-DWQ, General Permit No. CAS000004, WDRs for Storm Water Discharges from Small MS4s, adopted on February 5, 2013. The SWMP used the findings from the Corral Hollow Watershed Assessment (Salix Applied Earthcare and Geosyntec Consultants 2007a) to develop recommendations for innovative BMPs to reduce erosion and sediment issues.

Elements of the Carnegie SVRA SWMP include public education and outreach, public involvement and participation, detection and elimination of illicit discharges, storm water management at construction sites, postconstruction storm water management, and pollution prevention/good housekeeping. Specifically, the SWMP includes implementation of a trails management plan; implementation, monitoring, and maintenance of projects associated with the OHMVR Division's Soil Conservation Standard and Guidelines; and the use of an OHV-specific BMP manual (Salix Applied Earthcare and Geosyntec Consultants 2007b) for selecting, implementing, and maintaining appropriate BMPs. The SWMP also includes an OHV element dedicated to discussing management goals and activities for maintaining OHV trails and facilities as they relate to meeting water quality objectives.

The SWMP also created a framework for active adaptive management, involving assessment of erosion and sediment-transport sources, use of BMPs, monitoring and evaluation, and implementation of long-term maintenance plans to ensure continued protection of water quality.

The SWMP program requires activities that are used to evaluate the storm water program's impact on improving water quality. Activities include rehabilitation of OHV riding areas, installing BMPs, inspecting RMAs, and monitoring storm water among others.

Carnegie SVRA is subject to the requirements of the Phase II Permit as a Non-Traditional Permittee as noted above in section 10.1.1.2. The Phase II Permit requires the submittal of an Annual Report to summarize the previous year's compliance effort. The Phase II Permit Annual Report and Effectiveness Assessment summarize most of the details of the SWMP annual activities and are submitted electronically to the Water Board each year.

Carnegie SVRA implements a wet weather closure policy specified in the 2012 SWMP that is designed to meet regulatory water quality standards. The park hills are subject to closure when park soils become saturated enough for sheet flow to occur or conditions limit the ability of first responder access. Once conditions triggering a wet weather closure of the park hills have been met, access into the trails system in the hills is restricted until the hills have been closed for at least 12 hours and hill slopes have dried sufficiently and soils are stable enough to support OHV use. This policy effectively acts as a BMP for construction projects.

Carnegie SVRA Wet Weather Policy:

Policy Description

When wet weather occurs, the parks hills are closed to recreation. However, the valley floor of the park remains open including the 4x4area, the MX track, 70cc track, 110cc track, ATV track, campground, concession store, entrance station, day use parking, and related facilities. A quantitative cumulative precipitation measurement will be used to trigger park closures. Using hydrological models and historical conditions, the following thresholds were determined as points where the soil becomes saturated and sheet flow occurs. The park hills may be closed due to safety or environmental concerns at any time regardless of these thresholds set below.

- 12 hrs: >0.30”
- 24 hrs: >0.50”
- 48 hrs: >0.65”

As measured by the rain gauge at the entrance station, if any of these thresholds are realized, then all of the park hills will be closed. The hills will remain closed as long as precipitation levels remain above the listed amount for the allotted time period. The hills may re-open if:

- The park has had a minimum 12-hr closure.
- The hill slopes have dried sufficiently and soils are stable enough to support OHV use. This will be determined at the monitoring locations and hill areas using the following criteria: presence of surface water, excessive soil rutting by vehicles, BMP damage, and insufficient traction for support vehicles.

However, the hills, or portions of the hills, may remain closed due to safety or environmental concerns as determined by park managers.

Policy Implementation Process

Below is a step by step process aimed at clarifying when wet weather policy compliant hill closures and re-openings will occur.

Closure

If the answer is "yes" to any of questions 1-3 below, then the parks hills will be closed.

1) In the last 12 hours, has it rained more than 0.30 inches?

2) In the last 24 hours, has it rained more than 0.50 inches?

3) In the last 48 hours, has it rained more than 0.65 inches?

Re-Opening

The hills, or portions of the hills, should only be re-opened if **all** of the following conditions are met:

- Site conditions are safe.
- No environmental or resource concerns exist.
- Storm water BMPs are functional and in good condition, e.g. rolling dips and basins.
- The hills have been closed for at least 12 hours.
- The hill slopes have dried sufficiently and soils are stable enough to support OHV use. This will be determined at the monitoring locations and hill areas using the following criteria: presence of surface water, excessive soil rutting by vehicles, BMP damage, and insufficient traction for support vehicles.

Rutting is defined as the creation of depressions made by the tires of vehicles. Rutting occurs when the soil strength is not sufficient to support the applied loads from vehicle traffic.

10.1.4 SPRs for Hydrology

DPR implements SPRs for hydrology (Appendix B) to minimize potential for construction activities to impact water quality. Equipment must be refueled and serviced in designated areas outside of the 100-year flood plain, construction activity must be suspended when the site must be properly winterized by covering stockpiled materials or soils, and energy dissipaters must be installed at water discharge points as appropriate.

10.1.5 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Water Goals and Guidelines for the protection of water quality. Water Goal 1 with Water Guidelines 1.1 and 1.2 and Water Goal 2 with Water Guidelines 2.1 through 2.8 are relevant to the RMA Program. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

10.2 ENVIRONMENTAL SETTING

10.2.1 Hydrology

10.2.1.1 Climate and Precipitation

The climate of the Corral Hollow watershed consists of mild to hot, dry summers and mild, wet winters. Temperatures are generally coolest in January and warmest in July. Humidity is highest during the winter months and becomes quite low during the hot summer months. Because of the summer's low humidity, the evaporation rate is high during the growing season. Therefore, soil moisture reserves are depleted rapidly during the summer months. Humidity is also highest in the morning and lowest in the afternoon. The dominant geomorphic processes that have shaped the watershed's hills and low mountains include mass wasting from landslides and fluvial erosion.

The upper elevations in the region receive more rainfall than lower elevations. Intense rainfall is rare because the Coast Ranges moderate the spring storm systems coming onshore from the Pacific Ocean. As storm systems descend the northeastern-facing slopes, the air temperature increases and the air dries out, thus creating a "rain shadow." A rain shadow is a region that receives less rainfall and humidity than the surrounding areas because of topography and prevailing wind patterns.

Rainfall in the Corral Hollow watershed generally occurs as lengthy events of low intensity. The rainfall/runoff relationship in the Corral Hollow watershed is controlled primarily by low-intensity rainfall, the steepness of the canyon slopes, and the varied infiltration by the surficial soils. On average, approximately 57 percent of annual rainfall occurs in the winter months (December through January) and 80 percent occurs between November and March. Very little rain falls between June and September (Salix Applied Earthcare and Geosyntec Consultants 2007a).

10.2.1.2 Topography

The topography at Carnegie SVRA varies widely, ranging from approximately 600 feet above mean sea level along the eastern portion of Corral Hollow Creek (near the eastern boundary of the planning area) to approximately 1,700 feet above mean sea level along the southern border of the SVRA. Generally, hills with moderate to steep slopes trend down into narrow valleys, and slope down to more gently sloping and flat land along Corral Hollow Creek. Rock outcroppings are present in many locations throughout the SVRA.

10.2.1.3 Watersheds and Drainage

Carnegie SVRA is located primarily in the Corral Hollow watershed. Small headwater tributaries converge in the upper watershed to form the main stem of Corral Hollow Creek. The creek often infiltrates (flows into) the soil in the western reaches of the San Joaquin Valley and has no surface connection to the San Joaquin River. The watershed is flanked by the Arroyo Seco watershed to the west, Lone Tree watershed to the south, Deep Gulch Creek watershed to the east, and a small unnamed sub-watershed of the San Joaquin River to the north. The Corral Hollow watershed spans the Alameda/San Joaquin County line and is bordered on the north by Tesla Road/Corral Hollow Road.

Vegetation in the Corral Hollow watershed consists of native and nonnative grasslands, oak woodlands, and chaparral. The watershed's outlet is located just downstream (east) of Carnegie SVRA's eastern boundary.

Salix and Geosyntec (2007a) divided the Corral Hollow watershed into 11 smaller distinct drainage areas (Table 10-1, Figure 10-1). They used historical and current land uses, discharge locations, and proximity to critical areas to determine each drainage area's outlet point.

The RMA Program would implement project activities primarily within the Tyson's Canyon and Carrol Canyon drainages with some limited work occurring within the Kiln Canyon drainage and hillside areas flowing directly toward the stream corridor (Figure 7-3).

Table 10-1. Drainage Areas in the Corral Hollow Watershed

Drainage Area	Size (Acres)	Past and Current Land Uses
Baker's Ravine	963	Grazing, homesteading, mining/prospecting
Mitchell Ravine	4,845	Excavation and installation of Hetch Hetchy tunnel, sheep and cattle grazing, homesteading
Durban	349	Exploratory mining, grazing, residential uses
LLNL Site 300	3,653	Exploratory mining, historical grazing, controlled burns, research and development associated with LLNL
Stream Corridor	2,173	Divided into multiple sub-watersheds: *Tesla Gate (99 acres):* Historical residential uses, grazing, ranching *Diablo Range District Office (413 acres):* Grazing, residential uses *Mitchell Ravine Confluence (20 acres)*: Grazing *Pottery (438 acres):* Horse and cattle grazing, pottery manufacturing, off-highway vehicle recreation *Maintenance Yard (10 acres):* Cattle grazing, exploratory mining, off-highway vehicle recreation *Western Day Use (198 acres):* Cattle grazing, exploratory mining (past); off-highway vehicle recreation, transportation (current) *Park Entrance (224 acres):* Cattle grazing, exploratory mining (past); off-highway vehicle recreation (current) *Los Osos Trailhead (3 acres):* Off-highway vehicle use, transportation (current) *Carnegie (445 acres):* Cattle grazing, exploratory mining (past); off-highway vehicle recreation (current) *SRI Road (194 acres):* Cattle grazing, exploratory mining (past); research and testing of explosives, off-highway vehicle recreation (current) *Riparian Reference Reach (130 acres):* Gravel extraction, cattle grazing, research and development
Tyson's Pond	460	Mining, sheep and cattle grazing (past), off-highway vehicle recreation (current)
Carrol Canyon	328	Sheep and cattle grazing (past), off-highway vehicle recreation (current)

Table 10-1. Drainage Areas in the Corral Hollow Watershed		
Drainage Area	**Size (Acres)**	**Past and Current Land Uses**
Kiln Canyon	383	Sheep and cattle grazing, surface and tunnel mining for lime, cement processing activities associated with operation of lime kilns
Waterfall Canyon	526	Gravel surface mining, grazing, off-highway vehicle recreation (past), cattle grazing (ongoing)

10.2.2 Water Quality

10.2.2.1 Erosion and Sedimentation

The primary pollutant in the Corral Hollow watershed—sediment—is ultimately delivered to Corral Hollow Creek. Several sources in and near the SVRA can generate erosion that causes sediment transport. These sources include sheet erosion, gullies, grazing, waste rock piles, trail and stream crossings, and roads and trails. Gullies, trail and stream crossings, and roads and trails sources of erosion are most relevant to the proposed project and are summarized below. See the General Plan Update for descriptions of the other sources.

- *Gullies.* Gullies can form naturally but often are made worse by human activities. Gullies have formed in Carnegie SVRA largely because improperly designed trails and stream crossings have modified watershed hydrology. Channelization, concentration, and diversion of runoff can compound erosive forces and create substantial scouring at the discharge point of the concentrated flow path. This can cause gullies to form.
- *Trail and Stream Crossings.* A stream crossing is a point on a trail or roadway that intersects a natural drainage path. The high velocity of runoff flowing through a crossing can cause substantial erosion. Improperly designed crossings can damage trails and divert runoff to sensitive areas of the watershed that can erode easily.
- *Roads and Trails.* If designed improperly, roads and trails can alter a watershed's natural drainage patterns. As a result, they can contribute substantially to erosion and mobilization of sediment. Roads and trails can inadvertently become conveyance features by collecting runoff from upland slopes and diverting it from its natural drainage course. When runoff is concentrated on a trail's inboard side, substantial erosion can occur, especially where the trail is not surfaced. Runoff flows can cause additional erosion at the point where the concentrated flow is released. In addition, the increased energy from concentrated flow can cause soil piping where the flow path contacts a weak area of the trail or an existing animal burrow.

Carnegie SVRA has several constructed features (BMPs)—sediment basins, revegetation/erosion-control blankets, dust suppressants, and gully rehabilitation that either already existing in the landscape that were implemented as needed to control erosion and sediment transport. These sediment control features—are subject to modification in future versions of the SWMP or similar documents.

10.2.2.2 Corral Hollow Creek Monitoring

To assess the existing water quality of Corral Hollow Creek, Salix and Geosyntec jointly began a 2-year water quality monitoring program. Water samples were collected from 12 locations in the creek and its tributaries during three rainfall events that occurred during the 2005 and 2006 wet

seasons. Water quality data previously collected by EPA, the Central Valley RWQCB, DPR, Resource Design Technology, and LLNL were also reviewed and considered. Water quality data was also collected in 2014-2015 (DPR 2024b).

To summarize the relevant overall findings related to water quality (Salix Applied Earthcare and Geosyntec Consultants 2007a):

- Total and dissolved concentrations of silver and cadmium and dissolved concentrations of lead were not detected in any samples collected by Geosyntec.
- Neither acute nor chronic CTR criteria for metals were exceeded in the samples collected by Geosyntec, except that total copper slightly exceeded chronic criteria at Station 6 during the April 4, 2005, event.
- Selenium was detected only at Station 3 during the April 4, 2005, event and at Stations 1, 3, and 4 during the March 20, 2006, event.
- During the April 4, 2005, event, Station 3 exhibited the highest concentrations of conductivity, TDS, hardness, temperature, and total and dissolved arsenic, and was the only sampling station with detectable concentrations of selenium. Phosphate-phosphorous, TSS, and total and dissolved concentrations of arsenic and selenium were also highest at Station 3 during the March 20, 2006, event.
- During the March 20, 2006, event, Station 4 exhibited the highest concentrations of conductivity, salinity, total hardness, nitrate-nitrogen, sulfate, TDS, and total chromium.
- Station 4 exhibited the highest concentrations of salinity and TSS during the January 3, 2006, event. Station 4 was dry during the April 4, 2005 sampling event and was not sampled.
- Station 6 exhibited the highest concentrations of TSS, total chromium, total zinc, and total and dissolved copper during the April 4, 2005, event. Station 6 was dry during the March 20, 2006, event and was not sampled.
- Results from the sampling events generally indicated that the Tesla Coal Mine and the associated canyons were contributing substantial loads of TSS and sulfates to Corral Hollow Creek.
- Constituent concentrations in Corral Hollow Creek's main stem generally increased from the upstream end of the watershed study area (Station 12 – approximately 2 miles west of the SVRA) to the downstream end of the watershed study area (Station 1 – at the western end of the SVRA).
- The Basin Plan objectives for pH were not exceeded in any samples collected during the April 4, 2005, event, but were exceeded in a few samples collected during sampling events on January 3, 2006, and March 20, 2006.

Concentrations of aluminum, cadmium, and copper measured during the 2014 sampling events exceeded threshold limits; however, the aluminum and cadmium concentrations were identified as originating from off-site sources (i.e., the former Tesla Coal Mine and the LLNL Site 300). The elevated copper concentrations also occurred from these off-site sources, and from within the SVRA based on naturally occurring copper that is present in the underlying rock strata throughout the project area. The 2014 sampling results demonstrated that water quality from runoff leaving the SVRA through Corral Hollow Creek was either in compliance with all

applicable water quality standards, comparable, or of better quality than runoff entering the SVRA via Corral Hollow Creek (DPR 2024b).

10.2.3 Flood Hazard

FEMA has mapped a portion of the Carnegie SVRA on Flood Insurance Rate Maps. A portion of the SVRA along Corral Hollow Creek in San Joaquin County is located within a FEMA 100-year floodplain (Zone A). In Alameda County, the portion of the SVRA that is along Corral Hollow Creek is classified by the California Department of Water Resources (DWR) as a 100-year Awareness Floodplain. The remaining portion of the SVRA is above the 500-year floodplain level (Zone X).

10.3 PROJECT IMPACTS

10.3.1 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the implementation of the project or its alternatives on hydrology and water quality would be considered significant if it would:

(a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

(b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

(c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

  (i) result in substantial erosion or siltation on- or off-site;

  (ii) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off-site;

  (iii) create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff; or

  (iv) impede or redirect flood flows.

(d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

(e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

10.3.1.1 Issues Not Discussed Further in this DEIR

Groundwater Supplies or Recharge (b). The proposed project would not decrease groundwater supplies or interfere with groundwater recharge (b) because it would not utilize groundwater or increase impervious surface area. This issue is not discussed further in this EIR.

Flood, Tsunami, or Seiche Hazards (d). The project is not within a FEMA flood hazard area (see Figure 10-2). The Carnegie SVRA is located in a seismically active region; however, no enclosed bodies of water exist in the SVRA that would be large enough to pose a hazard from seismic seiches. The SVRA is not at risk from tsunamis because of the long distance of the

SVRA from the Pacific Ocean. Thus, no impact from floods, seiches, or tsunamis would occur from implementation of the proposed RMA Program, and these issues are not discussed further in this EIR.

Potential Conflicts with a Sustainable Groundwater Management Plan (e). The Carnegie SVRA is not situated within a DWR-defined groundwater basin. Therefore, a Groundwater Sustainability Plan is not required and has not been prepared. In addition, the project would not utilize groundwater or increase impervious surface area. This issue is not discussed further in this EIR.

10.3.2 Water Quality Standards or Waste Discharge Requirements

The preliminary work sites identified for the RMA Program project would occur in the Tyson's Pond and Carrol Canyon sub-watersheds and in areas directly draining to the Corral Hollow Creek stream corridor as shown in Table 10-2. Of the approximate 175 acres targeted for rehabilitation projects and 23 acres for maintenance projects, 72 acres are located in the Tyson's Pond sub-watershed, which drains through Tyson's Pond and 42 acres are located in Carrol Canyon, which drains through Carrol Basin. Roughly 43 acres of the rehabilitation sites drain directly into Corral Hollow Creek. Two work site areas (#21 and #24) comprising 18 acres straddle the Tyson's Pond and stream corridor watersheds.

Table 10-2. Sub-Watersheds of RMA Program Rehabilitation and Maintenance Sites

Watershed	RMA	Approximate Project Site Area (acres)	Project Sites
Stream Corridor	The Edge	<2	1, 2
Stream Corridor	Baby Cow, Confidence Hill, Death Canyon	<2	30
Stream Corridor	Snake Farm	<5	22, 23
Stream Corridor	Training Hill Area	<34	3
Stream Corridor/Tyson's Pond	Stockpile	<10	21
Stream Corridor/ Tyson's Pond	Confidence Hill	<8	24
Tyson's Pond	Training Hill Area	<16	4
Tyson's Pond	Sand Hill Area	<2	5, 19
Tyson's Pond	West Franciscan (north)	<2	6
Tyson's Pond	East Franciscan	<10	7, 11
Tyson's Pond	Clear Pond	<5	17, 18, 19, 20, 26
Tyson's Pond	Confidence Hill	<12	25
Tyson's Pond	Top of the World	<5	8, 9, 10, 12, 13, 14, 15, 17
Tyson's Pond	Death Canyon	<20	16, 25, 26, 27, 28
Carrol Canyon	Carrol West	<2	31, 32, 33, 35, 36
Carrol Canyon	Lower Juniper	<10	29, 36, 37, 38, 39
Carrol Canyon	Carrol East	<10	34
Carrol Canyon	Happiness Valley	<20	35, 36, 40, 41, 42, 43, 44, 45, 46, 47
Stream Corridor	Los Osos Climb	<10	48
Stream Corridor	Seven Trails	<1	49, 50
Kiln Canyon	Kiln West	<10	51, 52, 53, 54, 55

Table 10-2. Sub-Watersheds of RMA Program Rehabilitation and Maintenance Sites

Watershed	RMA	Approximate Project Site Area (acres)	Project Sites
Kiln Canyon	Bunkhouse	<1	56, 57
Kiln Canyon	Kiln East	<1	58

One of the main purposes of the proposed RMA Program is to effectively control sediment loss and erosion by reducing trail density, increasing vegetation, building and maintaining sustainable trails, limiting most OHV recreation to designated trails, and enforcing trails-only riding where designated (Project Description section 2.2). Implementation of the RMA activities would occur in phases over a 10-year period and would not disturb more than 20 acres in any given year (Project Description section 2.4.2). Therefore, the project would have a beneficial effect on water quality over the long term by reducing sedimentation, one of the main existing water quality issues in the Carnegie SVRA.

The project could potentially cause temporary short-term impacts on storm water runoff water quality during implementation of site rehabilitation projects due to soil disturbance or accidental release of construction equipment fuels or fluids. However, such effects would be limited by the BMPs incorporated in the project design from the OHV BMP Manual (see Table 2-10 in Project Description), SPRs for hydrology (section 10.1.4 and Appendix B), and cessation of work during wet weather per DPR policy (section 10.1.3).

All projects involving ground disturbance activities would comply with all applicable regulations described in section 10.1 above. Impacts to water quality would be prevented with implementation of storm water runoff management plan BMPs to control potential erosion, sedimentation, and other pollutants from construction sites (see Table 2-9 in Project Description). Storm water runoff from the rehabilitation work sites would be controlled at the work site and is unlikely to affect sediment loads entering SVRA drainages. Sediment in post-construction storm water runoff is expected to be lower than existing baseline conditions resulting in improved water quality of runoff entering the SVRA drainages. As a result, the overall impact of the RMA Program project would have a beneficial impact on water quality.

For the reasons described above, the proposed RMA Program is expected to have a ***less than significant*** impact on water quality standards or waste discharge requirements.

10.3.3 Drainage Patterns

The proposed RMA Program would not substantially alter the existing drainage pattern of the project area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces. The project would not alter the course of a stream or river and would not include any new impervious surfaces. One of the main purposes of the proposed RMA Program is to effectively control sediment loss and erosion; therefore, the project would have a beneficial effect on the drainage pattern of the project area over the long term by reducing sedimentation and polluted storm water runoff.

The proposed project would not result in substantial erosion or siltation on or off-site. Project-related erosion is discussed in more detail in Geology and Soils section 9.3 and was found to be less than significant.

The proposed project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off-site. The project would not increase the rate or

amount of surface runoff because it would not include any new impervious surfaces. The project could reduce the rate or amount of surface runoff by increasing the vegetated area which may increase percolation of water into the ground, reducing runoff.

The proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. There are no existing or planned storm water drainage systems in the project area; storm water runoff in the Carnegie SVRA flows into Corral Hollow Creek. As described previously, the project would not include new impervious surface area or create or contribute runoff water. The project would reduce polluted runoff over the long-term by reducing sedimentation, and construction related pollutants to storm water runoff would be avoided or minimized by BMPs incorporated into the project and regulatory compliance (see section 10.3.2 above for more information).

The proposed project would not impede or redirect flood flows. The project is not within a FEMA flood hazard area (see Figure 10-2) and would not include any buildings or structures that could impede or redirect flood flows.

For the reasons described above, the proposed project would have a ***less than significant*** impact on the drainage pattern of the site or area.

10.3.4 Potential Conflicts with a Water Quality Control Plan

As discussed in section 10.3.2 above, the proposed RMA Program would have beneficial effects on water quality over the long term, and short-term impacts on water quality would be avoided or minimized by BMPs incorporated into the project, and compliance with applicable water quality regulations. Therefore, the project would not conflict with or obstruct the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Central Valley RWQCB 2019), the applicable water quality control plan in the project region. This potential impact would be ***less than significant***.

10.4 CUMULATIVE IMPACTS

The proposed RMA Program would comply with BMPs incorporated into the project and applicable regulations and would have less than significant impacts related to hydrology and water quality. All potential impacts from the General Plan projects related to hydrology and water quality were also found to be less than significant in the General Plan Update EIR with implementation of the General Plan Update goals and guidelines (DPR 2024b). Likewise, trail maintenance operations would comply with applicable BMPs and applicable regulations and would have similar less than significant impacts as the proposed project.

There is also very little geographic overlap between the proposed new RMAs and the General Plan Update projects, and no geographic overlap between the new and existing RMAs where trail maintenance operations would occur. Although new RMAs may sometimes be implemented at the same time as General Plan Update projects and/or trail maintenance operations, the RMA Program, General Plan Update projects, and trail maintenance projects would all follow BMPs incorporated in the projects to avoid or minimize construction-related impacts.

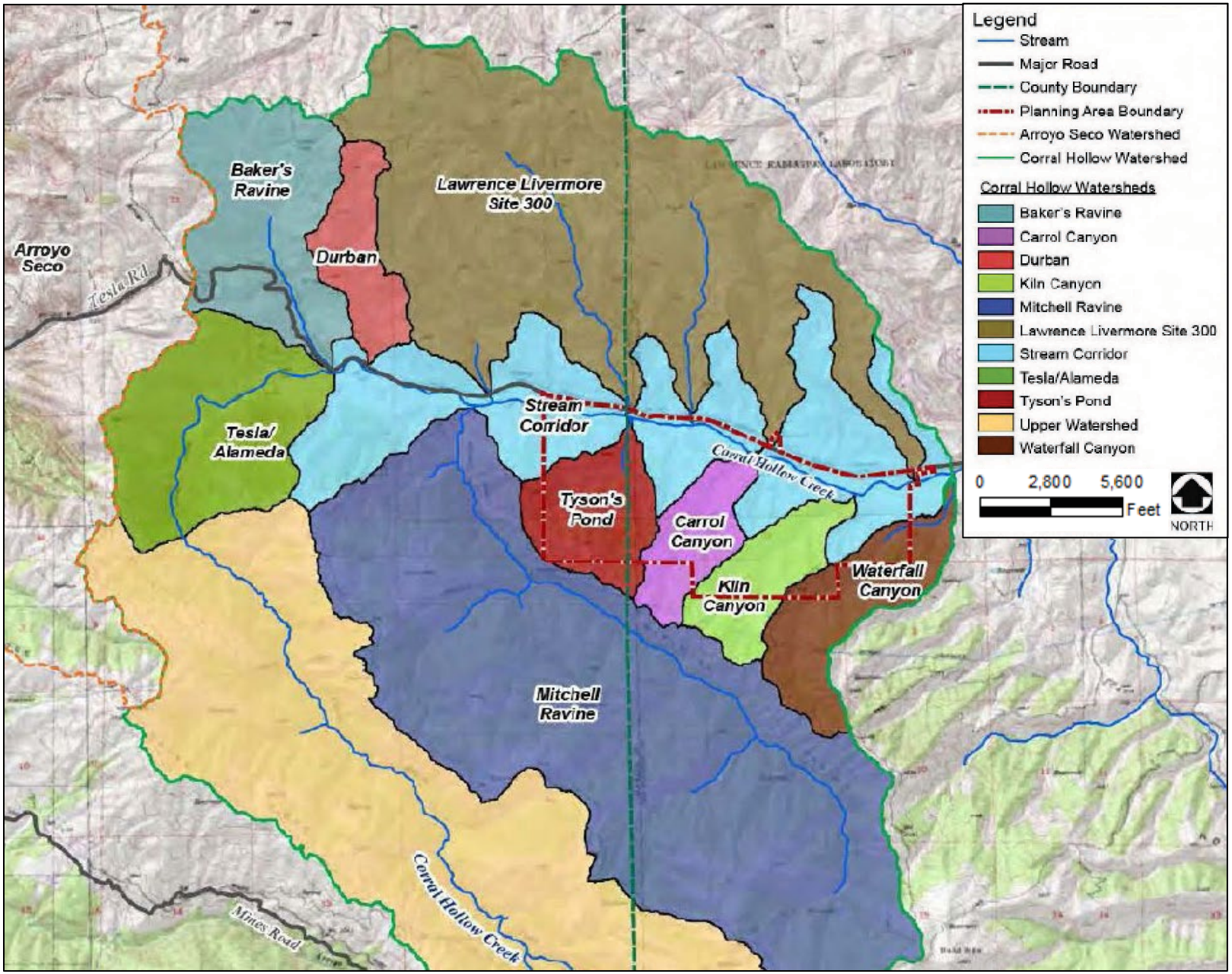
The exact future use of the Alameda-Tesla property is currently unknown, but it will be protected land either with limited public access or open to passive recreation. If passive recreational facilities are installed at the Alameda-Tesla property at some future point, it is not expected to result in cumulatively significant impacts when combined with the proposed project because the

facilities would likely be small-scale and compatible with natural resources protection and therefore, they would be unlikely to result in significant impacts.

For the reasons described above, the proposed RMA Program would have ***no cumulative impact*** on hydrology or water quality.

10.5 MITIGATION MEASURES

No significant impacts on hydrology and water quality have been identified for the project based on the analysis contained in sections 10.3 and 10.4 above. No mitigation is required.



Source: Carnegie General Plan Update 2024

Figure 10-1 Corral Hollow Creek Watershed Drainages

Carnegie SVRA Resource Management Area Program EIR

CHAPTER 11. RECREATION

11.1 REGULATORY SETTING

11.1.1 California Recreation Policy

The California State Legislature delegated responsibility for preparing the State's Recreation Policy to the State Park and Recreation Commission in the belief that all Californians should be provided with an array of opportunities allowing them to pursue their recreational interests. PRC section 540 directs the Commission to formulate, in cooperation with other state agencies, interested organizations and citizens, and recommend to the Director of California State Parks for adoption, a comprehensive recreational policy for the State of California. The 2005 California Recreation Policy is intended to be broad in scope and considers the full range of recreation activities—active, passive, indoors, and out-of-doors. It is a comprehensive policy directed at recreation providers at all levels: federal, state, and local agencies and private and nonprofit suppliers. The policy mandates opportunities and access to recreation activities for all activities and populations while preserving natural and cultural resources.

11.1.2 Off-Highway Motor Vehicle Recreation Act

PRC section 5090.02 enumerates certain findings of the State Legislature with regards to OHV recreation including its ever-increasing popularity and potential to have a deleterious impact on the environment if OHV recreation and access to non-motorized recreational activities is indiscriminate and uncontrolled. PRC section 5090.02(b) also sets forth the state Legislature's declaration that effectively managed areas and adequate facilities for the use of OHVs and conservation and enforcement are essential for ecologically balanced recreation. Accordingly, with passage of the OHMVR Act of 2003, the state legislature intended, in part, that: 1) Existing OHV recreational areas, facilities, and opportunities be expanded and managed to sustain long-term use (PRC § 5090.02(c)(1)); 2) New OHV recreational areas, facilities, and opportunities be provided and managed in a manner that sustains long-term use (PRC § 5090.02(c)(2)); 3) The OHMVR Division supports both motorized recreation and motorized OHV access to non-motorized recreation (PRC § 5090.02(c)(3)); and 4) When areas cannot be maintained to appropriate standards for sustained long-term use, they should be repaired to prevent accelerated erosion or closed and restored.

In addition, PRC section 5090.35(a) provides that protection of public safety, the appropriate utilization of lands, and the conservation of natural and cultural resources are of the highest priority in the management of SVRAs, and the OHMVR Division shall promptly repair and continuously maintain areas and trails and anticipate and prevent accelerated and unnatural erosion and other OHV impacts to the extent possible. The OHMVR Division shall also take steps necessary to prevent damage to significant natural and cultural resources within SVRAs.

SVRAs consist of areas selected, developed, and operated to provide OHV recreation opportunities. Areas must be developed, managed, and operated for the purpose of providing the fullest appropriate public use of the vehicular recreational opportunities present in accordance with the OHMVR Act, while providing for the conservation of cultural resources and the conservation and improvement of natural resource values over time (PRC § 5090.43 (a)). To protect natural and cultural resource values, DPR may establish sensitive areas within SVRAs. If OHV use results in damage to any natural or cultural resources or damage within sensitive areas, appropriate measures must be taken to protect these lands from any further damage. These

measures may include erecting physical barriers and must include restoring natural resources and repairing damage to cultural resources (PRC § 5090.43).

11.1.3 Carnegie SVRA General Plan Update

The Carnegie SVRA General Plan Update includes Goals and Guidelines for visitor experience and opportunities (VEO), visitor use facilities, and park operations and maintenance (OM) for the provision of quality recreation. The Goals and Guidelines relevant to the RMA Program are summarized below. See Appendix C for the complete text of the General Plan Update Goals and Guidelines relevant to the proposed RMA Program. Consistency of the RMA Program with these Goals and Guidelines is presented in Land Use Plans and Policies section 4.3.3.2.

11.2 ENVIRONMENTAL SETTING

The information in this section is from the General Plan Update (DPR 2024a) and references therein, abbreviated to the information most relevant to the proposed RMA Program.

11.2.1 Regional Recreation Overview

Carnegie SVRA plays an important role in meeting the recreational needs of the local and regional community. OHV recreation is a popular pastime in the region and Carnegie SVRA is one of only a few OHV facilities in or near the Bay Area. Recreational facilities in the Carnegie SVRA are described in Land Use Plans and Policies section 4.2.2.

Many non-vehicular parks and recreational facilities are in the region. The facilities located in Alameda and San Joaquin counties near Carnegie SVRA range from small neighborhood parks to regional recreation facilities and wilderness areas. These parks provide opportunities for passive and active recreation such as picnic areas, sports fields, hiking and equestrian trails, and fishing and boating opportunities. Regional recreational opportunities include the following:

- Federal properties such as the San Joaquin River National Wildlife Refuge, the South San Luis and Merced National Wildlife Refuges, and the San Juan Bautista de Anza National Historic Trail.
- Other SVRAs managed by the OHMVR Division include the Hollister Hills SVRA, approximately 100 miles to the south, and the Prairie City SVRA, about 90 miles to the north.
- East Bay Regional Park District parks including 73 parks and more than 125,000 acres of land offer amenities such as hiking and biking trails, equestrian trails, water recreation, fishing, camping, picnicking, nature viewing, and educational programs and opportunities (but no OHV Recreation).
- San Joaquin County parks such as Frank Raines Regional Park located 45 miles south of Carnegie SVRA and La Grange Regional Park located approximately 60 miles east of Tracy, both of which offer OHV recreation opportunities.
- Livermore Area Recreation and Park District manages approximately 6,000 acres of regional parkland.
- The City of Tracy has 76 parks covering more than 270 acres. Recreation opportunities include playgrounds, ball courts, walking paths, picnic and BBQ areas, and more (but no OHV recreation).
- The private Club Moto in Livermore has an outdoor motocross track and a mini track.

11.2.2 Carnegie SVRA Visitation

Over the last 20 years, Carnegie SVRA has hosted an average of 99,000 visits each year (DPR 2024a). Based on data collected from 2020 to 2022, roughly 4,000-7,000 visits to Carnegie SVRA per month occur from October through April, which is also the time when red-sticker vehicles are allowed to ride at the SVRA. Visitor use from May through September typically drops to roughly1,500 to 2,000 visits per month (DPR 2024a Figure 2-25). Few special events are currently held at the SVRA; these consist mainly of four annual hillclimb competitions and a visitor appreciation day. For the last few years, the visitor appreciation day has occurred in October. In previous years, the SVRA hosted other events, including hare scrambles and motocross races.

As part of the General Plan Update planning process, the planning team conducted an online survey of visitors and potential visitors. The median distance that visitors travel from home to Carnegie SVRA is 31 miles. The SVRA also attracts visitors from around the state and across the country, mostly for hillclimb competitions. Most visitors over 18 are between the ages of 36 and 55. If visitors bring children, the children are most often between the ages of 10 and 17. Close to 60 percent of visitors said they bring an average of two children each time they visit the SVRA, with the most popular subgroup being 14- to 17-year-olds (DPR 2024a).

The main attraction of the SVRA is its off-highway motorcycle trails. About 80 percent of the visitors surveyed come to ride off-highway motorcycles on the trails in the hills. Of the many facilities offered at Carnegie SVRA, the off-highway motorcycle trails are preferred over other facilities such as the ATV track or 4x4 area. The SVRA's location close to home and the presence of off-highway motorcycle trails led respondents to choose Carnegie SVRA over other OHV areas available to them (DPR 2024a).

11.2.2.1 Conditions that Have Affected Visitor Access

Certain conditions have necessitated park managers to restrict or limit visitor access to Carnegie SVRA. For example, some or all of the SVRA was closed for several months during the 2020 COVID-19 epidemic to protect public safety. Carnegie SVRA was closed in 2015, 2019, 2020, and briefly in 2022 due to wildfires on the property or close to it. Creek flooding and related infrastructure damage have also prompted partial closures of the SVRA. The SRI crossing was damaged by flooding in 2017, and in 2023, the park was closed for 100+ days due to flooding from the atmospheric river storms. Access to the SVRA from Livermore on Tesla Rd was closed for 4-6 weeks in 2023 while Alameda County Public Works repaired a slide. Carnegie's Storm Water Management Plan has policies to close areas of the park after rainfall reaches a certain amount to protect water quality (DPR 2024a).

11.3 PROJECT IMPACTS

11.3.1 Thresholds of Significance

Based on CEQA Guidelines Appendix G, the proposed RMA Program would have a significant environmental impact related to recreation if it would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated, or
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment.

11.3.1.1 Issues Not Discussed Further in this DEIR

Increased Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities. Implementation of the proposed RMA Program would not increase the use of existing neighborhood and regional parks or other recreational facilities. The project would not include new or expanded recreational facilities and thus is not expected to increase the number of visitors or the recreational use of the Carnegie SVRA compared to existing conditions. The project does not include any new housing or jobs and thus is not expected to increase the population in the project area. Therefore, the use of existing neighborhood and regional parks or other recreational facilities is not expected to increase because of the project. The proposed project would not impact local parks and recreation facilities, and this issue is not discussed further in this DEIR.

11.3.2 Construction or Expansion of Recreational Facilities

The proposed RMA Program does not include new or expanded recreational facilities. The project would have a net impact of converting 169 acres of distributed riding area to trails-only riding (Table 2-5) over a 10-year period. There would be no change in overall SVRA acreage available to OHV recreation and therefore no adverse impact on recreational opportunity. This change would provide increased protection of park soils and vegetative cover by putting into place a system of sustainable, well-maintained OHV trails. This is expected to have a positive effect on the environment by reducing erosion and sedimentation and protecting natural and cultural resources.

The net reduction in distributed area riding would bring current park operations into consistency with the 2024 General Plan Update visitor experience area designations governing visitor use areas. Under the proposed RMA Program, 167 acres of distributed riding area would still be available to recreationists after complete implementation of all RMAs as well as numerous improved and well-maintained trails in the trails-only area. The RMA Program project would also allow for OHV recreation to be sustained over the long term in the Carnegie SVRA, due to reduced erosion and sedimentation, increased protection of resources, and better maintained trails. The newly designated or rerouted trails in the trails-only RMAs could also increase user safety as unsafe trails would be closed the rehabilitated. For these reasons, the project is not expected to have adverse direct or indirect impacts on recreational facilities that might have an adverse effect on the environment, such as causing OHV recreationists to go elsewhere to recreate.

The project would result in short-term reductions in areas available to OHV recreation in the SVRA as areas are temporarily closed during project activities. This is not expected to have a significant impact on recreational facilities or the environment as only one to three new RMAs would be implemented in any given year (Table 2-6) and most of the SVRA would remain open to OHV recreation at any given time. Assuming all new RMAs (773 acres) would be implemented within a 10-year period, it is conservatively estimated that less than 100 acres, less than 10 percent of the total 1,227 acres managed in RMAs, would be closed to OHV recreation in any given year as the new RMAs are gradually implemented. Thus, the short-term effects of the project on recreational facilities would not create an adverse effect on the environment, such as by causing OHV recreationists to go elsewhere or increasing the likelihood that they would utilize unauthorized routes.

Based on the discussion above, all potential impacts from the proposed RMA Program on recreational facilities or related adverse effects to the environment would be ***less than significant***.

11.4 CUMULATIVE IMPACTS

Similar to the proposed project RMA implementation, the General Plan Update projects (see Table 3-1) would be implemented over a period of several years rather than all at the same time. There is also a minimal spatial overlap between the proposed new RMAs and the proposed General Plan Update projects; only General Plan Update communication or technology support projects would potentially occur in proposed new RMAs. The remaining General Plan Update projects would all be in the Corral Hollow Creek Management Unit, which does not overlap with any of the new RMAs. It is possible that a General Plan Update project could be implemented at the same time as an RMA project; however, such effects would be short-term, and the long-term environmental effects of the proposed project would be positive. All potential recreation impacts were found to be less than significant for both the proposed RMA Program (section 11.3) and the General Plan Update (DPR 2024b). The General Plan Update projects were found to have a beneficial effect on visitor experience by provision of new and improved recreational facilities. For all these reasons, the proposed project when combined with General Plan Update projects is not expected to result in cumulative impacts.

The existing RMA maintenance operations (see Table 3-1) would include similar work to the proposed RMA Program, such as trail redesign or rehabilitation and installation of fencing, but would occur within established RMAs at a smaller scale. Thus, the potential effects on recreational facilities and related effects on the environment from trail maintenance operations would be similar to the proposed project and would be less than significant. Although temporary closures for implementation of the new RMAs could overlap with temporary closures for trail maintenance operations, this would not substantially increase the closed area and most of Carnegie SVRA would remain open for OHV use. Thus, the proposed project would not have cumulative impacts when combined with trail maintenance operations.

The exact future use of the state-owned Alameda-Tesla property adjoining Carnegie SVRA to the west is currently unknown. It is anticipated that the land will have limited public access or be open to passive recreation. If passive recreational facilities are installed at the Alameda-Tesla property at some future point, it is not expected to result in cumulatively significant recreation impacts when combined with the proposed project; the facilities would likely be small-scale and compatible with natural resources protection and therefore, they would be unlikely to result in adverse effects on the environment, nor would they increase the use of neighborhood or regional parks.

For the reasons described above, the proposed RMA Program would have ***no cumulative impact*** on recreation.

11.5 MITIGATION MEASURES

No significant impacts on recreation and public access have been identified for the project based on the analysis contained in sections 11.3 and 11.4 above. No mitigation is required.

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CHAPTER 12. ALTERNATIVES

CEQA Guidelines section 15126.6(f) states that an EIR shall describe a range of reasonable alternatives to a project or location of the project that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects of the project. An EIR's discussion of alternatives does not need to consider every conceivable alternative but must foster informed decision making and public participation. CEQA intends for the alternatives discussion to focus on alternatives that are capable of avoiding or substantially reducing any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives. Project Description section 2.2.2 lists the following objectives for the proposed RMA Program:

- Operate Carnegie SVRA consistent with PRC 5006.48
- Formalize the evolution of the SVRA's trail management program that has developed over time
- Manage riding areas in a sustainable manner consistent with existing laws and regulations, the general plan, superintendent orders, agency permits and agreements, and court orders
- Meet water quality objectives, including reducing sedimentation of drainages and discharge of sediment into Corral Hollow Creek
- Reduce trail density
- Prevent accelerated erosion by dispersing storm water runoff and maintaining trails
- Provide for quality OHV recreation opportunities[14] consistent with the declared purpose for the SVRA, including making the fullest appropriate public use of the vehicular recreational opportunities present while ensuring cultural resources conservation and conservation and improvement of natural resources (PRC §5090.43[a]).

An EIR is not required to consider alternatives that are infeasible (CEQA Guidelines §15126.6(f)). A lead agency is responsible for selecting the range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. Factors that may be taken into account when considering feasibility include 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.

[14] Although the PRC does not define "quality recreational opportunities" for OHVs, for purposes of this EIR, "quality recreational opportunities" is interpreted to mean areas providing OHV opportunity that is of challenge and interest to the targeted recreationist, of adequate quantity in mileage and/or acreage, and well maintained in conjunction with other site amenities suitable to the site, e.g., day use and often camping facilities, interpretation, non-motorized trails, etc.

12.1 CONSIDERED AND REJECTED ALTERNATIVES

An EIR should identify any alternatives that were considered by the lead agency but were not compared to the proposed project in the EIR and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in the EIR are: 1) failure to meet most of the basic project objectives (see above); 2) infeasibility; and 3) inability to avoid significant impacts.

DPR considered and rejected complete closure of the SVRA to public use and conversion of the SVRA to non-motorized recreation use only as project alternatives. These alternatives fail to meet the basic purpose of the SVRA, which is to provide opportunity for motorized recreation (see Project Description section 2.2). DPR considers the effects of not implementing the program in the No Project Alternative and additional OHV use restriction by eliminating open (distributed) riding in the Trails-Only Alternative in 12.2.2 below. Given that the proposed RMA Program is a rehabilitation program designed to prevent and manage soil loss and erosion occurring in the watershed while maintaining quality OHV recreation, there are few alternatives available for consideration.

12.2 ALTERNATIVES CONSIDERED

Pursuant to CEQA Guidelines section 15126.6, the rationale for selecting the alternatives is to attempt to feasibly attain most of the basic project objectives while avoiding or substantially lessening the significant effects of the project. The effects of the proposed RMA Program were found to be largely beneficial over the long term due to a reduction in erosion and sedimentation in the proposed new RMAs, improved water quality, increased vegetation, and improved protection of natural and cultural resources. Short-term impacts were found to be less than significant impacts with incorporation of BMPs into the project, implementation of Mitigation Measures BIO-1 through BIO-11 and GEO-1, and regulatory compliance. Since long-term environmental effects of the RMA Program were found to be beneficial, this DEIR considers an alternative that could increase the beneficial effects of the project (Trails-Only Alternative), as well as the standard No Project Alternative.

12.2.1 Alternative 1: No Project Alternative

12.2.1.1 Alternative Description

CEQA Guidelines (§ 15126.6(e)) require evaluation of a "no project" alternative along with its impact. The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The impact of the no project alternative is analyzed by projecting what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on existing conditions in the project area.

Under this alternative, the area covered by the proposed new RMAs would continue to operate the same as under existing conditions. Existing distributed riding areas would remain and would not be converted to trails-only riding areas. Many of the activities proposed in the new RMAs would not occur, including perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation. Routine trail inspections, maintenance, and restoration of illegal trails would continue to occur as it does under existing conditions.

12.2.1.2 Environmental Analysis

Land Use. The No Project Alternative would not change the overall recreational land use of the RMA Program project acreage within the SVRA. The proposed project conversion of 169 acres of distributed riding areas to trails-only riding areas through the RMA Program would not occur. The RMA Program would not be used to bring OHV use into compliance with the visitor experience area designations established by the newly adopted 2024 General Plan Update. Under the No Project Alternative, perimeter fencing of proposed RMAs would not occur and designated trail-only riding in presently unfenced areas would remain difficult to enforce. OHV open riding practices occurring outside of the distributed riding areas designated by the 2024 General Plan Update would likely continue; this would be inconsistent with the 2024 General Plan Update. DPR would use education and enforcement, however, the likelihood of catching off trail riding is small; this approach has low effectiveness in changing generational memory on riding anywhere in the park as previously allowed. With the RMAs in place, there is the closure and exclusion of riding in those areas. Therefore, the No Project Alternative would have an increased land use impact compared to the proposed project.

Aesthetics. The No Project Alternative would not impact a scenic vista or a State Scenic Highway, change the visual character or quality of the project area, or add a new source of light or glare. The visual characteristics of the project area would remain similar to existing conditions under the No Project Alternative, although trail proliferation and hillside erosion could increase over time in distributed riding areas. The proposed RMA Program is expected to have a beneficial effect on the aesthetics of the project area over time by reducing erosion, closing and rehabilitating trails, and increasing vegetation. Therefore, the No Project Alternative would have an increased aesthetic impact compared to the proposed project.

Air Quality. The No Project Alternative would not affect air quality. Existing emissions of fugitive dust and equipment exhaust would continue. Proposed rehabilitation projects and associated indirect air quality benefits of increased vegetative cover and reduced fugitive dust emissions would not occur. Any increase in pollutant emissions associated with heavy equipment operations for project activities would not occur. Therefore, the No Project Alternative would have a reduced impact on air quality compared to the proposed project.

Biological Resources. The No Project Alternative would not affect special-status species, sensitive natural communities, jurisdictional waters or habitats, wildlife movement, or an adopted HCP. Potential impacts on biological resources in the Carnegie SVRA would remain similar to existing conditions, although further impacts could accrue over time if trail proliferation and hillside erosion could increase over time in distributed riding areas. The proposed RMA Program is expected to have a beneficial effect on biological resources in the project area over time by reducing erosion, closing and rehabilitating trails, and increasing vegetation; thus improving habitat for plants, wildlife, and natural communities and reducing pollutants in aquatic habitats. These beneficial impacts would not occur under the No Project Alternative. Therefore, the No Project Alternative would have reduced short-term impacts on biological resources and none of the long-term benefits compared to the proposed project.

Cultural Resources/ Tribal Cultural Resources. The No Project Alternative would not affect cultural or tribal cultural resources. Existing trail maintenance operations would continue without the project. Proposed rehabilitation projects would not occur. No impacts to cultural or tribal resources are anticipated under the proposed project and therefore, the effect of the No Project Alternative on cultural and tribal cultural resources would be the same as the proposed project.

Geology and Soils. The No Project Alternative would not impact geology and soils, although erosion could worsen over time in the project area due to continued use of unsustainable trails and/or trail proliferation in the distributed riding areas. The proposed RMA Program is expected to have beneficial effects on geology and soils by reducing erosion, increasing vegetation, and closing and rehabilitating unsustainable trails in the proposed new RMAs. These beneficial impacts would not occur under the No Project Alternative. Therefore, the No Project Alternative would have reduced short-term impacts on soils and none of the long-term benefits compared to the proposed project.

Hydrology and Water Quality. The No Project Alternative would have no impact on hydrology and water quality, although sedimentation could increase in the project area over time due to continued use of unsustainable trails and/or trail proliferation in the distributed riding areas. The proposed RMA Program is expected to have beneficial effects on hydrology and water quality by reducing sedimentation, increasing vegetation, and closing and rehabilitating unsustainable trails in the proposed new RMAs. These beneficial impacts would not occur under the No Project Alternative. Therefore, the No Project Alternative would have reduced short-term impacts on water quality and none of the long-term benefits compared to the proposed project.

Recreation. Under the No Project Alternative, no recreational facilities would be constructed or expanded, and the use of regional recreational facilities would not be affected. New or re-routed trail segments proposed for purposes of trail sustainability or improved connectivity would not be constructed.; however, this is not expected to result in significant impacts related to recreation opportunity. Therefore, the effect of the No Project Alternative on recreation would be the same as the proposed project.

12.2.1.3 DPR Consideration of Alternative

The No Project Alternative would not meet the project objective of managing riding areas in a sustainable manner consistent with existing laws and regulations, general plan, superintendent orders, agency permits and agreements, and court orders. The No Project Alternative also would not meet other project objectives, including reducing sedimentation of drainages and discharge to Corral Hollow Creek, reducing trail density, and preventing accelerated erosion by dispersing storm water runoff and maintaining trails. Erosion and sedimentation, and potential impacts on natural and cultural resources in distributed riding areas could continue to occur in the project area under the No Project Alternative. Some RMAs have already been implemented in the Carnegie SVRA and have been successful in reducing erosion and sedimentation and improving protection of resources; the proposed project merely formalizes and expands an existing program in the SVRA.

Because the No Project Alternative doesn't meet the project objectives and has reduced beneficial effects and/or increased impacts compared to the proposed project, the No Project Alternative is not a viable option and is rejected by DPR in favor of the proposed RMA Program.

12.2.2 Alternative 2: Trails-Only Riding

12.2.2.1 Description

Under the Trails-Only Riding Alternative, all 773 acres of the proposed RMA Program project area would be converted to trails-only riding; no part of the project area would remain a distributed riding area. This would eliminate the last open riding areas within the SVRA (i.e., Trans Am, Dead Cow, and Carrol Canyon management units; see Table 2-1) except for the Hillclimb Event Area; in effect leaving Carnegie SVRA to be managed as a trails-only riding

facility. The project activities proposed in the new RMAs (e.g., perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation) would still occur under the Trails-Only Riding Alternative.

12.2.2.2 Environmental Analysis

Land Use. The Trails-Only Riding Alternative would not change the overall recreational land use of the RMA Program project acreage within the SVRA. Under the Trails-Only Alternative, all of the 773 acres within the RMA Program area would be managed for trails-only riding, resulting in the conversion of 336 acres currently managed as distributed (open) riding area to trails-only riding area. The 2024 General Plan Update establishes distributed riding as a visitor experience area. This area as shown in Figure 4-2 covers 168 acres. The Trails-Only Riding Alternative would eliminate this riding experience from the SVRA inconsistent with the General Plan Update. Therefore, the Trails-Only Alternative would have an increased land use impact compared to the proposed project.

Aesthetics. The Trails-Only Riding Alternative would eliminate distributed (open) riding areas, which could have a beneficial effect on the aesthetics of the project area over time by reducing erosion, closing and rehabilitating trails, and increasing vegetation. Distributed riding areas are subject to trail proliferation, erosion, and denuding of vegetation which affects the visual quality of the area. Given that the proposed RMA Program would reduce but not eliminate distributed riding areas, the Trails-Only Riding Alternative would have an increased beneficial effect on aesthetics compared to the proposed project in the areas proposed by the project to remain as distributed riding areas. The Trails-Only Riding Alternative would not impact a scenic vista or State Scenic Highway or introduce a new source of light or glare similar to the proposed project. The Trails-Only Riding Alternative would implement the same activities as proposed in the RMA Program (i.e., perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation) and therefore aesthetic impacts from these activities would be unchanged by this alternative. Overall, the Trails-Only Riding Alternative could have a slightly increased beneficial effect on aesthetics compared to the proposed project.

Air Quality. The Trails-Only Riding Alternative would eliminate the distributed or open riding areas, which could alter the riding habits of OHV recreationists in a manner that affects vehicle operation and resulting exhaust emissions; however, such changes in exhaust emissions, if they occur, would have a negligible effect on emissions in the air basin and would not impact air quality. Construction of new or re-routed trail segments, trail maintenance, and rehabilitation activities involving the operation of heavy equipment and subsequent construction vehicle emissions would still occur. BMPs and SPRs identified in section 6.1.7 would still be required. Therefore, the Trails-Only Riding Alternative would have the same construction related fugitive dust and construction related equipment emissions when compared to the proposed project.

Biological Resources. The Trails-Only Riding Alternative would eliminate distributed (open) riding areas, which are subject to trail proliferation, erosion, and denuding of vegetation which affects the vegetation and wildlife habitat of the area. This could have a beneficial effect on the biological resources of the project area over time by reducing erosion, closing and rehabilitating trails, and increasing vegetation. This would increase the area of natural vegetation communities and wildlife habitat. Given that the proposed RMA Program would reduce but not eliminate distributed riding areas, the Trails-Only Riding Alternative would have an increased beneficial effect on biological resources compared to the proposed project in the areas proposed by the project to remain as distributed riding areas. The Trails-Only Riding Alternative would

implement the same trail improvement, maintenance, and rehabilitation projects as the proposed RMA Program project and therefore biological resource impacts from these activities would be unchanged by this alternative. SPRs and mitigation measures identified in Biological Resources (section 7.1.11 and section 7.5) to reduce or avoid impacts associated with the proposed RMA Program project (i.e., special-status plants and animal species, non-wetland jurisdictional waters of the U.S. and state, and native trees) would still be required. The Trails-Only Riding Alternative would not impact local policies protecting biological resources or an existing HCP similar to the proposed project. Overall, the Trails-Only Riding Alternative could have a slightly increased beneficial effect on biological resources compared to the proposed project.

Cultural Resources/ Tribal Cultural Resources. The Trails-Only Riding Alternative would eliminate distributed (open) riding areas, which are subject to trail proliferation, erosion, and denuding of vegetation. This could indirectly have a beneficial effect on the cultural or tribal cultural resources if off-trail riding occurs in areas of unknown cultural or tribal cultural resources and potentially affects those resources. The Trails-Only Alternative would implement the same activities as proposed in the RMA Program (i.e., perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation). SPRs and standard practices identified in Cultural and Tribal Cultural Resources sections 8.1.4 and 8.1.5 to reduce or avoid impacts associated with the proposed RMA Program project would still be required. Therefore, the Trails-Only Riding Alternative would have similar impacts or slightly increased beneficial impacts to cultural and tribal cultural resources when compared to the proposed project.

Geology and Soils. The Trails-Only Riding Alternative would eliminate distributed (open) riding areas, which is expected to have beneficial effects on geology and soils by reducing the area of soil disturbance and thereby reduce erosion, improving slope stability, increasing vegetation, and closing and rehabilitating unsustainable trails in the proposed new RMAs. Given that the proposed RMA Program would reduce but not eliminate distributed riding areas, the Trails-Only Riding Alternative would have an increased beneficial effect on geology and soils compared to the proposed project in the areas proposed by the project to remain as distributed riding areas. The Trails-Only Riding Alternative would implement the same activities as proposed in the RMA Program (i.e., perimeter fencing and gates, signage and public outreach, trail removal and hill rehabilitation, erosion control and repair, and revegetation). BMPs and SPRs identified in Geology and Soils section 9.1.3 and mitigation identified in Geology and Soils section 9.5 to reduce or avoid impacts associated with the proposed RMA Program project would still be required. The Trails-Only Riding Alternative would not have impacts related to fault rupture, strong seismic ground shaking, liquefaction, expansive soils, or alternative wastewater systems similar to the proposed project. Therefore, the Trails-Only Riding Alternative would have similar impacts or slightly increased beneficial impacts to geology and soils when compared to the proposed project.

Hydrology and Water Quality. The proposed Trails-Only Riding Alternative would eliminate distributed (open) riding areas, which is expected to have beneficial effects on hydrology and water quality by reducing sedimentation, increasing vegetation, and closing and rehabilitating unsustainable trails in the proposed new RMAs. Given that the proposed RMA Program would reduce but not eliminate distributed riding areas, the Trails-Only Riding Alternative would have an increased beneficial effect on hydrology and water quality compared to the proposed project in the areas proposed by the project to remain as distributed riding areas. SPRs identified in Hydrology section 10.1.4 would still be required. The Trails-Only Riding Alternative would not have impacts related to groundwater supply or recharge, flooding, or tsunami or seiche hazards

similar to the proposed project. Therefore, the Trails-Only Riding Alternative would have similar or slightly increased beneficial impacts to hydrology and water quality when compared to the proposed project.

Recreation and Public Access. The Trails-Only Riding Alternative would not change the overall recreational land use of the RMA Program project acreage within the SVRA. The alternative would eliminate the existing 335 acres of distributed riding area occurring in the SVRA resulting in lost opportunity for open riding recreation at the SVRA. The elimination of this type of recreation from the SVRA would be inconsistent with the 2024 General Plan Update and represents a significant impact to the quality of recreation experience provided at the SVRA. Therefore, the Trails-Only Riding Alternative would have an increased recreation impact when compared to the proposed project.

12.2.2.3 DPR Consideration of Alternative

The Trails-Only Riding Area Alternative would meet all the project objectives except for perhaps to "provide for a quality recreation experience." Although this alternative would continue to allow for OHV recreation in all the same areas as under existing conditions, some OHV recreationists may prefer or seek out distributed riding areas over trails-only areas. This alternative would meet the following objectives to the same degree or better than the proposed project: formalize the evolution of the park's trail management program that has developed over time; manage riding areas in a sustainable manner consistent with existing laws and regulations, general plan, superintendent orders, agency permits and agreements, and court orders; reduce sedimentation of drainages and discharge to Corral Hollow Creek; reduce trail density; and prevent accelerated erosion by dispersing storm water runoff and maintaining trails. However, this alternative was rejected by DPR in favor of the proposed RMA Program because it does not adequately balance the needs of OHV recreationists against the other objectives of the proposed project.

12.3 Environmentally Superior Alternative

The purpose of the alternatives analysis is to identify project alternatives that "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[.]" (CEQA Guidelines § 15126.6(a)). The discussion above presents alternatives to the proposed RMA Program based on the identified potentially significant impacts. The environmental impacts of the alternatives are compared above in section 12.2.

Alternative 2: Trails-Only Riding Alternative is considered the environmentally superior alternative. This alternative would allow DPR to obtain most of the project objectives and increase the beneficial effects of the project in reducing erosion and sedimentation, improving water quality, protecting natural and cultural resources, and improving the visual quality of the project area. The alternative may not achieve the project objective of providing quality recreation experience. Because the proposed project would still have beneficial effects, would have only temporary potentially significant impacts that would be minimized or avoided with BMPs and mitigation incorporated into the project, and would better meet the recreation project objective, Alternative 2: Trails-Only Riding Area Alternative was not selected as the preferred project.

Table 12-1. Comparison of Proposed RMA Program and Alternatives

Resource	Proposed RMA Program	Alternative 1: No Project	Alternative 2: Trails-Only Riding Area
Land Use Plans and Policies	Does not conflict with existing plans and policies.	Does not conflict with existing plans and policies.	Does not conflict with existing plans and policies.
Aesthetics	Beneficial effects on aesthetics due to reduced erosion, closing some trails, and increasing vegetation.	Generally no impact on aesthetics, but erosion and denuding of vegetation could worsen visual quality over time.	Beneficial effects on aesthetics due to reduced erosion, closing some trails, and increasing vegetation. Beneficial effects are greater than the proposed project.
Air Quality	Less-than-significant impacts from construction fugitive dust and construction equipment exhaust emissions.	No impact.	Less-than-significant impacts from construction fugitive dust and construction equipment exhaust emissions same as proposed project.
Biology Resources	Less-than-significant impacts on special-status species and natural communities with mitigation. Beneficial effects on biological resources due to reduced erosion, closing some trails, and increasing vegetation.	Generally no impact on biological resources, but erosion and denuding of vegetation could impact plants, wildlife, and natural communities over time.	Less-than-significant impacts on special-status species and natural communities with mitigation. Beneficial effects on biological resources due to reduced erosion, closing some trails, and increasing vegetation. Beneficial effects are greater than the proposed project. Impacts from project construction activity same as proposed project.
Cultural Resources/ Tribal Cultural Resources	Less than significant impacts to unknown or inadvertently discovered resources	No impact	Same as proposed project.
Geology and Soils	Beneficial effects on geology and soils due to reduced erosion, closing some trails, and increasing vegetation. Less than significant impacts with mitigation to unknown inadvertently discovered paleontological resources.	Generally no impact on geology and soils, but trail proliferation and denuding of vegetation could worsen erosion and slope stability over time.	Beneficial effects on geology and soils due to reduced erosion, closing some trails, and increasing vegetation. Beneficial effects are greater than the proposed project. Potential impacts with mitigation to unknown inadvertently discovered paleontological resources same as proposed project.
Hydrology and Water Quality	Beneficial effects on hydrology and water quality due to reduced erosion and sedimentation and improved water quality.	Generally no impact on hydrology and water quality, but trail proliferation and denuding of vegetation could worsen sedimentation and water quality over time.	Beneficial effects on hydrology and water quality due to reduced erosion and sedimentation and improved water quality. Beneficial effects are greater than the proposed project.

Table 12-1. Comparison of Proposed RMA Program and Alternatives

Resource	Proposed RMA Program	Alternative 1: No Project	Alternative 2: Trails-Only Riding Area
Recreation	Generally no impacts on recreation, but some distributed riding areas would be converted to trails-only areas and some recreationists may prefer distributed areas.	No impacts on recreation.	Generally no impacts on recreation, but all distributed riding areas would be converted to trails-only areas and some recreationists may prefer distributed areas.
Meet Project Objectives?	Yes	No	Partial

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CHAPTER 13. OTHER CEQA CONSIDERATIONS

13.1 POTENTIALLY UNAVOIDABLE SIGNIFICANT IMPACTS

There are no significant unavoidable impacts associated with the Carnegie SVRA RMA Program. The long-term environmental effects of the proposed RMA Program are expected to be beneficial, and all potential short-term impacts would be avoided or minimized with BMPs and mitigation incorporated into the project. As a result, all potential impacts on the environment are found to be less than significant.

13.2 GROWTH INDUCEMENT

The proposed Carnegie SVRA RMA Program would implement soil conservation measures through managing OHV access and rehabilitating disturbed soil as described in Project Description sections 0 and 2.5. The proposed RMA Program activities consist of park management operations that have been previously implemented in other areas of the SVRA and are considered routine operations.

The proposed RMA Program activities do not build capacity for future park improvements and do not involve infrastructure changes that would promote development of urban growth or conversion of land from existing park uses. The RMA Program projects would not change the park's carrying capacity and would not induce growth of park visitation. As such, the proposed project is not growth inducing.

13.3 IMPACTS FOUND TO BE NOT SIGNIFICANT

Using the CEQA Guidelines Appendix G checklist, DPR has determined the proposed RMA Program activities would clearly result in no impact or a less-than-significant impact on the resources described below.

13.3.1 Agricultural and Forest Resources

The Carnegie SVRA is classified by the Farmland Mapping and Monitoring Program (FMMP) as Vacant or Disturbed Land along Corral Hollow Creek, and as Grazing Land in the rest of the SVRA (CDC 2022). There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) in the SVRA. Therefore, the proposed project would not convert Farmland to a non-agricultural use.

Carnegie SVRA is zoned for agricultural use by the Alameda County and San Joaquin County zoning ordinances (DPR 2024b). However, local zoning ordinances do not apply to state-owned properties including Carnegie SVRA, and the proposed project would not change the existing land use within the SVRA, which is primarily OHV recreation. Carnegie SVRA is not under a Williamson Act contract (DPR 2024b). Therefore, the proposed project would not conflict with zoning for agricultural use, or a Williamson Act contract.

Carnegie SVRA is not zoned for forest land or timberland, and there is no forest land within the SVRA. Therefore, the project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland, or result in the loss of forest land or conversion of forest land to a non-forest use.

For the reasons described above, there would be ***no impact*** on agricultural and forestry resources.

13.3.2 Energy

Energy consumption is closely tied to the issues of air quality and greenhouse gas (GHG) emissions, because energy consumption – whether it be electricity, natural gas, or petroleum products (e.g., gasoline and diesel) – form the underlying basis for many of the emissions calculations.

The proposed RMA Program activities would require the use the gasoline and diesel fuels needed to power heavy-duty off-road equipment, State Parks vehicles (e.g., F350s), equipment used to transport materials (e.g., Kubota, Canycom, etc.), and have materials delivered to Carnegie SVRA. As described in Air Quality sections 6.2.6 and 6.3.3, DPR has been implementing RMAs in other portions of Carnegie SVRA since approximately 2011, and the activities proposed by the RMA Program project would be similar in nature to those in recent years – involving installation of fencing and gates, hillside rehabilitation, erosion repairs, trail management and maintenance, etc. Gasoline and diesel would continue to be consumed by this equipment moving forward; however, this energy consumption would not be wasteful, inefficient, or unnecessary. DPR would be undertaking the proposed RMA Program activities to manage riding area in a sustainable manner, reduce sedimentation of drainages and discharges to Corral Hollow Creek, and reduce trail density (among over project objectives, see Project Description section 2.2.2). Thus, the energy/fuel consumption needed to undertake these activities would not be wasteful or unnecessary, as it would be used in a manner that would improve environmental conditions at the SVRA over the long term. The proposed activities would also not be inefficient, as DPR would plan in detail the specific activities intended for each RMA before undertaking any activities. For these reasons, the proposed RMA Program activities would not be wasteful, inefficient, or unnecessary. The proposed project also would not conflict with or obstruct a state or local plan adopted for increasing renewable energy or energy efficiency. The proposed project would have ***no impact on energy resources.***

13.3.3 Greenhouse Gas Emissions

Gases that trap heat in the atmosphere and affect regulation of the Earth's temperature are known as "greenhouse" gases (GHG). GHG that contribute to climate regulation are a different type of pollutant than criteria or hazardous air pollutants because climate regulation is global in scale, both in terms of causes and effects. Some GHG are emitted to the atmosphere naturally by biological and geological processes such as evaporation (water vapor), aerobic respiration (carbon dioxide), and off-gassing from low oxygen environments such as swamps or exposed permafrost (methane); however, GHG emissions from human activities such as fuel combustion (e.g., carbon dioxide) and refrigerants use (e.g., hydrofluorocarbons) significantly contribute to overall GHG concentrations in the atmosphere, climate regulation, and global climate change.

Human production of GHG has increased steadily since pre-industrial times (approximately pre-1880) and atmospheric carbon dioxide concentrations have increased from a pre-industrial value of 280 parts per million in the early 1800s to 422 parts per million in September 2024 (NOAA 2024). The effects of increased GHG concentrations in the atmosphere include climate change (increasing temperature and shifts in precipitation patterns and amounts), reduced ice and snow cover, sea level rise, and acidification of oceans. These effects in turn will impact food and water supplies, infrastructure, ecosystems, and overall public health and welfare. GHGs can remain in the atmosphere long after they are emitted. The potential for a particular greenhouse gas to absorb and trap heat in the atmosphere is considered its global warming potential (GWP). The reference gas for measuring GWP is CO_2, which has a GWP of one. By comparison, CH_4 has a

GWP of 25, which means that one molecule of CH_4 has 28 times the effect on global warming as one molecule of CO_2 (IPCC 2014).

In 2006, the California State Legislature adopted the California Global Warming Solutions Act of 2006, AB 32, which implemented a goal of 1990 GHG emissions levels for 2020 GHG emissions limits using various measures. Since AB 32, California passed SB 32, codifying the state's goal to reduce GHG emissions by 40 percent below 1990 levels by 2030, and AB 1279, codifying California's 2045 carbon neutrality goal and establishing a GHG emission reduction target of 85% below 1990 levels by 2045.

Both the BAAQMD and SJVAPCD maintain GHG CEQA thresholds of significance; however, neither air districts' GHG thresholds of significance are applicable to the project, as they either do not account for the State's current long-term climate goals or strategies and/or are not applicable to unique construction- / maintenance-related activities at open space recreational land uses. Instead, this analysis uses a construction-specific GHG significance threshold established by the Sacramento Metropolitan Air Quality Management District (SMAQMD), which is 1,100 $MTCO_2e$ per year. This threshold was established by the SMAQMD to support jurisdictions' evaluation of potential construction GHG emissions levels and is most relevant to the RMA project, given its unique characteristics. In addition, the analysis conducted in the Carnegie SVRA General Plan Update EIR also used the SMAQMD threshold of 1,100 $MTCO_2e$ per year to evaluate potential General Plan construction GHG emissions (SMAQMD 2020).

Existing emissions associated with RMA activities at Carnegie SVRA were estimated using the same data sources and methodologies described in Air Quality section 6.2.6. These existing emission estimates are shown in Table 13-1.

Table 13-1. GHG Emissions from Existing RMA Activities

Year	GHG Emissions (Metric Tons of Pollutant)			
	CO_2	CH_4	N_2O	CO_2e
2019	141	<1	<1	230
2020	160	<1	<1	255
2021	102	<1	<1	181
2022	116	<1	<1	189

Notes: See Appendix D.

As shown in Table 13-1 historic, annual emissions associated with RMA activities have typically generated approximately 214 $MTCO_2e$ on average, with an estimated maximum of 255 $MTCO_2e$. As discussed under Air Quality section 6.3.3, State Parks is not proposing to increase staffing or the number of SPEOs at Carnegie SVRA. RMA-related activities would have to increase approximately 4.3-fold in order to meet or exceed the 1,100 $MTCO_2e$ per year threshold, which would not occur under proposed conditions. For these reasons, the proposed project would not generate direct or indirect GHG emissions that would have the potential to result in a significant impact or conflict with or otherwise obstruct the implementation of a plan, policy, or regulation adopted for the purposes of reducing GHG emissions. The proposed project would have a ***less-than-significant impact*** regarding GHG emissions.

13.3.4 Hazards and Hazardous Materials

Hazardous materials typically used in construction operations such as diesel fuel, solvents, and paints would likely be used during construction activities associated with implementation of the new RMAs. State Parks employees are required to use and dispose of hazardous materials in accordance with all federal, state, and local regulations, thus minimizing any potential for accidental release of or exposure to such materials. Training related to use, storage, and handling of hazardous material is routinely provided to employees at the SVRA maintenance yard. Hazardous materials are collected at a minimum annually by a hazardous materials recycler. The SVRA is operated under a site-specific Storm Water Management Plan (DPR 2012)), which includes measures to prevent spills of hazardous materials and to appropriately clean up any accidental spills that may occur. Additionally, SPRs for hazards (Appendix B) include measures such as equipment inspections, preparation of a Spill Prevention and Response Plan, Materials Management Plan and designated decontamination and staging areas for equipment, which minimize the potential for hazardous materials to enter the environment. Therefore, the proposed project would result in less-than-significant impacts associated with the routine use, transport, disposal, upset, and accident conditions related to hazardous materials.

The SVRA does not include any known hazardous materials contamination sites, including Cortese-listed sites or Superfund sites. The Pit 6 Landfill, which is part of the LLNL Site 300 Superfund site and is also on the Cortese list, is located approximately 1,000 feet west of the SVRA's groundwater well and approximately 200 feet north of the existing ranger station. Also, the former Tesla Coal Mine is approximately 1.5 miles northwest of the SVRA. However, based on groundwater monitoring at LLNL Site 300, and water quality monitoring in Corral Hollow Creek, the Carnegie SVRA is not being impacted by Superfund or Cortese-listed sites, or the off-site Tesla Coal Mine site, and therefore these sites would not affect the proposed project (DPR 2024b).

There are no K-12 schools within 0.25 miles of the SVRA. The nearest school is the Anthony Traina Elementary School, approximately 6.4 miles northeast, near Carbona. Therefore, the project would not emit or handle hazardous materials near an existing or proposed school.

There are no airports within 2 miles of the SVRA, nor is the SVRA located within an airport land use plan. Therefore, the project would not result in a related safety hazard for people living or working in the project area.

Corral Hollow Road/Tesla Road is a paved arterial roadway that serves as the primary evacuation route out of the Carnegie SVRA. The project would not impact Corral Hollow Road/Tesla Road, and therefore would not impair or interfere with an emergency response or evacuation plan.

For the reasons described above, the project would have a ***less-than-significant impact*** on hazards and hazardous materials.

Note that Hazards and Hazardous Materials threshold g concerning wildfire hazards (CEQA Guidelines Appendix G) is addressed in section 13.3.11 Wildfire below.

13.3.5 Mineral Resources

Coal, clay, gravel, lime, manganese, and sand were mined in and adjacent to the SVRA between 1855 and 1960. Several coal mining companies explored, mined, and transported coal within Corral Hollow, most notably from the Tesla Coal Mine west of the SVRA. However, the Carnegie SVRA is not located within the boundaries of a mineral land classification study under

the Surface Mining and Reclamation Act, and therefore, is not part of a present-day, regionally designated "significant" mineral resource recovery zone (i.e., deposits classified as MRZ-2 by the California Geological Survey; (DPR 2024b)). Although the SVRA and the surrounding area formerly contained mineral resources, a substantial amount of the area's mineral resources was removed because of historic mining activities. Mining is not a currently permitted use within the SVRA, and no mining activities are planned with the SVRA in the future. Therefore, the proposed project would not result in the loss of regionally designated "significant" deposits of mineral resources (i.e., deposits classified by the California Geological Survey as MRZ-2).

As a State agency, State Parks is not required to consider the impacts of its projects related to local general plans. However, to comply with the Mineral Resources CEQA threshold b, State Parks has consulted the relevant local general plans and presents the following for informational purposes. According to the San Joaquin County General Plan, the SVRA is not located in a locally designated mineral-resource recovery area (San Joaquin County 2016). The historic coal, clay, and gravel mining operations that took place in and near the SVRA are mentioned in the mineral resources background discussion of the *Alameda County General Plan* (Alameda County Community Development Agency 1994), but the SVRA is not in a locally designated mineral-resource recovery area. Thus, project implementation would not result in the loss of availability of locally-designated areas of significant mineral resources**.**

For the reasons described above, the project would have ***no impact*** on mineral resources.

13.3.6 Noise

Noise is defined as unwanted sound. Airborne sound is the rapid fluctuation of air pressure above and below atmospheric pressure. The frequency (pitch), amplitude (intensity or loudness), and duration of a sound all contribute to the effect on a listener, or receptor, and whether or not the receptor perceives the sound as "noisy" or annoying. The existing noise environment within the RMA Program area is mainly characterized by human-made sources such as vehicular operation both on local roads and OHV or truck activities within the park. Local traffic and OHV operations in the SVRA are the dominant sources of noise in the project area. Other noise sources, including detonations associated with explosives testing on nearby properties and gunshots associated with a nearby firing range, are relatively infrequent events that nevertheless produce high noise levels in the area (DPR 2024a).

As part of the recent Carnegie SVRA General Plan Update EIR effort, ambient noise levels were collected at several locations in proximity of Carnegie SVRA, including near a State Parks residence located immediately west of the SVRA, approximately 230 feet from the SVRA boundary (DPR 2024a). The measurements collected at this location indicate daytime ambient noise environment is approximately 45 dBA L_{eq}.

The proposed project would include activities such as installing fencing, undertaking erosion control measures (e.g., use of grader, excavator, etc.), and cutting new trails (e.g., using a sweco trail dozer). These activities would occur in various RMAs throughout the SVRA. The distance between these work areas and the nearest off-site sensitive receptor (private residence located at 16459 Tesla Road) would vary, ranging from approximately 0.7 to 2.1 miles depending on which work area is in active operation at a given time. Heavy-duty equipment operation, such as that of a dozer, excavator, or grader, are predicted to produce noise levels of approximately 82 dBA L_{eq} at a distance of 50 feet from the piece of equipment while it is in operation. If two or more pieces of equipment are operating concurrently next to one another, noise levels would approach approximately 82 dBA L_{eq} at a distance of 50 feet (Caltrans 2013). At a distance of 3,800 feet

(the approximate distance between the private residence located at 16459 Tesla Road and the nearest RMA work area on the project site), typical equipment would generate worst-case noise levels of approximately 43 dBA L_{eq} for a single piece of equipment and up to 46 dBA L_{eq} for two pieces of equipment. Therefore, worst-case noise levels associated with typical equipment in operation at the project site would be similar to existing ambient noise levels at the nearby private residence. SPRs for noise (Appendix B) generally limit construction activities to daylight hours during weekdays and construction equipment with internal combustion engines must be equipped with a muffler recommended by the manufacturer.

The noise levels described above, however, represent worst-case conditions (i.e., construction / maintenance activities occurring within the RMA closest to the nearest sensitive receptor). Most project work would take place at RMAs and distances further than that previously described, which would reduce noise received at the receptor location. There are also topographical changes between the residential receptor and the project area, as well as within the project area itself, that could provide some shielding from noise depending on where equipment would be operating. Finally, the ground type in the project vicinity is mainly hilly and open space, which is considered acoustically soft (DPR 2024b). Therefore, noise energy would likely dissipate more rapidly over the soft ground between work areas and sensitive receptors compared to hard surfaces such as paved roads and parking lots.

Implementation of the proposed RMA Program would not result in generation of excessive noise, nor would it expose persons to excessive noise. The proposed RMA new activities do not involve the siting of any new receptors that could be exposed to excessive aircraft noise, nor would the project have the potential to generate groundborne vibration that would have a significant effect on receptors or buildings. For these reasons, the proposed RMA activities would have ***less-than-significant impact*** related to noise.

13.3.7 Population and Housing

The proposed project involves implementing new RMAs to reduce erosion and sedimentation and protect natural resources. The project is not expected to increase visitation to the Carnegie SVRA or require additional employees. Implementation of the proposed RMAs would not induce population growth in the area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure). The RMA implementation would not displace existing housing, necessitating construction of replacement housing elsewhere, and would not displace any people, necessitating the construction of replacement housing elsewhere. Therefore, the proposed project would have ***no impact*** on population or housing.

13.3.8 Public Services

Law enforcement and emergency response at Carnegie SVRA are performed mostly by DPR rangers and park aides. Non-DPR staff from federal, state, and local agencies also provide law enforcement or emergency services in certain instances. The California Department of Forestry and Fire Protection (Cal Fire) provides fire protection to the SVRA.

The proposed new RMAs would not increase visitor use or staff at Carnegie SVRA. Therefore, the project would not increase demand for fire or police protection, emergency services, or other public services. The proposed RMA Program would have ***no impact*** on public services.

13.3.9 Transportation

Vehicle access to Carnegie SVRA is through the main entrance on Tesla Road/Corral Hollow Road. Called Tesla Road in Alameda County and Corral Hollow Road in San Joaquin County, this two-lane rural road runs between South Livermore Avenue in Livermore and the City of Tracy and is a popular commute route between Tracy and the Bay Area. This road provides the only access to the SVRA for vehicles. Private vehicles are the only way to access Carnegie SVRA; no transit or shuttle service is available in the immediate area (DPR 2024a)

The proposed project would not conflict with a program, plan, ordinance or policy addressing the circulation system, or conflict with CEQA Guidelines section 15064.3. The project is not expected to increase visitation or staffing at the Carnegie SVRA. Implementation of the new RMAs would be accomplished primarily by existing staff, perhaps with the occasional short-term addition of specialized equipment operators as needed. Therefore, the project would not increase traffic, change traffic or transportation patterns, or increase vehicle miles traveled (VMT) in the project area.

The proposed project would not increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses because the project would not include any new or modified roads or other transportation infrastructure and would not include any changes in land use in the project area.

The project would not result in inadequate emergency access because it would not require any road closures for construction or modifications to any existing roads or other emergency access points.

For the reasons described above, the proposed project would have ***no impact*** on transportation.

13.3.10Utilities and Service Systems

The following summary of utilities and service systems in the Carnegie SVRA is from the General Plan Update (DPR 2024a):

- *Water Supply:* A well and water treatment plant supply water to Carnegie SVRA. The plant is north of Corral Hollow Road, near the Carnegie SVRA office.
- *Wastewater Treatment:* No permanent sewer system exists at Carnegie SVRA. All wastewater at the SVRA is disposed of through septic tanks with leach lines, or through chemical or vault toilets that are pumped out for off-site disposal.
- *Electricity:* Pacific Gas and Electric Company (PG&E) provides electrical service to Carnegie SVRA. A PG&E transmission line runs north to south near the SVRA, approximately 1 mile west of the Alameda/San Joaquin County line.
- *Telecommunications:* Telephone, Internet, and cable services are provided through a contract with AT&T. Aboveground cables supported by utility poles bring these services to Carnegie SVRA. The primary communication cable system parallels Corral Hollow Road/Tesla Road, with secondary cables branching off at individual residences and facilities.
- *Solid Waste:* Solid waste generated at Carnegie SVRA is transported by Delta Disposal Service Company to the Tracy Material Recovery and Transfer Station, located at 30703 South MacArthur Drive in Tracy. The solid waste is then transported to the San Joaquin

County–owned Foothill Sanitary Landfill, located at 6484 North Waverly Road in the community of Linden.

The proposed project is not expected to increase visitation or staffing at Carnegie SVRA. In addition, the project is designed to reduce erosion and sedimentation in the new RMAs and would not include new structures or impervious surface areas. Therefore, the project would not require or result in the relocation or construction of new or expanded water, wastewater or storm water drainage, electric power, natural gas, or telecommunications facilities. The project would not require new water supplies and is not served by a wastewater treatment provider nor would it increase generation of wastewater compared to existing conditions. The project would not result in any long-term increase in solid waste, and construction waste is expected to be minimal since no building demolition or removal of pavement is proposed. The project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste. For these reasons, the project would have ***no impact*** on utilities and service systems.

13.3.11 Wildfire

Wildfire records show that, within the last ten years, a large wildfire occurs in or around Carnegie SVRA every 3.3 years. Carnegie SVRA has had four major fires in the area. The first being the Corral Fire that started on August 13, 2009, lasting three days and burning 12,500 acres. The second fire was the Tesla Fire that started on August 19, 2015, lasting 3 days and burning 2,700 acres. The Hollow Fire started on July 3, 2019, lasting 2 days and burning 283 acres. The Santa Clara Unit Lightning Complex fire that broke out in September 2020 denuded a portion of the drainage area of vegetation. A strip of areas north and south of Corral Hollow Road as well as Corral Hollow Creek are designated by Cal Fire as a moderate fire hazard severity zone; the remainder of the SVRA is designated as a high fire hazard severity zone (DPR 2024b).

Despite the recent history of frequent wildfires, and the designation as a moderate to high fire hazard severity zone, the proposed project is not expected to exacerbate wildfire risks or expose people or structures to wildfire risks in Carnegie SVRA. No buildings, structures, or other flammable developments are proposed as part of the project, and the project is not expected to increase visitation or staffing in the SVRA.

During implementation of the RMAs, there could be a short-term increased risk of wildfires from vehicles and construction equipment. Construction vehicles use flammable fuels, such as diesel and gasoline, and would be operated in proximity to dry vegetation; their hot tailpipes or sparks from chains or other metal objects could ignite dry brush, especially during the warmer, dry months between June and October. However, wildfire risks would be offset by State Parks compliance with fire safety and wildfire suppression measures, including (but not limited to):

- PRC Section 4427, which identifies appropriate fire suppression equipment and stipulates removal of flammable materials to a distance of 10 feet from any equipment that could produce a spark, fire, or flame on days when burning permits are required;
- PRC Section 4428, which identifies additional firefighting equipment requirements during the period of highest fire danger (April 1–December 1);
- PRC Section 4431, which prohibits the use of portable tools powered by gasoline-fueled internal combustion engines within 25 feet of flammable materials when burning permits are required; and
- PRC Section 4442, which requires engines be equipped with a spark arrestor.

Adherence to these safety measures, when considered together, would minimize the risk of increased frequency, intensity, or size of wildfires and decrease the risk of exposure of people or structures to wildfire.

Implementation of the new RMAs could result in some existing OHV trails being closed and revegetated, and some existing distributed riding areas becoming trails-only areas, perhaps increasing the vegetated areas in the RMAs. However, the project would not change the habitat types in the RMAs, and it is anticipated that the minor increases in vegetated areas resulting from the project would not significantly increase the risk of wildfires. The project has the potential to reduce wildfire risk slightly by restricting OHV recreation to trails-only in certain areas, reducing the likelihood that OHVs could ignite vegetation by riding off trail in distributed areas.

For the reasons described above, the project is not expected to exacerbate wildfire risk 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 risk; expose people or structures to significant risks as a result of runoff, post-fire slope instability, or drainage changes; or expose people or structures to a significant risk of loss, injury or death involving wildland fires. The proposed project would have a ***less than significant impact*** on wildfire.

Note that Wildfire threshold a concerning emergency response and evacuation plans (CEQA Guidelines Appendix G) is addressed in section 13.3.4 above.

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CHAPTER 14. REFERENCES

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14.2 REPORT PREPARERS

This report was prepared under the direct supervision of DPR Diablo Range District. The following individuals were involved in preparing the report.

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California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program

Draft Environmental Impact Report

SCH No. 2023020424

Appendices

January 2026

Prepared for:
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LIST OF APPENDICES

Appendix A: Notice of Preparation and Responses

Appendix B: OHV Environmental Protection Measures

1. OHV BMP Manual for Erosion and Sediment Control (2007)
2. Standard Project Requirements for Road and Trail Management Plans (2013)

Appendix C: Carnegie SVRA General Plan Update Policies and Guidelines

Appendix D. Air Quality Data

Appendix E. Special-Status Species Lists

California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program EIR

Appendix A: Notice of Preparation and Responses

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State of California • Natural Resources Agency
Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
Armando Quintero, *Director*
Off-Highway Motor Vehicle Recreation Division
715 P Street
Sacramento, California 95814

NOTICE OF PREPARATION

Date: February 14, 2023

To: California State Clearinghouse, Responsible and Trustee Agencies, federal agencies, local jurisdictions, and interested individuals and organizations

Subject: **Notice of Preparation (NOP) of the Carnegie State Vehicular Recreation Area (SVRA) Resource Management Areas Program Environmental Impact Report (EIR)**

Lead Agency: California Department of Parks and Recreation (DPR)

Project Location: Carnegie SVRA located at 18600 Corral Hollow Road in eastern Alameda and western San Joaquin counties approximately 15 miles east of Livermore and 12 miles west of Tracy. See attached project location map (Figure 1).

Project Description: DPR proposes to implement sediment and erosion controls at Carnegie SVRA through establishment of new Resource Management Areas (RMAs) within the park. A brief description of the project, including its location and probable environmental effects, is attached.

The purpose of this NOP is to invite comment on the scope and content of the environmental review. Agencies should comment on the elements of potential environmental effects that are relevant to their statutory responsibilities in connection with the proposed project.

Pursuant to California Environmental Quality Act (CEQA) Guidelines 15082(b), you have 30 days from the date of receipt of this NOP to respond. **Responses must be received by 5 pm, March 20, 2023**. Please send your written responses to Gina Benigno, Senior Environmental Scientist, Specialist, as follows:

By email: Gina.Benigno@parks.ca.gov. Please include “Carnegie SVRA RMA Program EIR” in the subject line.

By mail: Gina Benigno, Senior Environmental Scientist, Specialist
California State Parks Diablo Range District
15751 Tesla Road, Livermore, CA 94550

Agency responses should include the name of a contact person at the agency.

Signature: DocuSigned by: Clinton Elsholz DB5FF6A6A92248B... Date: 2/15/2023

Title: District Superintendent (Acting)

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION
CARNEGIE SVRA RESOURCE MANAGEMENT AREAS PROGRAM
PROJECT DESCRIPTION

Project Site Description

Carnegie State Vehicular Recreation Area (SVRA) is a 1,575-acre off-highway vehicle (OHV) park in in eastern Alameda and western San Joaquin counties (Figure 1) overseen by the Off-Highway Motor Vehicle Recreation (OHMVR) Division and operated by the Diablo Range District of California Department of Parks and Recreation (DPR). Carnegie SVRA has been operated as an OHV park since it was purchased by DPR and became a unit of the State Parks System. The park offers numerous off-road opportunities for motorcycles, all-terrain vehicles (ATVs), 4x4s, and recreational off-highway vehicles (ROVs or side-by-sides). Carnegie SVRA has more than 1,300 acres of riding area and over 80 miles of trails. OHV recreation within the park is divided into open riding areas, trails only riding areas, and trails only riding areas within fenced Resource Management Areas (RMAs), which are areas that have been rehabilitated in recent years. Roughly half of the 1,575-acre total park acreage is managed as RMAs (Figure 2).

The proposed project involves implementation of resource management activities, described below, within the existing Carnegie SVRA. Proposed project activities would not occur on the adjoining state park property (also known as the Alameda and Tesla Expansion Area).

Proposed Project

DPR proposes to progressively establish new RMAs and provide ongoing sustainable OHV recreation management within the new and existing RMAs. The proposed project consists of implementing activities that disperse storm water runoff, prevent accelerated erosion, and manage the existing trail system. Sediment loss and erosion control measures include reducing the number of trails, increasing vegetation, building sustainable trails, and enforcing trails-only riding. A brief description of the project activities associated with the new RMAs and the subsequent maintenance of the new and existing RMAs is presented below.

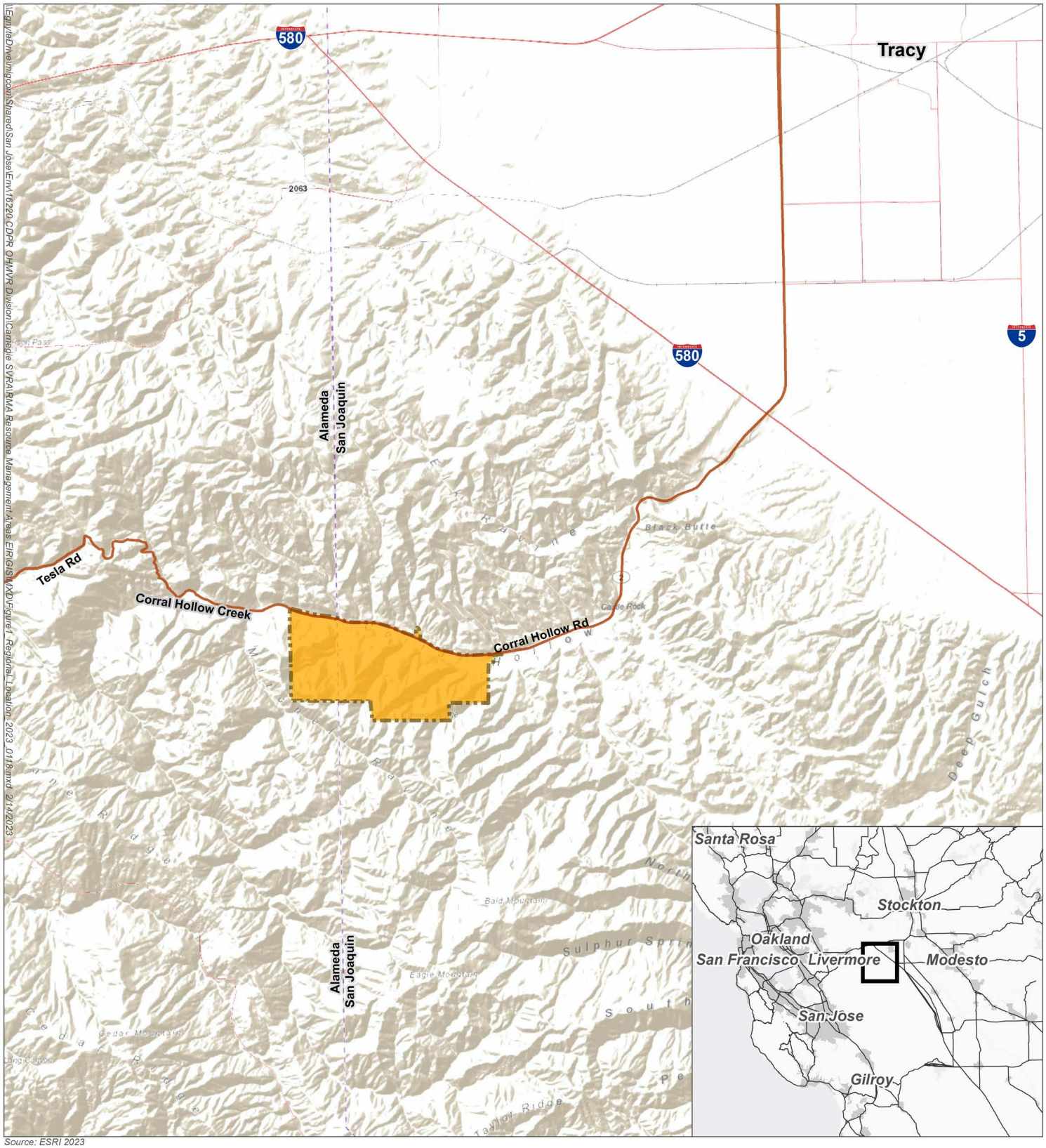
- Perimeter Fencing. Install and maintain fencing to establish RMA boundaries and isolate treatment areas from public access. Field fencing, a type of utility wire fencing with broad grid spacing, would be installed 6 to 8 inches off the ground with an H brace installed every 100 feet, to allow wildlife passage.
- Signage. Install signage at approved route/trail entrances along with signs carrying a public message explaining why certain areas are closed and how to get involved.
- Landform Grading. Grade area to restore natural slope gradient of impacted areas. Apply replacement soils as needed to achieve grade and prevent erosion.
- Access Routes. Create temporary roads to provide access for heavy equipment for bringing in soil, crews, wattles, tree trimming, etc. Temporary roads will be obliterated as the equipment is withdrawn.
- New Trail Construction. Construct new trails in stable, resilient soils to replace unsustainable trail routes.
- Erosion Control. Apply erosion control measures (e.g., hydroseeding, wattles) on bare slopes and install hard water crossing pavers on trail sections where drainage sheet flows across a trail.
- Revegetation. Establish vegetation on impacted areas through hydroseeding and/or hand planting.

- Inspections and Evaluations. Conduct visual inspections, including using drones to look for signs of off-trail riding and any damaged areas needing repair. Evaluate trail surface conditions using a Trail Evaluation Form.
- Off-Trail Rehabilitation. Cover disturbed area and install barriers. Place straw on new disturbance areas where vehicle has gone off a designated trail. Install metal H bars and drift fencing across non-designated trails to block access and stop use.
- Habitat Improvement. Improve habitat values through new native species plantings and removal of exotic or invasive species.
- Drainage System Maintenance. Remove accumulated sediment from culverts and watershed sediment basins.
- Routine Trail Maintenance. Assess and maintain trail conditions including trail surfaces, trail width, and drainage controls.

Probable Environmental Effects

The Carnegie SVRA Resource Management Areas Program EIR is expected to address potential environmental effects in the following resource areas: aesthetics, air quality, biological resources, cultural resources, energy, geology/soils, greenhouse gases, hydrology/water quality, land use, recreation, and tribal cultural resources.

Several areas of potential concern are likely to be found less than significant given the type of project, the absence of a resource, or the nature of the project site (e.g., agriculture/forestry, hazards/hazardous materials, mineral resources, noise, population/housing, public services, transportation, utilities, and wildfire). Further refinement of the scope of the technical issues to be addressed in the EIR will occur during the CEQA process, including input received in response to this NOP.



Source: ESRI 2023

Carnegie SVRA Project Site

County Line

0 0.75 1.5 3 Miles

N

Figure 1 Regional Location

Carnegie State Vehicular Recreation Area RMA Program EIR

M I G

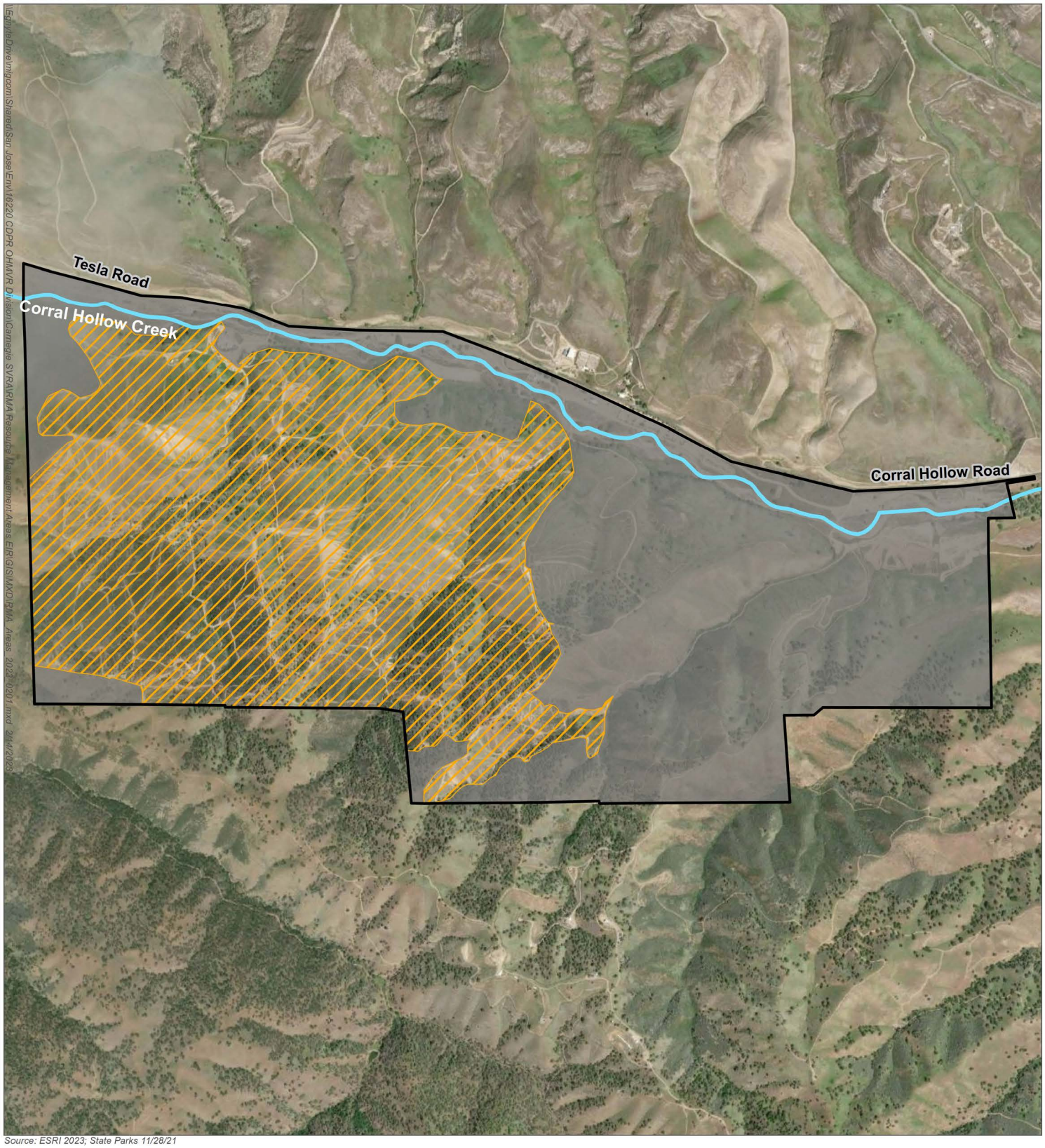


Figure 2 New and Existing Resource Management Areas

Carnegie State Vehicular Recreation Area RMA Program EIR

20 March 2023

Gina Benigno
California Department of Parks and Recreation,
Diablo Range District
15751 Tesla Drive
Livermore, CA 94550
Gina.Benigno@parks.ca.gov

COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, CARNEGIE SVRA RMA PROGRAM, SCH#2023020424, ALAMEDA AND SAN JOAQUIN COUNTIES

Pursuant to the State Clearinghouse's 16 February 2023 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environmental Impact Report* for the Carnegie SVRA RMA Program, located in Alameda and San Joaquin Counties.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore, our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has

adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:
https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., “non-federal” waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources Control Board website at:

https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

If you have questions regarding these comments, please contact me at (916) 464-4684 or Peter.Minkel2@waterboards.ca.gov.

Peter Minkel

Peter Minkel
Engineering Geologist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

NATIVE AMERICAN HERITAGE COMMISSION

Governor's Office of Planning & Research

FEB 17 2023

STATE CLEARING HOUSE

February 17, 2023

Gina Benigno
California Department of Parks and Recreation, Diablo Range District
15751 Tesla Drive
Livermore, CA 94550

Re: 2023020424, Carnegie State Vehicular Recreation Area (SVRA) Resource Management Areas Program Project, Alameda and San Joaquin Counties

Dear Ms. Benigno:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project 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. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

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AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).

2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.

3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).

4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:

- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:

- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. 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.
- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cody.Campagne@nahc.ca.gov.

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

cc: State Clearinghouse

From:	Mark Connolly
To:	Benigno, Gina@Parks
Cc:	Elsholz, Clinton@Parks
Subject:	Notice of Preparation (NOP) of the Carnegie State Vehicular Recreation Area (SVRA) Resource Management Areas Program Environmental Impact Report (EIR)
Date:	Saturday, March 18, 2023 7:59:07 PM
Attachments:	Supplemental Return to Peremptory Writ of Mandate.pdf Issued Peremptory Writ of Mandate.pdf Notice of Entry of Judgment 6-10-2021.pdf Filed Order Granting Pettiion for Writ fo Mandate.pdf 2022030810_CDFW Comment.pdf

Note: Attachments to this email are on file with DPR and available for review Upon request

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Ms. Genigno,

This email is being submitted on behalf of Connolly Ranch Inc. and Connolly Garamendi LLC., and is to comment on the scope and content of the environmental review of the Carnegie State Vehicular Recreation Area (SVRA) Resource Management Areas Program.

The DPR proposes to implement sediment and erosion controls at Carnegie SVRA through establishment of new Resource Management Areas (RMAs) within the park. Implementation of the proposed project would violate the attached Peremptory Writ of Mandate, Judgment and Order Granting Petition for Writ of Mandate. Please note that in the Supplemental Return to Peremptory Writ of Mandate Eduardo Guaracha indicates he directed Carnegie SVRA Staff to refrain from activity associated with implementation of Resolution 04-2016 that could result in a change or alteration to the physical environment until the California Environmental Quality Act compliance is corrected." Any physical implementation of this RMA Program would violate the Writ, Judgment and Order.

Resolution 04-2016 was the approval of the Carnegie SVRA General Plan, which was also a program EIR. That program EIR was also an attempt to avoid consideration and mitigation for significant unavoidable environmental impacts by fragmenting the larger project by use of a program EIR. This RMA Program suffers from the same defect. In fact, it is worse. The attached Order states the following, which if this project proceeds just to study and planning, would be applicable:

"Piecemealing of the environmental review process.
A program EIR is "an EIR which may be prepared on a series of actions that can be characterized as one large project are related either:
(1) Geographically,
(2) As logical parts in the chain of contemplated actions,
(3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or
(4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways. (14 CCR § 15168.)

When using a program EIR with later activities, they must be "examined in the light of the program EIR to determine whether an additional environmental document must be prepared.
(1) If a later activity would have effects that were not examined in the program EIR, a new initial study would need to be prepared leading to either an EIR or a negative declaration. That later analysis may tier from the program EIR as
provided in Section 15152.
(2) If the agency finds that pursuant to Section 15162, no subsequent EIR would be required,

the agency can approve the activity as being within the scope of the project covered by the program EIR, and no new environmental documents
would be required. Whether a later activity is within the scope of a program EIR is a factual question that the lead agency determines based on substantial evidence in the record. Factors that an agency may consider in making that determination include, but are not limited to, consistency of the later activity with the type of allowable land use, overall planned density and building intensity, geographic area analyzed for environmental impacts, and covered infrastructure, as described in the program EIR.
(3) An agency shall incorporate feasible mitigation measures and alternatives developed in the program EIR into later activities in the program.
(4) Where the later activities involve site specific operations, the agency should use a written checklist or similar device to document the evaluation of the site and the activity to determine whether the environmental effects of the operation
were within the scope of the program EIR.
(5) A program EIR will be most helpful in dealing with later activities if it provides a description of planned activities that would implement the program and deals with the effects of the program as specifically and comprehensively as possible. With a good and detailed project description and analysis of the program, many later activities could be found to be within the scope of the project described in the program EIR, and no further environmental documents would be required. (14 CCR § 15168 (c).)

The CEQA Guidelines also discuss the tiering process that occurs subsequent to finalization of a program EIR.

Where a lead agency is using the tiering process in connection with an EIR for a large-scale planning approval, such as a general plan or component thereof (e.g., an area plan or community plan), the development of detailed, site-specific information may not be feasible but can be deferred, in many instances, until such time as the lead agency prepares a future environmental document in connection with a project of a more limited geographical scale, as long as deferral does not prevent adequate identification of significant effects of the planning approval at hand. (14 CCR § 15152 (c).)

Petitioner argues Respondents identified the EIR as a program EIR in order to enable improper piecemealing of the environmental review process. Respondents acknowledge that the
General Plan includes "facility descriptions" but argues these are not specific projects being approved as part of the General Plan's EIR. (AR 8249.) Respondents further argue the "visitor experience areas" identified are allowable uses within different parts of the SVRA, but are not commitments to a definite course of action as to any of these potential allowable future uses.

Prior to the hearing on this matter, the Court asked the parties to specifically address Rio Vista Farm Bureau Center v. County of Solano (1992) 5 Cal.App.4th 351, as part of their oral arguments. In Rio Vista Farm Bureau Center, the project at issue was adoption of a hazardous
waste management plan, which was incorporated into the County's general plan. (Id. at 371.) The appellant argued the FEIR failed to comply with CEQA because it did not provide a "description of potential future facilities or the 'degree to which project-level decisions' have been made by the County." (Id.) The First District Court of Appeal held the EIR was sufficient as the general plan made "no commitment to future facilities other than furnishing siting criteria and designating generally acceptable locations. While the Plan suggests that new facilities may
be needed by the County, no siting decisions are made; the Plan does not even determine that future facilities will ever be built." (Id.) Further, [w]hile we agree with appellant that additional hazardous waste facilities in the County may be a foreseeable consequence of the

Plan, any such facility would not alter the nature or scope of the initial assessment considered in the FEIR, which functions independently as merely a general planning device. The Plan is not, as we read it, the first part of a fragmented project; rather it provides the general guidelines required by law for any separate, but as yet undetermined future hazardous waste management project. The scope of the Plan, as appropriately described in the FEIR, is limited to recitation of policies requirements, and siting criteria, and designation of general areas in which future facilities may permissibly be located. No specific facility has been proposed, and the county has not committed to a definite course of action.
Moreover, any future projects have been expressly made contingent upon
CEQA compliance...
An EIR is not required for an element of a master plan which has not been proposed for development. Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA. (Id at 373)(citations omitted.)

Petitioner argues Rio Vista Farm Bureau is distinguishable because in that matter the County did not own all the land subject to the general plan. Petitioner further argues no siting decisions were made in Rio Vista Farm Bureau, whereas in this case a preferred concept for site
use has been developed, including distinct visitor experience areas. (See AR 8249.) In light of these decisions having been made as part of the subject project, Petitioner argues Respondents were obligated pursuant to CEQA to provide more detailed analysis of environmental impacts resulting from these decisions than was required in Rio Vista Farm Bureau Center. (See Cleveland National Forest Foundation v. San Diego Assn. of Gov'ts (2017) 17 Cal.App.5th 413,441.)

Respondents argue Rio Vista Farm Bureau is controlling and on point. Respondents contend the preferred concept map does not approve trails or campgrounds or specific uses, and is merely akin to, "siting criteria, and designation of general areas in which future facilities may
permissibly be located." Respondents also argue Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners is applicable in the Second District Court of Appeal's summarization of the law that,[wjhile an FEIR cannot defer all consideration of cumulative impacts to a later time, it may legitimately indicate that more detailed information may be considered in future project EIR's." 'Tiering'" refers to "the coverage of
general matters in broader EIRs (such as on general plans...) with subsequent site-specific EIRs... concentrating solely on the issues specific to the EIR subsequently prepared." (Guidelines, § 15385.)

A FEIR need only conform with the general rule of reason in analyzing the impact of future projects, and may reasonably leave many specifics to future EIR's. "CEQA recognizes that environmental studies in connection with
amendments to a general plan will be, on balance, general." (Schaeffer Land Trust V. San Jose City Council (1989) 215 Cal.App.3d 612,625.)
Deferral of more detailed analysis to a project EIR is legitimate. It has been held that "where practical considerations prohibit devising such measures early in the planning process (e.g., at the general plan amendment or rezone stage), the agency can commit itself to eventually devising measures that will satisfy specific performance criteria articulated at the time of project approval...[Citation.]" (Sacramento Old City Assn. v. City Council (1991) 229 CaI.App.3d 1011, 1029.) ((1993) 18 Cal.App.4th 729,746-47.)

In response. Petitioner argues the project constitutes a site use plan. The Expansion Area was acquired for a specific use, as an SVRA, and the map demonstrates that certain uses/activities will be permitted in certain distinct sections of the Expansion Area. For

example.
Petitioner argues the entrance locations are clearly defined. Accordingly, Petitioner argues Rio Vista Farm and Al Larson Boat Shop do not apply and the EIR in this case improperly deferred analysis of reasonably foreseeable impacts to future phases. (See Vineyard Area Citizens for
Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 431.)

The Court finds Petitioner is correct. The facts in this case are distinguishable from Rio Vista Farm Bureau and Al Larson Boat Shop. Here, the Respondents purchased the property with the intent of using it to expand the SVRA. Unlike the general plan in ^io Vista Farm Bureau,
Respondents have ownership of and control over the entirety of the land subject to the general plan. Further, Respondents have made definitive decisions as part of the "program" EIR that make certain reasonably foreseeable impacts ready for analysis now, as opposed to a circumstance wherein environmental analysis must be detailed because the project decisions will not be made until a future date. Respondents here have committed to a selection of development "zones" such as a gathering area and interpretive facility at the Tesla Coal Mine site, Gathering and Service areas as denoted in Figure 2-3 of the Draft EIR (AR008268), as well as entrance and exit locations for the Expansion Area.

This case is analogous to Laurel Heights Improvement Assn. v. Regents (1988) 47 C3al.3d 376. Similar to the facts in that case, the intended use of the property has been established. Like the facts before the Supreme Court, the future expansion and general type of future use is
reasonably foreseeable here. Respondents have clearly stated the purpose for the acquisition was to expand OHV use at Carnegie SVRA; various areas within the Expansion area have contemplated uses such as an Advanced Trails area, an Intermediate/Beginner Trails area, and a
Potential Gathering Area. The Court acknowledges that case law does not require absolute precision. Although Respondents argue that the specific site of the visitors' center, for example, has not been determined, the use of the land outlined in the General Concept Map is clearly foreseeable. As the Supreme Court in Laurel Heights pointed out, "[t]he fact that precision may not be possible, [] does not mean that no analysis is required." (Id at p. 399.)

While Respondents argue a more substantial environmental review will be done at a future date, CEQA does not authorize them to delay analysis in such a manner. On this issue, the Court finds the Respondents did not proceed in the maimer required by law."

DPR is fragmenting the 2016 program EIR into smaller parts to avoid both the consideration of impacts but also to avoid the Judgment, Writ and Order described above. This RMA program EIR is a part of the larger Carnegie SVRA General Plan which DPR was required to set aside and rescind, and subject to the above-described Writ.

Having failed in its attempt to use a program EIR for all of Carnegie, DPR cannot proceed by use of an RMA Program to proceed through the entire Park an RMA at a time and avoid the analysis required for an EIR for the entire park. We know this RMA plan is intended to proceed across the entire Park . The rescinded Final EIR stated the following:

O24-m: Overall, from 2009-2013 trail green ratings have increased from 27 percent to 46 percent; trail yellow ratings have decreased from 45 percent to 34 percent; and trail red ratings have decreased from 28 percent to 20 percent. Some trails have gone from green to yellow, or yellow to red. The reason for this is that rather than tackling trail maintenance in a fragmented approach, Carnegie SVRA is implementing sustainable trails via Resource Management Areas. This method is taking place from east to west, so those trails in the western areas of the park that need maintenance,

will not receive it (unless there is a safety concern related to it) until the areas east of it are rehabilitated. This uses staff time more efficiently, and results in recreational trails that are sustainable.

FREIR 02-29: As indicated in response to comment 024-m, rather than tackling trail maintenance in a fragmented approach, Carnegie SVRA is implementing sustainable trails via Resource Management Areas. This method is taking place from east to west, so those trails in the western areas of the park that need maintenance will not receive it until areas farther east are rehabilitated (unless there is a safety concern). This uses staff time more efficiently and results in recreational trails that are sustainable.

In summary, DPR is again using a program EIR to fragment and piecemeal the complete EIR required into smaller parts.

I have attached the May 19, 2022 letter from the California Department of Fish and Wildlife. It appears this RMA Program is an attempt to avoid the requirements stated in that letter. ALL the comments in that letter are applicable to this project. Please note it states: "An approved General Plan is required before State Parks can move forward with site-specific improvements that are beyond minor capital outlay projects." DPR cannot avoid the analysis described in the May 19th, 2022 letter by again abandoning a General Plan process to a RMA Program approach.

Please make sure I am provided with all notices related to this project.

Mark Connolly.

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From: Erik Schaffer
To: Benigno, Gina@Parks
Subject: CarnegieSVRA RMA Program EIR
Date: Friday, February 17, 2023 3:05:01 PM

[You don't often get email from eriktheexpert@att.net. Learn why this is important at https://protect-us.mimecast.com/s/fNs6CDkVXXF5grPotWwUMS?domain=aka.ms]

Hi Gina,
I have been riding at Carnegie since 1975. The damage caused by this major storm is unbelievable. The destruction is far beyond anything I've ever seen. Jeremy showed pictures of how much the park has changed.
My concern was the hard to reach inner valleys for repair.
Maybe using large rock, in strategic spots, to reduce damage and slow the flow of water to save access to key parts of the park. Thanks for working hard to reopen the parks soon.
Cheers
Erik Schaffer

Sent from my iPhone

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California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program EIR

Appendix B: Environmental Protection Measures

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Appendix B. Environmental Protection Measures

California Department of Parks and Recreation

OHV BMP Manual for Erosion and Sediment Control (2007)

BMP ID	Name	SWPPP Summary
EP-1	Scheduling and Phasing	Construction, maintenance, rehabilitation, and restoration projects shall be scheduled and phased to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and transport of sediment off-site (vehicle tracking). Project planners shall determine the rainy season and develop a list of candidate BMPs based on that information. Soil disturbing activities shall be phased, if possible, such that critical areas (such as highly erodible soils, areas adjacent to receiving waters, etc.) are not disturbed during the rainy season. If disturbance during the rainy season is unavoidable then the area shall receive an effective combination of soil stabilization and sediment control BMPs. Projects such as new road and trail construction shall be phased so the entire length of area that is disturbed at any one time is kept to a size that can be controlled effectively with appropriate BMPs as necessary. In the rainy season the DSA shall not exceed the Park staff's ability to promptly apply surface stabilization upon the imminent threat of an ensuing rainstorm.
EP-2	Wet Weather Closure	Wet weather closure is implemented to protect water quality, trail treads, road surfaces, and drainage facilities (rolling dips, outsloped road sections, etc.) from damage during wet weather. EP-2 also reduces maintenance costs and reduces the potential for adverse effects on other resources.
EP-3	Minimize Disturbance and Buffer Strip	Minimizing Disturbance and Buffer Strip is a planning process which retains natural vegetative cover and also maintains vegetative buffer strips near watercourses. A healthy dense and vigorous grassed buffer strip can greatly reduce the extent and need for alternative sediment control barriers such as a silt fence and fiber rolls.
EP-4	Land and Road Grading to Minimize Erosion	These land grading practices are intended to be integrated as construction and land disturbing activities are occurring in order to minimize the erosion potential and facilitate plant establishment. Roadways can be aligned following natural contours rather than up and down steep slopes. Natural drainage patterns shall be noted and maintained as possible. The layout of buildings and other Park facilities shall be tailored to fit the topography of the site. All graded or disturbed areas including slopes will be constructed in a manner that will facilitate the establishment of vegetation.
EP-5	Identify Underlying Geologic Soil Conditions	Soil survey data shall be reviewed and analyzed prior to new construction projects at the park. Erosion control measures will be properly chosen, located, and implemented in accordance with soil types. Roads and trails will be located where soils are the least erosive, whenever possible. Soil maps are useful for planning but not for site-specific purposes, so actual onsite review will also be performed.
SS-1	Surface Roughening	After final grading of all construction, rehabilitation, and restoration projects, a rough texture shall be applied to the disturbed soils to prevent erosion, decrease runoff, increase infiltration, and aid in vegetation establishment. SS-1 Surface Roughening is a technique for roughening a bare soil surface with furrows running across the slope, stair stepping, or tracking with construction equipment.

BMP ID	Name	SWPPP Summary
SS-2	Topsoiling	Topsoil shall be preserved to help provide a suitable growth medium for final site stabilization with vegetation. Topsoil shall be preserved in the Park by stripping the topsoil during facilities development and road and trail building activities and setting aside in stockpiles for later re-application.
SS-3	Mycorrhizae Inoculation	Mycorrhizal fungi and "biofertilizers" shall be used in construction and revegetation projects in order to enhance soil nutrient availability and biological soil structure, encourage native plant succession, reduce erosion, and discourage invasive plant species. Inoculation of soils with mycorrhizal fungi or the presence of pre-existing soil microbes is essential for the stabilization of adverse soils, establishment of native grasses, and the exclusion of non-native "annuals" and noxious weeds.
SS-4	Seeding	Seeding involves the establishment of a permanent, perennial vegetative cover on disturbed areas from seed. Native, indigenous, or naturally-occurring species (particularly grasses) will be used for seeding. These "native" species have evolved in a manner that will not compete with or preclude the establishment, or natural recruitment, of naturally-occurring woody vegetation.
SS-5	Straw Mulching	All disturbed soil areas shall be protected with straw mulch. Mulching is the application of a protective layer of straw or other suitable material to the soil surface. Straw mulch and/or hydromulch shall be used in conjunction with seeding and hydroseeding of critical areas for the establishment of vegetation. Mulching with straw (or fiber mulches) is commonly used as a temporary measure to protect bare or disturbed soil areas that have not been seeded, until native vegetation regrows. Certified weed-free or rice straw mulch shall be used to prevent the introduction of undesired plant species.
SS-6	Hydromulching	Hydromulching is a soil stabilization (erosion control) technique for applying fiber mulch to the exposed and disturbed soil surface. The fiber is applied hydraulically, in a slurry, produced by mixing fiber, water and a binding agent together in a mechanical hydroseeder. Wood fiber is widely-used but other fibers can include paper, straw, coir, corn, etc. The effectiveness of SS-6 Hydromulching is extremely dependant on the application rates (which can vary widely), the actual fibers used, and the type of bonding agent(s) added. A general rule of thumb is mulches (wood fiber, straw, compost, etc.) should have a minimum application rate of 3000# per acre for protection of the soil surface from raindrop impact erosion. Hydromulching is also useful as a tackifier to anchor straw mulch and as a means to apply seeds.
SS-7	Compost Blankets	A compost blanket is a layer of compost designed to prevent erosion, especially rills and gullies that may form under more traditional methods of erosion control. In many cases, a compost blanket can be more effective at vegetation establishment, weed suppression and erosion control than an Erosion Control Blanket (ECB) or hydroseeding. Compost blankets can be applied by hand, conveyor system or compost spreader; however, the most cost effective and efficient method is the use of a pneumatic delivery system, i.e. a compost blower truck.
SS-8	Erosion Control Blankets	Erosion Control Blankets (ECBs) are a soil stabilization (erosion control) BMP, intended to protect disturbed soil surfaces from raindrop impact erosion. ECBs are carpet-like mats, installed over and anchored to the properly prepared soil surfaces. Properly selected and installed, ECBs can mimic the beneficial effects of vegetative cover thereby reducing erosion rates by over 90%. ECBs also protect seeds and provide a beneficial environment for vegetation to become established.

BMP ID	Name	SWPPP Summary
SS-9	Cellular Confinement Systems	Cellular Confinement Systems are three-dimensional, honeycomb earth-retaining structures used to mechanically stabilize slopes, roads, trails, and low-water crossings, and other channel lining systems. The cells can be filled with rock, gravel, or topsoil and provide an alternative to hard armor soil stabilization.
SS-10	PAM (Polyacrylamide)	PAM (Polyacrlamide) is useful as a temporary soil stabilization and soil binding BMP which is also a flocculating agent used to reduce turbidity of runoff. PAM is also used as tackifier, either alone or in formulation with binding agents, for hydromulching applications.
SS-11	Dust Control and Tackifiers	Wind erosion (dust) control shall be considered year-round for all disturbed soils in the park that are subject to wind erosion, when significant windy, dry conditions are anticipated, particularly during large special OHV events, around camping areas, and on areas of facility construction. Tackifiers also act as a "glue" to hold soil in place for dust control, by mixing with water and a small amount of hydraulic mulch for trace purposes, and applying from a hydroseeder.
TC-1	Stabilized Construction Entrance	Temporary construction entrances are constructed at the egress point from the construction area onto a paved road. TC-1 Stabilized Construction Entrance is a Tracking Control BMP intended to prevent tracking of soil from the construction site by equipment and vehicles. The entrances are constructed of large angular rock and/or steel ribs (rumble strips) intended to knock the mud off the tires before traveling onto the roadway.
TC-2	Temporary Stabilized Construction Roadway	A Temporary Stabilized Construction Roadway is a temporary access road for use during construction and expansion of facilities at the Park. It is designed and stabilized to control dust and erosion from vehicular tracking during construction activities, or if needed for special events.
TC-3	Temporary Equipment Crossings	A temporary equipment crossing is a structure placed across a waterway that allows heavy equipment and other vehicles to cross the waterway during construction or maintenance activities. Proper design, installation, and maintenance of TC-3 Temporary Equipment Crossings shall be implemented in order to minimize sedimentation and ecological damage to waterways.
TC-4	Wash Racks	OHV park visitors often like to leave with mud covered trucks. However, was racks shall be used where mud and dirt is tracked onto public roads. Wsash racks shall be located near paved or stabilized gravel roadways to remove soil and sediment from motorcycles and ATV's. The wash rack would be located at a point where vehicles exit the park. During construction of roads, trails, and new park facilities, wash racks shall be located in the staging areas to remove soil and sediment from construction equipment. Runoff from all wash racks will be channeled away from natural drainages and into sediment traps.
RC-1	Energy Dissipator	An energy dissipator is a structure designed to control erosion at the outlet of a channel or conduit.
RC-2	Rock-lined Channels	Rock-lined channels are channels or roadside ditches lined with rock or riprap and incorporated into road and trail design in order to reduce sedimentation and improve the quality of surface water. Rock-lined channels shall be used to convey runoff and provide bed stability where an unlined or grassed waterway would be inadequate.
RC-3	Riprap	Riprap is a layer of stone designed to protect and stabilize areas subject to erosion. Riprap is a versatile, highly erosion-resistant material that can be used effectively in

BMP ID	Name	SWPPP Summary
		many locations and in a variety of ways to control erosion on construction sites, slopes, roadsides, and streambanks.
RC-4	Turf Reinforcement Mats / Grass-lined Channels	Turf Reinforcement Mats (TRMs) are a runoff control BMP, intended to protect soil from the tractive (erosive) forces of flowing water. They are used to line drainage conveyance channels on a temporary basis or, most commonly, until grasses or other natural vegetation becomes established (Grass-lined Channels). Vegetated TRMs are a biotechnical erosion control BMP because the structural materials (geotextile) and biological components (roots and shoots reinforcement) mutually reinforcing manner. However, some TRMs are very effective and long-lasting for use when vegetation is difficult to establish.
RC-5	Diversion Dikes and Diversion Swales	A Diversion Dike is a temporary ridge of compacted soil constructed immediately above a new cut or soil fill slope or around the perimeter of a disturbed area. Diversion Swales are ditches cut into the soil in a roughly parabolic or trapezoidal shape, and they accompany diversion dikes for intercepting runoff.
SC-1	Sediment Ponds	A sediment pond is usually created by excavation and/or construction of an embankment; it is designed to retain or detain runoff for a time sufficient to allow sediment to settle out of suspension. The skimmer outlet device improves sediment-trapping efficiency by regulating filling and draining of the sediment basin better than conventional methods using perforated risers or stone. Sediment basins shall be designed such that the flow length from the inlet to the outlet is relatively long. Flow length (L:W ratio) and detention time are the critical factors for increasing sediment pond efficiency.
SC-2	Sediment Traps	A sediment trap is a temporary containment area that allows sediment in collected storm water to settle out during infiltration of before the runoff is discharged through a stabilized spillway. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area. Sediment traps shall be used in conjunction with BMPs such as TC-4 Wash Racks, PO-5 Stockpile Management, and PO-6 Solid and Liquid Waste Management.
SC-3	Bioretention and Swales	Bioretention basins and bioswales direct sheet flow across a grass buffer strip to a ponding area for infiltration. They utilize soils and both woody and herbaceous plants to remove pollutants from storm water runoff. The ponding area generally consists of a surface layer containing organics such as mulch, trees, native grasses and shrubs, a subsurface layer of planting soil, and a sand bed.
SC-4	Silt Fence	A silt fence is a temporary sediment barrier consisting of filter fabric entrenched into the soil and attached to supporting posts. Silt fence is intended to be installed where sediment-laden water can pond, thus allowing the sediment to fall out of suspension and separate from the runoff. Silt fence installed with a trencher or by slicing is the most effective installation method to ensure against common silt fence failures.
SC-5	Fiber Rolls	Fiber rolls are manufactured from straw, wood excelsior, coconut fibers, and/or other materials which are bound with polypropylene or biodegradable netting into tight tubular rolls. Fiber rolls control three types of erosional processes; erosion control, run off control, and sediment control. SC-5 Fiber Rolls are extremely effective as; 1) “slope interrupters” to reduce erosion on newly constructed slopes; 2) temporary “ditch checks” to reduce runoff velocities in drainage channels, and 3) sediment control barriers for small DSAs such as stockpiles, discrete slopes or individual lots.

BMP ID	Name	SWPPP Summary
SC-6	Straw Bale Dike	A straw bale dike is a temporary barrier consisting of straw bales installed across a slope, at the toe of a slope, and/or around the perimeter of the construction site. Straw bale dikes intercept and detain small amounts of sediment transported by sheet type runoff.
SC-7	Compost Berms and Compost Socks	A compost berm is a trapezoidal berm that intercepts sheet flow and ponds runoff, allowing sediment to fall out of suspension. Compost berms provide an environmentally-sensitive and cost-effective alternative to silt fence. A compost sock is a type of contained compost berm, with the added benefit of better withstanding any machinery or other vehicle traffic. Compost socks are mesh tubes filled with compost, installed across a slope or small drainage swale to pond water and allow sediments to settle. Compost socks are also similar to fiber rolls in their applications.
RT-1	Crown	Crowned roads are designed to quickly drain road surfaces from the center of the road to side ditches. This technique helps to prevent water from standing on the road surface. Standing water results in road failures, destabilized sub-base, potholes, and erosion.
RT-2	Outslope	An outsloped trail is one that is lower on the outside or downhill side of the trail bench than it is on the inside or bank side. Outsloping lets runoff flow naturally, as uniform sheet flow, off the trail. Outsloping protects the trail or road prism from erosion and mimics and attempts to restore the natural hillslope processes and watershed hydrology which can greatly improve water quality.
RT-3	Inslope	Insloping is a road shape where the road surface is lower on the inside (sloe side) of the road. Insloping collects surface runoff into an inboard ditch system.
RT-4	Road Surface	Surfacing the native roadbeds (and trail surfaces) with gravel, crushed aggregate and/or base rock improves the structural support and reduces road surface erosion. Low-volume roads intended for all-weather use shall be stabilized by surfacing with gravel.
RT-5	Rolling Dip	Rolling dips are gently sloping excavations running diagonally across the road surface. They limit the accumulation of erosive volumes of storm water on roads by diverting surface runoff off the road a pre-designed intervals.
RT-6	Terrain Dip	A terrain dip is a specially designed rolling dip that is placed at the intersection of a road (or trail) and a natural drainage course or swale in order to allow runoff from the upslope swale to exit the road in its pre-disturbance location.
RT-7	Climbing Turn	The climbing turn (switchback) is a road and trail design used to climb steep slopes in confined areas or make outboard turns (around a ridge node) with minimal erosion. From uphill to downhill the road drainage goes from outsloped to steeply insloped (super elevation) and then to outsloped again. A strategically placed rolling dip is used to cross drain (relieve) the inboard ditch.
RT-8	Culvert Crossing	Culverts shall be installed and maintained in order to convey water where a stream or drainage intersects a road or trail, if a culvert is the only drainage option. The use of culverts shall preserve road base by draining water from ditches along roads. Culverts shall be properly designed and installed in order to prevent erosion problems. Culvert inlets and outlets shall also be properly designed to stabilize soil, prevent scour, and improve flow efficiency.
RT-9	Slope Drain or Overside Drain	A slope drain is flexible tubing or a pipe, overside drain, or other conduit extending from the top to the bottom of a cut slope, fill slope, or other steep slope needing protection from runoff that cannot be diverted elsewhere. Slope drains shall be

BMP ID	Name	SWPPP Summary
		installed to convey concentrated runoff down the face of the slope without causing erosion.
RT-10	Low Water Crossings	Low water crossings are BMPs used to allow vehicular access across streams and drainage ways while protecting the channel. A well-designed low water crossing will protect the channel bottom and bands from erosion and sedimentation.
RR-1	Revegetation	Areas of rehabilitation and repair (revegetation) shall be closed to vehicular traffic. Closed areas shall be signed and fenced, and riders shall be educated to stay on established trails, and not blaze trails through vegetation. Native, locally-adapted plant species shall be used, and soil shall be amended as needed to promote growth.
RR-2	Live Staking	Live stakes are pieces of freshly cut woody plant stem planted in the ground or into erosion control or streambank stabilization structures. Live stake cuttings can be used to repair small earth slips and slumps. The stakes can help buttress the soil and arching. Gullies and bare gully banks can benefit from live staking. Live stakes or poles can be inserted or driven through interstices or openings in gabions, riprap, articulated block, or cellular confinement systems (joint planting). Live stakes can be used to anchor and enhance the effectiveness of live fascines, fiber rolls, turf reinforcement mats, and other erosion control materials.
RR-3	Willow Posts and Poles	RR-3 Willow Posts and Poles is a biotechnical erosion control technique whereby the use of vegetative components and structural materials are combined in a mutually reinforcing manner. Willow posts and poles are excellent additions to any technique that requires excavation, particularly when the depth and location of the excavation intercepts soils conducive to willow growth. Willow posts and poles may be inserted into stone or soil backfill and thus become incorporated with the structure as they root.
RR-4	Live Fascines	Live fascines are also known as live brush (willow) bundles, or willow wattles. Live fascines are bundles of live branch cuttings placed in long rows in shallow trenches across the slope on contour, or at an angle. Fascines are used for biotechnical stabilization of slopes and streambanks. Live fascines may be used for erosion control and vegetation establishment on long slopes, road fills, road cuts, trails, gullies, slumped areas, eroded slopes, or eroding streambanks. Frequently, they are used to repair small earth slips and slumps or to protect slopes from shallow slides 1-2 feet deep. This technique is useful on slopes requiring other planting materials such as woody vegetation, transplants, seeded grasses, and forbs. Live fascines provide soil stability while promoting vegetation and cover establishment.
RR-5	Vegetated Riprap	Correctly designed and installed, vegetated riprap offers an opportunity for the designer to attain the immediate and long-term protection afforded by riprap, with the habitat benefits inherent with the establishment of a healthy riparian buffer. The riprap will resist the hydraulic forces, while roots and branches increase geotechnical stability, prevent soil loss (or piping) from behind the structures, and increase pull-out resistance. Aboveground components of the plants will create habitat for both aquatic and terrestrial wildlife, provide shade (reducing thermal pollution), and improve aesthetic and recreational opportunities. The roots, stems, and shoots will help anchor the rocks and resist 'plucking' and gouging by debris. This technique can also be applied to stabilize slopes where habitat and aesthetic values are important.

BMP ID	Name	SWPPP Summary
RR-6	Vegetated Gabion Basket	Vegetated gabions are used as pervious retaining and armoring structures, culvert outlet or inlet stabilization, and as flexible toe-walls that reduce the steepness of slopes or streambanks. This technique is typically used where large rock is unavailable, as gabion baskets filled with small rocks can resist higher tractive forces than the rocks would normally be able to withstand without wire reinforcement. Vegetated gabions are mitigation for unvegetated gabions. Besides providing habitat enhancements, vegetating gabions with woody plants during construction will increase longevity of the structures.
RR-7	Gully Repair	When gully erosion rates and sediment yield are excessive, gully repair becomes imperative. Gullys are complex and RR-7 Gully Repair usually consists of a combination of techniques for stabilizing these eroding intermittent or ephemeral channels. These repair techniques include identifying and minimizing the source of concentrated flows, installing drainage measures as required, preventing further downcutting, grading the disturbed soils, and applying soil stabilization techniques.
PO-1	Trail and Service Road Inspection and Maintenance	Erosion control features on trails and service roads in the Park shall be maintained through periodic inspection and maintenance, including cleaning dips and crossdrains, repairing ditches, marking culvert inlets to aid in location, and clearing debris from culverts. Roads and trails will be avoided during wet periods if such use would likely damage the road drainage features.
PO-2	Campground Maintenance	The implementation of best management practices for campground, trail, and parking lot activities is designed to prevent pollutants from these areas from entering nearby stream systems or storm water conveyance systems.
PO-3	Portable Septic Waste Management	Portable septic systems will be necessary in order to perform projects throughout isolated areas of the park. Portable septic waste management controls shall be practiced to minimize or eliminate the discharge of septic waste materials to watercourses. Park staff and other contractors shall be educated on portable septic practices.
PO-4	Vehicle Maintenance and Fueling	Vehicle and equipment fueling procedures and practices are designed to minimize or eliminate the discharge of fuel spills and leaks into storm drain systems or to watercourses.
PO-5	Stockpile Management	Stockpile management procedures and practices shall be implemented to reduce or eliminate air and storm water pollution from stockpiles of soil, compost, sand, and paving materials such as Portland cement and asphalt-based materials, aggregates, and pressure-treated wood.
PO-6	Solid and Liquid Waste Management	Solid and liquid waste management procedures and guidelines shall be practiced in order to minimize or eliminate the discharge of pollutants to the watercourses at the Park. The specifications for PO-6 Solid and Liquid Waste Management shall be followed for the creation, collection, and disposal of these wastes. Recycling stations shall be made available in order to reduce solid waste.
PO-7	Hazardous Materials and Waste Management	Hazardous materials and waste management controls shall be practiced in order to minimize or eliminate the discharge of pollutants from hazardous waste to a storm drain or to watercourses.
PO-8	Hazardous Spill Response	Hazardous spill control procedures shall be implemented anytime chemicals and/or other hazardous substances are actively used or stored. This BMP shall apply to all construction, maintenance and road/trail building projects.

California Department of Parks and Recreation
Resource Services
STANDARD PROJECT REQUIREMENTS (SPRs)

Carnegie SVRA Resource Management Area (RMA) Program

The following SPRs applicable to the Carnegie SVRA RMA Program are used by California State Parks for park projects throughout the statewide park system. Applicable SPRs are built into individual projects as part of each park's internal planning process. As indicated by the brackets, these SPRs are meant to be tailored for each project by filling in text as appropriate. Brackets have been filled in with relevant project information. Underlined or ~~strikeout~~ text denotes where SPR text has been modified for implementation clarity and reflects Diablo Range District standard practices. Because there are various Natural and Cultural Resource classifications within DPR, the following naming convention is used for anyone qualified who possesses the skills to do a particular task correctly as [Natural Resource Specialist] and [Cultural Resource Specialist]. This naming convention also applies to any qualified and DPR-approved consultant or contractor who possesses the necessary skills and qualifications to do a particular task correctly.

General

- Prior to the start of on-site construction work, a [Cultural and Natural Resource Specialists] will consult with the contractor or project manager to identify all resources that must be protected.
- No track-mounted or heavy-wheeled vehicles will be allowed in identified environmentally sensitive areas, including culturally sensitive sites, at any time; foot traffic will only be allowed with specific permission from the State's Representative after clearance from [DPR Resource Specialists].
- At the discretion of [DPR Resource Specialists], mechanized vehicles on [sensitive] resource sites will be restricted to ~~a~~ short-term use of rubber tire tractors only. All such vehicles must enter and exit the area via the same route of travel (by backing up). Vehicles are strictly prohibited from turning on the surface of site(s).
- Prior to the start of on-site construction work, a DPR-qualified [natural, cultural, historical, aesthetic, public safety, recreational or other value] Resources Specialist will train construction personnel in [applicable] Resource identification and protection procedures.
- Prior to the start of on-site construction work, and at the discretion of a [DPR Environmental Scientist], a [DPR-approved biologist] will flag and/or fence all [Sensitive Natural Communities] with a buffer of [100 feet] for avoidance during on-site construction activities. The [Project Manager] will remove the fencing after project completion.
- Prior to any earthmoving activities, a DPR-qualified [Resource Specialist] will approve all subsurface work, including the operation of heavy equipment within [buffered distances as specified in Project Mitigation identified in EIR Table S-1] of the identified Environmentally Sensitive Area (ESA).

- Prior to the start of [earth moving] work, the [Project Manager] will notify the [Diablo Range District CEQA Coordinator] or [the Altamont Sector Manager] a minimum of three weeks in advance, unless other arrangements are made, to schedule [resource] monitoring as previously identified during the planning process. ~~A DPR qualified [**insert who]** will monitor all ground disturbing phases of this project at his/her discretion.~~

Cultural Resources

General Cultural Standard Requirements

- Prior to the start of on-site construction work, the [Project Manager] will notify the **Cultural Resources Supervisor**, unless other arrangements are made in advance, a minimum of three weeks to schedule a **Cultural Resource Specialist** to monitor work, as necessary, to ensure that ~~removal and reconstruction of historic fabric~~ treatment of known cultural resources will occur in a manner consistent with the Secretary of the Interior's Standards.
- If sensitive cultural resources were previously identified during the planning process ~~Before, during, and after construction~~, a [Cultural Resource Specialist] will photo-document all aspects of the project, before, during, and after construction, and will add the photos to the historical records (archives) for the park.
- Prior to the start of on-site construction work, and to the extent not already completed, a [Cultural Resource Specialist or DPR-approved Cultural Resource Specialist] will map and record all cultural features within the proposed Area of Potential Effects (APE) to a level appropriate to the Secretary of Interior Standards.

~~Historian's Standard Requirements~~

- As needed, a~~A~~ [Cultural Resource Specialist] familiar with the project site's cultural/tribal cultural/historic resources will monitor all construction activities. Where appropriate and as requested through tribal consultation, a Native American monitor will be present during ground disturbing construction activity. All cultural/tribal cultural/historical resources uncovered during the project will be recorded in place with a photograph and/or drawing showing any new material or recovered and archived, at the discretion of the monitor.

Archaeologist's Standard Requirements

- Prior to the start of any ground-disturbing activities, a DPR-approved archaeologist will complete pre-construction testing to determine specific avoidance areas as identified in the planning process.
    - If necessary, a DPR-qualified Cultural Resource Specialist will prepare a research design, including appropriate trenching and/or pre-construction excavations
    - Based on preconstruction testing, project design and/or implementation will be altered, as necessary, to avoid impacts to archaeological resources or reduce the impacts to a less than significant level, as determined in consultation with a DPR-qualified archaeologist.
- Unless previously flagged by DPR Resource Specialists, [DPR or Contractor] will manually remove or flush cut vegetation to avoid ground-disturbing activities; removal of roots will not be allowed. In areas lacking appropriate archaeological survey coverage

only chemical treatments will be allowed unless archaeological surveys are performed first.

- If **anyone** discovers previously undocumented ~~cultural~~ archaeological resources during project construction, all work ~~within~~ [in the project area and in areas nearby reasonably suspected of having undiscovered cultural resources] will stop. Work ~~of the find~~ will be temporarily halted until the DPR archaeologist designs and implements appropriate treatments in accordance with the Secretary of the Interior's Standards and Guidelines for archaeological resource protection.
    - [The RMA Program supervisor or designee] will modify the project to ensure that construction activities will avoid ~~cultural~~ archaeological resources upon review and approval of a [DPR-qualified Cultural Resource Specialist].
    - If ground disturbing activities uncover intact ~~cultural features~~ archaeological sites (including but not limited to dark soil containing shellfish, bone, flaked stone, groundstone, or deposits of historic ash), when a DPR Qualified cultural resources specialist is not on-site, [Project Manager] will contact the DPR State Representative immediately and [Contractor] will temporarily halt or divert work within the immediate vicinity of the find until a DPR-qualified cultural resources specialist evaluates the find and determines the appropriate treatment and disposition of the cultural resource.
- In the event that human remains are discovered on the project site, work will cease immediately in the area of the find and the project manager/site supervisor will notify the ~~appropriate DPR Personnel~~ Supervising Ranger, who will secure the discovery. Any human remains and/or funerary objects will be left in place or returned to the point of discovery ~~and covered with soil~~. The ~~DPR Sector Superintendent (or authorized representative)~~ Supervising Ranger will then notify the County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (or Tribal Representative). If a Native American monitor is on-site at the time of the discovery, the monitor will be responsible for notifying the appropriate Native American authorities. The County Coroner will make the determination of whether the human bone is of Native American origin.
    - If the Coroner determines the remains represent Native American interment, the NAHC in Sacramento and/or ~~tribe~~tribal representative will be consulted to identify the most likely descendants and appropriate disposition of the remains. Work will not resume in the area of the find until proper disposition is complete (PRC §5097.98). No human remains or funerary objects will be cleaned, photographed, analyzed, or removed from the site prior to determination.
    - If it is determined that the find indicates a sacred or religious site, the site will be recorded and evaluated under PRC 5024 and 5024.5 with consultation of the MLD (if needed) or Tribal representative. Formal consultation with the State Historic Preservation Office and review by the Native American Heritage Commission/Tribal Cultural representatives will occur as necessary to define additional site mitigation or future restrictions.

Natural Resources

General Biological Resource Standard Project Requirements

- To prevent the spread of noxious weeds, all construction vehicles and equipment will enter and leave the project site free of soil, vegetative matter, or other debris that could contain weed seeds.
- All new or modified trail construction will be consistent with the State Parks Trail Manual guidelines, State Parks OHV BMP Manual, Carnegie SVRA Stormwater Management Plan, and Soil Conservation Standard.
- At the discretion of [the Natural Resource Specialist], ~~project activities will be~~ a [DPR-approved Natural Resource Specialist] will monitor~~ed~~ [construction in the RMA Program work sites] to ensure that impacts to [special-status plants and animals, nesting birds, roosting bats, sensitive natural communities, or jurisdictional waters potentially occurring in the work site area as identified during the project planning phase] are minimized. This individual will be familiar with the life history of the protected species with the potential to occur within the work areas and shall be trained in identification of these special-status species that could be encountered during the project and shall have the authority to stop work to avoid impacts on such species.
- The [RMA Program Supervisor or designee] will post information signs near project areas with restricted access or closures lasting longer than 3 months. The signs will include the following information:
    - Explanation for and description of the project; and
    - Anticipated completion date.
- Prior to the start of on-site construction activities, a [DPR-approved Natural Resource Specialist] will train on-site construction personnel on the life history of [special-status plants and animals, nesting birds, roosting bats, and sensitive natural communities potentially occurring in the work site area as identified during the project planning phase], work constraints, and any other pertinent information related to the species. For the RMA Program, pertinent information includes project boundaries, sensitive resources, and protected species and habitats relevant to the current year's work site location(s). This training shall include:
    - a description of the special-status species, their habitats, and other sensitive natural communities,
    - the importance of the species,
    - the general measures that are being implemented to avoid potential project impacts,
    - the appropriate protocol to follow in the event that these sensitive resources are found onsite,
    - buffer areas, and
    - any other measures to protect the sensitive resources.

Plants

- If [special-status plants or locally rare plants] are located within [100 feet] of the project area, the [plants] will be flagged by [a DPR-approved botanist], fenced off prior to the start of on-site construction activities, and ~~completely~~ avoided. The Environmental Scientist may adjust the buffer distance based on site conditions.
- Best Management Practices (BMPs) to avoid creation of dust will be employed during all construction activities within [100 feet] of [special-status plants or locally rare plants].
- Prior to the start of on-site construction activities and when the plants are in a phenological stage conducive to positive identification (i.e., usually during the blooming period for the species), a [DPR-approved Natural Resource Specialist] will conduct surveys for special-status and locally rare plant species ~~throughout the project area~~ with the potential to occur in the project work area. The surveys shall include but not be limited to, conducting surveys during appropriate conditions, utilizing appropriate reference sites, and evaluating all direct and indirect impacts such as altering off-site hydrological conditions where special-status plant species may be present. The location and extent of all occurrences of special-status plant species encountered during the surveys shall be mapped and maintained in the SVRA's Geographic Information System (GIS) database.
- Prior to the start of on-site construction activities, a [DPR-approved Natural Resource Specialist] will flag and fence sensitive plant communities (e.g., vegetation series, alliances, or associations) and jurisdictional waters within [100] feet of the project area to avoid impacts.
- No [ground-disturbing activities or equipment storage] will be allowed within [ten] times the diameter-at-breast-height (DBH) of retention trees, unless approved in advance by a DPR-approved biologist, forester, or certified arborist.
- The [RMA Program Supervisor] will avoid or minimize impacts to federally protected wetlands and other jurisdictional waters to the extent practicable by conducting work in upland areas.
- A [DPR-approved biologist, forester, or certified arborist] will be present during all ground-disturbing activities within the [area of ten times the DBH] of trees.
- Any trenching in a "structural root zone" will be completed by hand; no roots larger than [two inches] in diameter will be cut or damaged.
- All herbicides will be handled, applied, and disposed of in accordance with the MSDS Fact Sheet and all local, State, and federal laws.
- To maintain genetic integrity, only locally native plant stock collected within the [Carnegie SVRA or from the same ecological region, elevation, and site characteristics as the site to be revegetated] will be used for re-vegetation in the project area in accordance with the DPR Genetic Integrity Policy (DOM Natural Resources Section, Plant Resources Chapter 0310.4.4).
- [DPR] will employ Best Management Practices (BMPs) for erosion control to avoid runoff of project-related sediments, vehicle fluids, and other liquids into ~~special~~ sensitive plant communities.

Wildlife

- If feasible, [DPR] will schedule all work (including but not limited to mobilization and staging, clearing, grubbing, vegetation removal, fence installation, demolition, and grading) between September 16 and January 31 to avoid ~~the~~[impacts to nesting birds].
- If work is required during the [nesting bird] season ([February 1-September 15]) a [DPR-approved Natural Resource Specialist] will conduct a survey to identify [active nests[1]] within [a 250-foot (passerines) and 1,000-foot (raptor nests) buffer around disturbance areas including staging and storage] of the project area. The survey will be conducted no more than [five] calendar days prior to the beginning of construction. If project activities are delayed by more than five days, an additional nesting bird survey shall be performed. The results of the surveys shall be documented.
- If [active nest(s)] are found during the nesting bird survey, ~~located within feet of the project area,~~ no construction will occur within [250-feet for passerines or 1,000 feet for raptors] of the [work site] during the [nesting bird] season or until the young have fledged, as determined by a DPR-approved ~~biologist~~Natural Resource Specialist.
- If individuals or other recent signs of [special-status animals] are observed within [500 feet] of the project area, [a DPR-approved Natural Resource Specialist] will be present on the site to monitor during construction activities at his/her discretion.
- Immediately prior to the start of work each morning, [a DPR-approved Natural Resource Specialist] will conduct a visual inspection of the construction zone.
- If [a special-status animal] is found on the project site, work in the vicinity of the animal will be delayed until the species moves out of the site on its own accord, or is temporarily relocated to a suitable habitat area outside of the work site by [a USFWS- and/or CDFW-permitted biologist or a DPR-approved Natural Resource Specialist (depending on the listing status of the species)]~~biologist~~. DPR shall not relocate state- or federally-listed species or species that are candidates for listing under the California Endangered Species Act without applicable permits.
- To prevent trapping of [wildlife], all holes and trenches will be covered at the close of each working day with plywood or similar materials, or will include escape ramps constructed of earth fill or wooden planks; all pipes will be capped. A [DPR-approved biologist], or other staff trained by a [DPR-approved Natural Resource Specialist] will inspect trenches and pipes for [trapped animals] at the beginning of each workday. If a trapped animal is discovered, they will be released in suitable habitat at least [100 feet] from the project area.
- [DPR or Contractor] will not remove any trees equal to or greater than [four] inches DBH unless first inspected by [a DPR-approved Natural Resource Specialist] and determined to be unsuitable as habitat for roosting bats.

Aesthetics

- Projects will be designed to incorporate appropriate park scenic & aesthetic values including the choices for: specific building sites, scope & scale; building and fencing materials and colors; use of compatible aesthetic treatments on pathways, retaining

[1] Active nesting is present if a bird is building a nest, sitting in a nest, a nest has eggs or chicks in it, or adults are observed carrying food to the nest.

walls or other ancillary structures; location of and materials used in parking areas, campsites and picnic areas; development of appropriate landscaping. The park scenic and aesthetic values will also consider views into the park from neighboring properties.

- [Contractor] will store all project-related materials outside of the viewshed of [the Carnegie SVRA].

Air Quality

- During dry, dusty conditions, all active construction areas will be lightly sprayed with dust suppressant (water) to reduce dust without causing runoff.
- All trucks or light equipment hauling soil, sand, or other loose materials on public roads will be covered or required to maintain at least two feet of freeboard.
- All ~~gasoline-powered~~ equipment will be maintained according to manufacturer's specifications, and in compliance with all State and federal requirements.
- Excavation and grading activities will be suspended when sustained winds exceed 15 miles per hour (mph), instantaneous gusts exceed 25 mph, or when dust occurs from remediation related activities where visible emissions (dust) cannot be controlled by watering or conventional dust abatement controls.

Geology and Soils (erosion)

- After a large earthquake event (i.e., magnitude 5.0 or greater within 50 miles of the project site), [RMA Program Supervisor or designee] will inspect all project structures and features for damage, as soon as is possible after the event. Any damaged structures or features will be closed to park visitors, volunteers, residents, contractors, and staff.
- No track-mounted or heavy-wheeled vehicles will be driven through [project site] areas during the rainy season or when soils are saturated to avoid compaction and/or damage to soil structure.
- [RMA Program Supervisor or designee] will develop a rehabilitation plan for the decommissioned trail that includes using brush and trees removed from the new trail alignment for bio-mechanical erosion control (bundling slash and keying it in to fall of trail, filling damaged trails sections with soil and duff removed from the new trail alignment, constructing water bars, and replanting native trees and shrubs).
- [DPR or Contractor] will clearly block both ends of the trail and scatter its length with vegetative debris from new trail construction to discourage continued use and degradation of the decommissioned portion of the trail.

Hazards

- Prior to the start of on-site construction activities, [DPR or Contractor] will inspect all equipment for leaks and regularly inspect thereafter until equipment is removed from the project site. All contaminated water, sludge, spill residue, or other hazardous compounds will be contained and disposed of outside the boundaries of the site, at a lawfully permitted or authorized destination.
- Prior to the start of on-site construction activities, [DPR or Contractor] will prepare a Spill Prevention and Response Plan (SPRP) ~~as part of the Storm Water Pollution Prevention Plan (SWPPP) for [Regional Water Quality Control Board] approval~~ to

provide protection to on-site workers, the public, and the environment from accidental leaks or spills of vehicle fluids or other potential contaminants. This plan will include (but not be limited to);

- a map that delineates construction staging areas, where refueling, lubrication, and maintenance of equipment will occur;
- a list of items required in a spill kit on-site that will be maintained throughout the life of the project;
- procedures for the proper storage, use, and disposal of any solvents or other chemicals used in the restoration process;
- and identification of lawfully permitted or authorized disposal destinations outside of the project site.

- [DPR or Contractor] will set up decontamination areas for vehicles and equipment at Park entry/exit points. The decontamination areas will be designed to completely contain all wash water generated from washing vehicles and equipment. Best Management Practices (BMPs) will be installed, as necessary, to prevent the dispersal of wash water beyond the boundaries of the decontamination area, including over-spray.
- All heavy equipment will be required to include spark arrestors or turbo chargers (which eliminate sparks in exhaust) and have fire extinguishers on-site.
- Construction crews will be prohibited from parking vehicles and using portable tools powered by gasoline-fueled internal combustion engines [within 25 feet] from flammable material, such as dry grass or brush. At the end of each workday, construction crews will park heavy equipment over a non-combustible surface to reduce the chance of fire.
- DPR personnel will have a State Park radio at the Park, which allows direct contact with CalFire and a centralized dispatch center, to facilitate the rapid dispatch of control crews and equipment in case of a fire.
- Prior to the start of on-site construction activities, [DPR or Contractor] will clean and repair (other than emergency repairs) all equipment outside the project site boundaries.
- Under dry conditions, a filled water truck and/or fire engine crew will be onsite during activities with the potential to start a fire.
- [DPR or Contractor] will designate and/or locate staging and stockpile areas within the existing maintenance yard area or existing roads and campsites to prevent leakage of oil, hydraulic fluids, etc. into [the environment].

Hydrology

- If subject to NPDES General Construction Permit requirements, ~~Prior to the start of construction involving ground-disturbing activities,~~ [DPR or Contractor**]** will prepare and submit a Storm Water Pollution Prevention Plan (SWPPP). ~~that identifies P~~prior to the start of land-disturbing activities for~~DPR~~ approval by the State Water Resources Control Board. The SWPPP is a document that must assess the site conditions, sources of sediment and other pollutants in stormwater and non-stormwater discharges and shall identify the Best Management Practices (BMPs) that will best suit the construction activities and meet the requirements of Regional, State, and Federal water pollution

control objectives. Water Pollution Control Drawings shall be included as a component of the SWPPP and shall show locations of all construction site BMPs, in accordance with Construction Site Monitoring Program Guidelines. The SWPPP will identify temporary (e.g., tarping of any stockpiled materials or soil; use of silt fences, straw bale barriers,[2] fiber rolls,[3] etc.) and permanent (e.g., structural containment, preserving or planting of vegetation) for use in all construction areas to reduce or eliminate the discharge of soil, surface water runoff, and pollutants during all excavation, grading, trenching, repaving, or other ground-disturbing activities. The SWPPP will include BMPs for hazardous waste and contaminated soils management and a Spill Prevention and Control Plan (SPCP), as appropriate.

- The project will comply with all applicable water quality standards as specified in the [Central Valley RWQCB] Basin Plan.
- All heavy equipment parking, refueling, and service will be conducted within designated areas outside of the 100-year floodplain to avoid watercourse contamination.
- If construction activities extend into the rainy season ([October through April]) or if an unseasonal storm is anticipated, [DPR or Contractor] will properly winterize the site by covering (tarping) any stockpiled materials or soils and by constructing temporary perimeter sediment barriers, such as silt fences, ~~straw bale~~strawbale barriers, fiber rolls, or other structures around stockpiles and graded areas.
- All construction activities will be suspended during heavy precipitation events (i.e., at least 1/2-inch of precipitation in a 24-hour period) or when heavy precipitation events are forecast.
- [DPR or Contractor] will install appropriate energy dissipators at water discharge points, as appropriate.

Traffic

- Prior to delivery and/or removal of project-related equipment or materials that could impede or block access to driveways, cross streets, or street parking, [RMA Program Supervisor or designee] will coordinate with the local jurisdictions to develop and implement traffic control measures.

Noise

- Internal combustion engines used for project implementation will be equipped with a muffler of a type recommended by the manufacturer. Equipment and trucks used for p~~P~~roject-related activities will utilize the best available noise control techniques (e.g., engine enclosures, acoustically attenuating shields or shrouds, intake silencers, ducts, etc.) whenever necessary.

[2] Straw/hay bales shall be certified weed-free materials. A copy of CDFA Form 66-079 "Certificate of Quarantine Compliance (CQC)" associated with the inspection of the specific forage/straw materials may be obtained from the vendor to ensure certification.

[3] Fiber rolls shall be temporary products that do not contain netting, or that contain netting manufactured from 100% biodegradable non-plastic materials such as jute or coir fiber. Degradable, photodegradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting are not acceptable alternatives. All netting materials used should have a wildlife-safe, loose-weave design with movable joints between the horizontal and vertical twines that allow twines to move independently and reduce the potential for wildlife entanglement.

- [DPR or Contractor] will locate stationary noise sources and staging areas as far from potential sensitive noise receptors, as possible. If they must be located near potential sensitive noise receptors, stationary noise sources will be muffled or shielded, and/or enclosed within temporary sheds.
- Construction activities will generally be limited to the daylight hours, Monday – Friday. If work during weekends or holidays is required, no work will occur on those days before [8:00] a.m. or after [5:00] p.m. (check contract docs for time restrictions)
- Internal combustion engines used for any purpose at the job site will be equipped with a muffler of a type recommended by the manufacturer. Equipment and trucks used for construction will utilize the best available noise control techniques (e.g. engine enclosures, acoustically-attenuating shields, or shrouds, intake silencers, ducts, etc.) whenever necessary.

California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program EIR

Appendix C: 2024 General Plan Update Policies Relevant to RMA Program

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Appendix C. Carnegie SVRA General Plan Update 2024, Goals and Guidelines Relevant to the RMA Program

Visitor Experience and Opportunities (VEO) Goals and Guidelines

VEO Goal 1: When planning for recreation opportunities and visitor services, provide a broad range of OHV and other recreation experiences and opportunities for visitors to enjoy and appreciate.

- **VEO Guideline 1.2:** Provide appropriate facilities for a range of age and skill levels from novice through expert OHV recreationists, as feasible.

Visitor Use Facilities Goals and Guidelines

Off-Highway Vehicle (OHV) Use Goal 1: State Parks will maintain, improve, or expand visitor area connectivity, practice areas, and riding opportunities for all OHV recreationalists.

- **OHV Use Guideline 1.5**: State Parks may enhance or develop other trails, practice areas, and riding opportunities for motorized recreationists of all skill levels and as allowed in the visitor experience areas (may require additional environmental analysis).

Parkwide Goals and Guidelines

Water Goal 1: Manage the SVRA for the protection of jurisdictional waters of the United States, including wetlands and waters of the state, while maintaining a quality OHV recreational experience.

- **Water Guideline 1.1:** Avoid locating facilities in areas delineated as jurisdictional waters of the United States, including wetlands; areas that qualify as waters of the state under the Porter-Cologne Water Quality Control Act of 1969, and areas subject to California Department of Fish and Wildlife (CDFW) regulation under California Fish and Game Code Section 1602. Where avoidance is not feasible, such as for trail crossings, design facilities to minimize impacts.
- **Water Guideline 1.2:** Work to attain no net loss of wetlands functions and values at the SVRA. If impacts on jurisdictional features cannot be fully avoided:

  ─ Determine the acreage of direct impacts (i.e., fill of wetlands) and indirect impacts (i.e., alterations to wetland hydrology) that would result from project implementation, and obtain necessary permits.

  ─ Provide compensatory mitigation such that the functions and values of all affected wetlands and other waters of the United States, waters of the state, and stream and riparian habitats protected under the California Fish and Game Code are replaced, restored, or enhanced on a "no net loss" basis. Restore, enhance, and/or replace wetland, water, and riparian habitat acreage at a location and by methods agreeable to the U.S. Army Corps of Engineers (USACE), the Central Valley and San Francisco Bay Regional Water Quality Control Boards (RWQCBs), CDFW, and/or the U.S. Fish and Wildlife Service (USFWS) as appropriate and depending on agency jurisdiction.

Water Goal 2: Manage the SVRA for the protection of water quality while maintaining a quality OHV recreational experience.

- **Water Guideline 2.1:** Avoid siting facilities in and immediately adjacent to riparian or stream corridors or within waters of the United States or the state, including seeps, ponds, or drainages. Stream corridors shall be managed with vegetated buffers and crossings shall be properly sited for circulation and designed to minimize erosion and other water quality impacts. Design measures include but are not limited to:

  ─ armoring approaches,

  ─ providing sediment traps or filter areas,

  ─ hardening the crossing surface,

  ─ protecting the streambanks from vehicle backwash and overflow during flooding, and

  ─ modifying super elevation (direction of tilt) such that roads and trails drain away from stream corridors.

  Culverts or bridge crossings shall be considered in highly erosive areas.

- **Water Guideline 2.2:** Implement best management practices (BMPs) in operating the SVRA, consistent with the *Storm Water Management Plan for Carnegie SVRA* (SWMP) or applicable subsequent document. Monitor water quality regularly and implement adaptive management practices as warranted. Adaptive management practices used may include permanent or seasonal area closures, facility redesign, and hillside restoration.

- **Water Guideline 2.3:** Implement the requirements of the SWMP or subsequent amendments or replacement documents. These requirements include use of sediment basins, revegetation and erosion control blankets, dust suppressants, gully rehabilitation, and monitoring for water quality as prescribed in the plan and may include additional measures in the future.

- **Water Guideline 2.4:** Before, during, and after the construction of facilities proposed and envisioned in this General Plan, implement all water quality control measures required under the National Pollutant Discharge Elimination System Construction General Permit. Develop a storm water pollution prevention plan, including the identification of BMPs that must be implemented to reduce water quality degradation of receiving waters during and after construction activities. Incorporate construction BMPs from the *OHV BMP Manual for Erosion and Sediment Control* (OHV BMP Manual) or subsequent applicable document, as appropriate.

- **Water Guideline 2.5:** When developing detailed plans for facilities proposed and envisioned in this General Plan, incorporate permanent water quality control features, as appropriate, with guidance from the SWMP and any subsequent amendments or replacement documents. Incorporate information from the OHV BMP Manuel and the OHMVR *Soil Conservation Standard and Guidelines* (or subsequent amendments) as appropriate to designs. Select water quality control features appropriate to site conditions at Carnegie SVRA and consistent with state-of-the art science on water quality management.

- **Water Guideline 2.6:** To reduce erosion and sedimentation, improve areas that have experienced substantial erosion from surface water runoff as determined by annual inspections. Implement rehabilitation concepts for these features as described in the SWMP or subsequent or replacement documents.
- **Water Guideline 2.7:** Close an area to OHV use if it has been determined that the area cannot feasibly be rehabilitated or reclaimed in accordance with OHMVR Division water quality management standards.
- **Water Guideline 2.8:** To minimize erosion problems, landslide hazards, and costly maintenance, temporarily close portions or all of the SVRA based upon conditions established by the rain closure policy. That policy will be reviewed and updated as necessary.

Soils Goal 1: Manage the SVRA for a balance of uses that allow protection and conservation of soil while maintaining a quality OHV recreational experience.

- **Soils Guideline 1.1:** Manage Carnegie SVRA facilities to meet the current OHMVR Division *Soil Conservation Standard and Guidelines* or subsequent amendments or replacement documents.
- **Soils Guideline 1.3:** Incorporate the guidance provided in the OHV BMP Manual or subsequent or replacement document when planning for the development of new facilities. Select, implement, and maintain BMPs, including those designed for stockpiles, during and after construction activities to avoid soil loss and the potential for resulting air pollution or degradation of water quality.
- **Soils Guideline 1.4:** Use slope to help manage soils. A full range of park facilities may be considered on areas with less than 20 percent slopes. Trails may be constructed (with BMPs) in areas with slopes between 20 percent and 45 percent, but buildings should not be constructed in these areas. On areas with slopes in excess of 45 percent, trails and park facilities should be limited and serve only the most advanced riders. Appropriate BMPs should be implemented in each area to manage erosion potential.
- **Soils Guideline 1.5:** Restrict hillclimbing activities to the hills adjacent to Corral Hollow Creek. In this area, soils mapped as Altamont clay (0–65 percent slope) and Saurin loam and clay loam (0–65 percent slope) are preferred for intensive hillclimbing.

Geo Goal 2: Promote staff education and visitor awareness of paleontological resources and proper procedures to be followed if fossils are discovered.

- **Geo Guideline 2.2:** If paleontological resources are discovered inadvertently during construction activities, cease construction activities within and in the vicinity of the fossil and consult an OHMVR Division archaeologist or other qualified paleontological resource professional to determine the potential significance of the find. If the fossil is determined to be a unique paleontological resource, develop and implement a recovery plan consistent with Society of Vertebrate Paleontology (SVP 2010) criteria. The recovery plan may include but is not limited to a field survey, construction monitoring, sampling and data recovery procedures, curation for any specimen recovered, and a report of findings.

Natural Resources Management (NRM) Goal 1: Manage Carnegie SVRA for a balance of uses that allow protection and stewardship of natural resources while maintaining a quality OHV recreational experience.

- **NRM Guideline 1.1:** Locate visitor-serving facilities in prior disturbed areas or areas of relatively low resource value to minimize disturbance to higher-value habitat areas.
- **NRM Guideline 1.2:** Before planning new visitor-serving or operations facilities, or expanding existing ones, conduct site-specific surveys/mapping of sensitive biological resources (e.g., special-status species and sensitive habitats, migratory corridors, nesting sites, and colony locations) and take the location and extent of these resources into consideration during the planning and design process. Avoid affecting sensitive biological resources during planning, design, and construction. Utilize fencing and other methods to exclude public access in environmentally sensitive areas, as necessary. Conduct worker environmental awareness training for construction personnel before construction.
- **NRM Guideline 1.3:** In the event that disturbing a sensitive biological resource is unavoidable, minimize the disturbance to the minimum area necessary to achieve the project purpose, and identify and implement measures to offset those impacts in coordination with a qualified biologist and the appropriate resource agencies, depending on the listing or protection status of the resource. Coordination with the agencies may include acquisition of any required environmental permits, take authorizations, management plans, or other documents as required by the respective agencies.
- **NRM Guideline 1.5:** Focus new trail development in areas of relatively low habitat value. Route new trails around the edges of high-quality habitat and include buffers to avoid habitat fragmentation. Maintain strict enforcement of riding destination requirements throughout the SVRA, according to the allowable uses in the respective visitor experience areas and monitor for compliance. If noncompliance is documented, enact adaptive management techniques such as temporary closures or other measures proven effective at the SVRA.

NRM Goal 2: Encourage a balance of uses that allow for the restoration or enhancement of natural habitats while maintaining a quality OHV recreational experience.

- **NRM Guideline 2.2:** Implement adaptive management, including temporary or rotating closures, invasive species management, and habitat enhancement, to allow natural regenerative processes to occur; enact these measures proactively. Use signage to inform visitors of areas that contain sensitive biological resources or are closed. Use interpretive materials to inform visitors of habitat enhancement and restoration activities to promote environmental stewardship.
- **NRM Guideline 2.3:** Manage SVRA landscapes to preserve natural vegetation and to enhance native California plant communities and associated habitat functions and values. Management strategies include habitat restoration and enhancement; invasive species management; focused propagation of desired species; fencing or other barriers to protect sensitive habitats such as riparian areas, to maximize natural recruitment of riparian species; controlled burns; managed grazing; or other management techniques proven beneficial to the maintenance of healthy natural ecosystems.

Plant Goal 1: Manage the SVRA for a balance of uses that allow protection of special-status plants and sensitive natural communities while maintaining a quality OHV recreational experience.

- **Plant Guideline 1.1:** Conduct protocol-level surveys for special-status plants and sensitive natural communities on the sites of proposed facilities during the planning and design process. Conduct the surveys during the blooming season for all potentially occurring special-status plant species according to the most current methodology recommended by CDFW and USFWS, depending on the listing status of the species. The surveys shall be conducted by a qualified botanist familiar with the flora of Alameda and San Joaquin Counties. Document the survey results in a written report submitted to the OHMVR Division. Map the location and extent of all occurrences of special-status plant species encountered during the surveys and maintain the data in the SVRA's Geographic Information System database. If construction of facilities is delayed, repeat special-status plant surveys every 5 years to ensure that data are current and account for long-term and seasonal variation.
- **Plant Guideline 1.2:** Prohibit impacts on existing occurrences of special-status plants during project implementation.
- **Plant Guideline 1.3:** Avoid siting facilities within 100 feet of known special-status plant occurrences to avoid indirect impacts. If these buffers cannot be maintained, use design features to protect the occurrences from indirect impacts.
- **Plant Guideline 1.4:** Use drought-tolerant plants, and whenever feasible, use plants native to the site for landscaping. Select plants that require little or no irrigation. If irrigation is required for plant establishment, use temporary irrigation methods that allow a gradual tapering off of watering over a 3- to 5-year period. Regulate water pressure at a level that applies sufficient water without causing erosion, damage to plants, or runoff.
- **Plant Guideline 1.5:** Monitor for existing and/or incipient populations of invasive weeds annually. If new invasive weeds are documented, implement actions to prevent their establishment and spread before they become established or occupy large portions of the SVRA. Maintain weed management practices for the SVRA consistent with OHMVR Division policies or other applicable guidance and based on best available science.
- **Plant Guideline 1.6:** Limit removal of native trees. Any trees removed as a result of facilities construction shall be replaced, with the specific number of trees to be replaced determined during project-level planning. At both new and existing facilities, prohibit adverse indirect effects on native trees from root compaction and physical damage. Preserve or enhance the extent of native woodlands at the SVRA and look for opportunities for enhancement and restoration.

Wildlife Goal 1: Manage the SVRA to maintain a quality OHV recreational experience while protecting native wildlife species, including special-status wildlife species and their designated habitats.

- **Wildlife Guideline 1.1:** Conduct annual (or more frequent) monitoring as part of the HMS or WHPP, to look for signs of active use by burrowing owls and for active kit fox dens in the planning area. If signs of burrowing owl use or active dens are detected

during monitoring, consider active management strategies to encourage and preserve use of the site by the species. Such strategies include placing new facilities away from any active burrowing owl; appropriate buffers shall be sized depending on the use of the burrow (nesting or wintering) and the disturbance impact, as described in Staff Report on Burrowing Owl Mitigation (DFG 2012) or subsequent version and/or consultation with CDFW. If active dens were found, strategies that include not siting facilities within 500 feet of active dens would be initiated based on USFWS guidelines (USFWS 2011). USFWS would be contacted regarding appropriate setbacks for a natal/pupping den if found, both occupied and unoccupied.

- **Wildlife Guideline 1.2:** Avoid siting new facilities within 150 feet of pools currently known or later identified to support California red-legged frog, California tiger salamander, western pond turtle, or western spadefoot.
- **Wildlife Guideline 1.3:** Avoid siting facilities within 100 feet of elderberry shrub locations, for complete avoidance. If work or placement of facilities closer to existing shrubs is required, implement appropriate measures, developed in consultation with USFWS, to avoid or compensate for direct and indirect impacts on valley elderberry longhorn beetle.
- **Wildlife Guideline 1.4:** Avoid siting facilities within 150 feet of preferred Alameda whipsnake habitat, particularly scrub vegetation types. If placement of facilities within or adjacent to Alameda whipsnake habitat cannot be avoided, implement appropriate measures to avoid or compensate for direct and indirect impacts on Alameda whipsnake resulting from project-specific activities. Implement protection measures agreed upon during consultation with USFWS. Encourage further research into the presence of Alameda whipsnake at the site, to ensure that management is based on the best available knowledge of the species and its requirements.
- **Wildlife Guideline 1.5:** During placement of new facilities, avoid known breeding locations of all special-status avian species known to occur in the planning area.
- **Wildlife Guideline 1.6:** If construction activities are planned during the breeding season of common and special-status birds, conduct a preconstruction survey of the construction zone and establish an appropriate buffer (as determined by a qualified biologist) within 2 weeks of construction onset. If breeding birds are documented, establish appropriate buffer zones around the occupied nests to protect the birds until the young have fledged.
- **Wildlife Guideline 1.7:** If construction activities are planned within suitable upland habitat for special-status herpetofauna (California red-legged frog, California tiger salamander, western pond turtle, or western spadefoot) and within the known maximum upland dispersal distance of those species from known breeding habitat, develop and implement appropriate measures to avoid or compensate for potential direct and indirect impacts of project-specific activities on special-status herpetofauna in upland habitats. Before the start of construction, implement any protection or mitigation measures agreed upon during consultation with the wildlife agencies.
- **Wildlife Guideline 1.8:** Perform a preconstruction survey for potential bat roosting habitat (large trees with cavities, rock outcrops, caves, mines) in proposed construction areas and a 100-foot buffer around the construction area (Western Bat Working Group 2007). Implement avoidance and minimization measures determined appropriate by a

qualified biologist based on guidance from the wildlife agencies and the best available science before conducting any activity within 100 feet of known bat roost locations. Avoidance and minimization measures may include establishment of roost avoidance buffers, seasonal activity restrictions, or monitoring of roost locations.

- **Wildlife Guideline 1.9:** Perform preconstruction surveys for active burrowing owl burrows for proposed construction that would occur within suitable burrowing owl habitat or within 50 feet of suitable burrowing owl habitat. Conduct preconstruction surveys according to current CDFW guidelines as described in their Staff Report on Burrowing Owl Mitigation (DFG 2012) or subsequent version. Because burrowing owls can be present throughout the year, this guideline would be implemented in suitable burrowing owl habitat regardless of the time period for initiation of construction. If active burrowing owl burrows are found, CDFW would be consulted regarding appropriate avoidance and minimization measures, including no disturbance buffers, to be implemented during construction and any additional mitigation measures agreed upon during consultation with CDFW.
- **Wildlife Guideline 1.10:** During placement of new facilities, avoid interference of movement through known migratory wildlife corridors in the planning area.

CR Goal 2: Protect, stabilize, and preserve cultural resources.

- **CR Guideline 2.4:** Design all SVRA undertakings, including routine maintenance and new facility development, to avoid or minimize significant impacts on all known cultural resources either listed or eligible for listing in the NRHP, CRHR, or as a CHL, and all tribal cultural resources identified by local tribes and individuals as sacred or culturally significant. Knowledge of the location of these sites was taken into consideration when selecting the preferred concept and shall be taken into consideration during future site specific planning in all visitor experience areas.
- **CR Guideline 2.8:** If cultural resources are inadvertently discovered during construction activities, cease construction activities within and in the vicinity of the find and consult a State Parks archaeologist or other qualified cultural resource professional to determine the potential NRHP/CRHR/CHL eligibility/ significance of the find. If the find is recommended to be significant, develop and implement mitigation measures in consultation with the qualified state archaeologist or cultural resource professional consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Mitigation measures could include, but would not necessarily be restricted to, redesign to avoid the resource, archival research, additional in-field documentation, interpretive signage, capping of the site, or data recovery through excavation. If data recovery is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the significant resource, should be prepared and adopted before any excavation. If the discovery is determined not to be eligible for listing in the NRHP or CRHR, then no further investigations or mitigation of adverse effects is necessary.
- **CR Guideline 2.10:** In the event that human remains are discovered during project activities, temporarily halt all work at the discovery location and areas within 100 feet adjacent to the find. Leave any human remains and associated artifacts and features in

place; avoid cleaning, photographing, or analyzing human remains or associated artifacts and features, and avoid removing them from the site. The State Parks employee or construction contractor must immediately contact the State Park District Superintendent to inform him/her of the find. The State Parks District Superintendent (or designee) will notify the county coroner, in accordance with Section 7050.5 of the California Health and Safety Code, and the NAHC will be notified within 24 hours of the discovery if the coroner determines that the remains are Native American. In compliance with PRC Section 5097.98, the NAHC will immediately notify those person(s) believed to be the most likely descendant (MLD) of the deceased Native American. The MLD will complete his/her inspection and make recommendations for treating or disposing the human remains or associated grave goods. If a Native American monitor is at the park at the time of the discovery, and that person has been designated the MLD by the NAHC, the monitor, as a representative of the MLD, may make a recommendation of the appropriate disposition. Work will not resume in the area of the find until proper disposition is complete (PRC Section 5097.98).

Tribal Cultural Resources (TCR) Goal 1: Identify and interpret the tribal cultural resources, traditional cultural places, and past and present cultural uses in the Park and protect these culturally significant places.

- **TCR Guideline 1.6:** Provide annual tribal cultural resource training to park staff members. Ensure that SVRA field staff, such as maintenance and trails team members, understand the procedures for what to do if tribal cultural resources, and most importantly human remains, are inadvertently discovered during a project or a park visitor. Involve local California Native American guest speakers as participants in annual tribal cultural resource training to share and teach park staff members about today's local Native American population, their heritage, and the important role of cultural resource management in protecting their heritage. Inform SPPOs about the location of known tribal cultural resources most susceptible to looting, vandalism, or damage by park visitors so that they can monitor site conditions and watch for site impacts and vandalism. Ensure that SPPOs have the latest information on current tribal cultural resource laws.

  If anyone identifies previously undocumented tribal cultural resources or suspected tribal cultural resources during any maintenance, construction, or other activities – work will be temporarily halted in the area of the resource/suspected resource. Work will not resume in that area until the Native American monitor inspects the resource, and appropriate avoidance, protection, or treatment is implemented.

  In the event of an accidental discovery or recognition of human remains during any maintenance, construction, or other activities – all work will cease immediately in the area of the find in compliance with California Health and Safety Code §7050.5 and §7052; and Public Resources Code §5097.99. The State Parks' Sector Superintendent (or authorized representative) will notify the County Coroner/Medical Examiner in accordance with § 7050.5 of the California Health and Safety Code. If the coroner determines the remains represent Native American internment, the Native American Heritage Commission in Sacramento will be consulted to identify the most likely

descendant/s and the appropriate disposition of the remains. Work will not resume in the area of the find until proper disposition is complete (PRC § 5097.98).

Park Operations and Maintenance (OM) Goals and Guidelines

OM Goal 2: Maintain and enhance the quality of OHV recreational opportunities.

- **OM Guideline 2.1:** Provide recreation opportunities that enhance OHV recreation at the SVRA, and provide opportunities for a range of OHV types, riding skill development, and practice areas.
- **OM Guideline 2.4:** Provide SVRA park maps and trail signs that help visitors easily understand the allowable recreational activities within the different visitor experience areas.

OM Goal 3: Provide facilities and services that contribute to the safety and convenience of visitors and staff.

- **OM Guideline 3.2:** Ensure that recreation areas are maintained properly and monitor for hazards. Close areas with unsafe conditions until improvements are completed; close areas with unauthorized trails and restore these areas.
- **OM Guideline 3.3:** Provide clear signage and/or fencing as appropriate around areas of known potential hazard, such as deep gullies, drop-offs, or restricted areas.
- **OM Guideline 3.14:** Mark the boundaries of the SVRA and the different visitor experience areas (if applicable) clearly with signs, fences, barriers, or a combination. Signs must be clearly visible to, and worded for, the benefit of SVRA visitors. Identify use areas and appropriate uses in visitor maps.

OM Goal 5: Develop and maintain SVRA facilities and monitor OHV activities to ensure compatibility with surrounding land uses.

- **OM Guideline 5.3:** Employ practices to reduce noise levels for noise-sensitive receptors during construction of facilities. Reduce noise generated during construction and maintenance activities by:

  ─ properly maintaining equipment with noise-reduction devices in accordance with manufacturer specifications (e.g., mufflers, shrouds, filters);

  ─ using quieter than standard equipment when possible (e.g., electrically powered equipment);

  ─ limiting activities to between 8:00 a.m. and 6:00 p.m., Monday through Saturday (excluding emergency work);

  ─ restricting equipment travel and use within 500 feet of noise-sensitive receptors, unless the equipment used would not exceed the daytime standard of 50 A-weighted decibels day-night average sound level (dBA Ldn) and the nighttime standard of 45 dBA Ldn at the property line of noise-sensitive receptors;

  ─ turning off equipment during prolonged periods of nonuse;

— restricting alarms to warn of safety issues only;

— using noise-attenuating buffers when activities take place within 500 feet of adjacent sensitive receptors (e.g., berms, stationary barriers, noise blankets, shrouds);

— following standard construction practices;

— locating equipment staging areas and material loading and unloading zones greater than 500 feet from the nearest sensitive receptor;

— using rubber-tired equipment as much as feasible to minimize groundborne noise; and

— locating any stationary noise sources (e.g. generators) within noise enclosures.

- **OM Guideline 5.4:** Maintain the fencing and existing buffer areas between Carnegie SVRA and adjacent properties to minimize conflicts and prevent OHV use where it is not allowed.
- **OM Guideline 5.5:** Place rest areas and steep uphill trails at locations to provide a barrier effect and/or increase the distance to noise-sensitive uses.

OM Goal 6: Limit potential air quality impacts on residential properties within the planning area that could result from construction, maintenance, and OHV recreation activities.

- **OM Guideline 6.1:** Implement current Bay Area Air Quality Management District (BAAQMD) Table 5-2 Basic Best Management Practices for Construction-Related Fugitive Dust Emissions for all projects as feasible and applicable, which may include the following measures:

  — All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

  — All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

  — All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

  — All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

  — All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

  — All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.

  — All trucks and equipment, including their tires, shall be washed off prior to leaving the site.

  — Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.

  — Publicly visible signs shall be posted at the soil transfer site within BAAQMD, with the telephone number and person to contact at Alameda County regarding dust complaints. This person shall respond and take corrective action within 48 hours.

BAAQMD's phone number also shall be visible, to ensure compliance with applicable regulations.

- **OM Guideline 6.2:** Implement current Bay Area Air Quality Management District (BAAQMD) Table 6-1 Best Management Practices for Construction-Related GHG Emissions for all projects as feasible and applicable, which may include the following measures:

  ─ Use zero-emission and hybrid-powered equipment to the greatest extent possible, particularly if emissions are occurring near sensitive receptors or located within a BAAQMD-designated Community Air Risk Evaluation (CARE) area or Assembly Bill 617 community.

  ─ Require all diesel-fueled off-road construction equipment be equipped with EPA Tier 4 Final compliant engines or better as a condition of contract.

  ─ Require all on-road heavy-duty trucks to be zero emissions or meet the most stringent emissions standard, such as model year (MY) 2024 to 2026, as a condition of contract.

  ─ Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 2 minutes (A 5-minute limit is required by the state airborne toxics control measure [Title 13, Sections 2449(d)(3) and 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site and develop an enforceable mechanism to monitor idling time to ensure compliance with this measure.

  ─ Prohibit off-road diesel-powered equipment from being in the "on" position for more than 10 hours per day.

  ─ Use California Air Resources Board–approved renewable diesel fuel in off-road construction equipment and on- road trucks.

  ─ Use U.S. Environmental Protection Agency SmartWay certified trucks for deliveries and equipment transport.

  ─ Require all construction equipment is maintained and properly tuned in accordance with manufacturer's specifications. Equipment should be checked by a certified mechanic and determined to be running in proper condition prior to operation.

  ─ Where grid power is available, prohibit portable diesel engines and provide electrical hook ups for electric construction tools, such as saws, drills and compressors, and using electric tools whenever feasible.

  ─ Where grid power is not available, use alternative fuels, such as propane or solar electrical power, for generators at construction sites.

  ─ Encourage and provide carpools, shuttle vans, transit passes, and/or secure bicycle parking to construction workers and offer meal options onsite or shuttles to nearby meal destinations for construction employees.

  ─ Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products used should be certified through a sustainable forestry program.

— Use low-carbon concrete, minimize the amount of concrete used and produce concrete on-site if it is more efficient and lower emitting than transporting ready-mix.

— Include all requirements in applicable bid documents, purchase orders, and contracts, with successful contractors demonstrating the ability to supply the compliant on- or off-road construction equipment for use prior to any ground-disturbing and construction activities.

- **OM Guideline 6.3:** Implement current BAAQMD Table 5-3 Enhanced Best Management Practices for Construction-Related Fugitive Dust Emissions as necessary and as feasible for projects with construction emissions above the BAAQMD thresholds of significance, which may include the following measures:

  — Limit the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities.

  — Install wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.

  — Plant vegetative ground cover (e.g., fast-germinating native grass seed) in disturbed areas as soon as possible and watered appropriately until vegetation is established.

  — Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.

  — Minimize the amount of excavated material or waste materials stored at the site.

  — Hydroseed or apply non-toxic soil stabilizers to construction areas, including previously graded areas, that are inactive for at least 10 calendar days.

- **OM Guideline 6.4:** Implement San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII control measures for construction emissions of respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), which includes the following requirements:

  — All disturbed areas, including storage piles, that are not being actively utilized for construction purposes shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, and covered with a tarp or other suitable cover or vegetative ground cover.

  — All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.

  — All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions through application of water or presoaking.

  — With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition. When materials are transported off-site, all material shall be covered or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container shall be maintained.

  — All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit

the visible dust emissions. Use of blower devices is expressly forbidden. Following the addition of materials to or the removal of materials from the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.

– Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.

– An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles, shall implement measures to prevent carryout and trackout.

- **OM Guideline 6.5:** Implement current SJVAPCD Emission Reduction Clean Air Measures as necessary for projects with construction emissions above the SJVAPCD thresholds of significance, which may include the following measures (note that this is not an exhaustive list):

  – Utilize the cleanest available off-road construction equipment, including the latest Tier diesel or electric equipment (e.g. scrapers, graders, trenchers, tractors, loaders, backhoes, etc.).

  – Utilize electric on-road vehicles and off-road vehicles and equipment to the extent feasible.

  – Limit traffic speeds on unpaved roads to 15 mph.

  – Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.

  – Additional control measures (for projects that are large in area or located near sensitive receptors, or that for any other reason warrant additional emissions reductions):

  – Construct and maintain wind barriers sufficient to limit visible dust to 20% opacity on the construction site.

  – Utilize On-site water sprays or other dust suppression materials.

  – Suspend excavation and grading activity when winds exceed 20 mph.

  – Minimize idling time (e.g., 5-minute maximum).

  – Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

  – Curtail construction during periods of high ambient concentrations of pollutants; this may include ceasing construction activity during the peak hour of vehicular traffic on adjacent roadways.

  – Implement activity management (e.g., rescheduling activities to reduce short-term impacts).

- **OM Guideline 6.6:** Maintain a buffer of at least 250 feet around any non-State Park owned residential properties within the planning area during and after implementation of the General Plan.

- **OM Guideline 6.7:** Conduct an environmental analysis for all construction projects located within 1,000 feet of any residents (on-site or off-site) to assess potential air

quality health impacts of construction-related emissions on the existing residence(s). If any significant impacts (e.g., health risk thresholds) are determined pursuant to the applicable air district thresholds of significance (i.e., BAAQMD or SJVAPCD), the applicant and contractor shall implement all necessary measures to minimize emissions.

OM Goal 8: Manage the SVRA to maintain current aesthetic qualities and reduce visual impacts on surrounding areas that could result from construction, maintenance, and OHV recreation activities.

- **OM Guideline 8.1:** Design any new structures such that they are similar in height and scale to existing structures at the SVRA, and have an architectural style similar to the existing structures. Locate facilities with minimal impact on the viewshed. Utilize California native plant and tree species as necessary to screen new facilities from views.

California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program EIR

Appendix D: Air Quality Emission Estimates and Transportation Energy Calculations

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Carnegie SVRA RMA EIR

Operational Air Quality Emission Estimates and Transportation Energy Calculations
Prepared by: MIG, Inc.
November 2024

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Sheet 1: Emissions Summary

Table 1-1: 2019 Conditions: Annual Exhaust Emission Totals

Construction Phase / Source	AQ Emissions (short tons)					GHG Emissions (Metric tons)			
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O	CO2e
Heavy-Duty Off-Road Equipment	0.0	0.2	0.1	0.0	0.0	10.3	0.0	0.0	10.4
Parks-Owned On- and Off-Road Vehicles	0.0	0.2	0.2	0.0	0.0	97.3	0.0	0.0	99.9
Small, Utility Off-Road Equipment	1.6	5.2	0.2	0.0	0.0	30.9	0.0	0.0	31.1
Worker and Vendor Trips	0.3	0.3	0.3	0.3	0.3	2.9	0.3	0.3	88.8
Total	1.9	5.9	0.9	0.3	0.3	141.4	0.3	0.3	230.1

Table 1-2: 2019 Conditions: Average Daily Exhaust Emission Totals

Construction Phase / Source	Emissions (pounds)				
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)
Heavy-Duty Off-Road Equipment	0.0	1.4	0.9	0.0	0.0
Parks-Owned On- and Off-Road Vehicles	0.2	1.5	1.6	0.0	0.0
Small, Utility Off-Road Equipment	12.1	40.3	1.8	0.1	0.1
Worker and Vendor Trips	2.5	2.5	2.5	2.5	2.5
Total	14.9	45.7	6.8	2.6	2.6

Sheet 2: Off-Road Heavy-Duty Equipment Emissions

Table 2-1: Existing Heavy-Duty Equipment Annual Emissions

Equipment	Annual Runtime	Horsepower	Load Factor	Emission Factor (g/hp-hr)								Annual Emissions (short tons)							
				NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O	NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O
7130 TRACTOR	149.0	130	0.70	2.32	3.7	0.09	0.112	0.112	256.19	0.021	0.004	0.03	0.06	0.00	0.00	0.00	3.83	0.00	0.00
672G GRADER	68.0	255	0.41	1.29	2.6	0.06	0.009	0.009	215.47	0.021	0.004	0.01	0.02	0.00	0.00	0.00	1.69	0.00	0.00
430E BACKHOE	149.0	95	0.37	2.74	3.7	0.09	0.112	0.112	194.32	0.021	0.004	0.02	0.02	0.00	0.00	0.00	1.12	0.00	0.00
480 TRAIL DOZER	7.0	91	0.43	2.74	3.7	0.09	0.112	0.112	226.33	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
750J DOZER	8.0	157	0.43	2.32	3.7	0.09	0.112	0.112	225.68	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00
544K LOADER	167.0	163	0.36	2.15	3.7	0.08	0.009	0.009	190.18	0.021	0.004	0.02	0.04	0.00	0.00	0.00	2.05	0.00	0.00
E18B MINI EX	7.0	15	0.38	4.55	4.1	0.09	0.128	0.128	223.65	0.024	0.005	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
T190 SKID STEER	50.0	61	0.37	2.74	3.7	0.09	0.192	0.192	194.06	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00
500 TRAIL DOZER	0.0	80	0.43	2.74	3.7	0.09	0.192	0.192	226.52	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RENTAL KOBELCO	160.0	175	0.37	2.15	3.7	0.08	0.009	0.009	193.09	0.021	0.004	0.02	0.04	0.00	0.00	0.00	2.21	0.00	0.00
											Total	0.11	0.19	0.00	0.00	0.00	11.35	0.00	0.00

Sheet 3: Off-Road Heavy-Duty Equipment Emission Factors

Table 3-1: Equipment Category and Emissions Assignment (Default; No Runtime Hour Adjustment)

Equipment	Horsepower	Engine Tier	OFFROAD Category	HP_Bin	Load Factor	Default (Zero Hour) Emission Factors							
						ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	130	3	Agricultural - Agricultural Tractors	175	0.70	0.090	3.700	2.320	0.112	0.112	256.1869078	0.021	0.004
672G GRADER	255	4	Construction and Mining - Graders	300	0.41	0.060	2.600	1.290	0.009	0.009	215.47	0.021	0.004
430E BACKHOE	95	3	Construction and Mining - Tractors/Loaders/Backh	100	0.37	0.090	3.700	2.740	0.112	0.112	194.3169133	0.021	0.004
480 TRAIL DOZER	91	3	Construction and Mining - Crawler Tractors	100	0.43	0.090	3.700	2.740	0.112	0.112	226.3270142	0.021	0.004
750J DOZER	157	3	Construction and Mining - Crawler Tractors	175	0.43	0.090	3.700	2.320	0.112	0.112	225.6829174	0.021	0.004
544K LOADER	163	4	Construction and Mining - Rubber Tired Loaders	175	0.36	0.080	3.700	2.150	0.009	0.009	190.1849419	0.021	0.004
E18B MINI EX	15	4	Construction and Mining - Excavators	50	0.38	0.090	4.100	4.550	0.128	0.128	223.6520186	0.024	0.005
T190 SKID STEER	61	3	Construction and Mining - Skid Steer Loaders	75	0.37	0.090	3.700	2.740	0.192	0.192	194.0642185	0.021	0.004
500 TRAIL DOZER	80	3	Construction and Mining - Crawler Tractors	75	0.43	0.090	3.700	2.740	0.192	0.192	226.5213249	0.021	0.004
RENTAL KOBELCO	175	4	Construction and Mining - Tractors/Loaders/Backh	175	0.37	0.080	3.700	2.150	0.009	0.009	193.0941923	0.021	0.004

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

Table 3-2: Equipment Category and Emissions Assignment (Runtime Hour Adjustment)

Equipment	Existing Runtime Hours on Equipment	Adjusted/Deteriorated Emission Factors							
		ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	459.3	0.099	3.700	2.332	0.112	0.112	256.19	0.021	0.004
672G GRADER	1941.5	0.093	2.600	1.323	0.010	0.010	215.47	0.021	0.004
430E BACKHOE	2658.9	0.151	3.700	2.836	0.133	0.133	194.32	0.021	0.004
480 TRAIL DOZER	346.7	0.098	3.700	2.752	0.115	0.115	226.33	0.021	0.004
750J DOZER	4230.4	0.175	3.700	2.434	0.114	0.114	225.68	0.021	0.004
544K LOADER	1672.1	0.113	3.700	2.195	0.010	0.010	190.18	0.021	0.004
E18B MINI EX	2200	0.169	4.100	4.759	0.149	0.149	223.65	0.024	0.005
T190 SKID STEER	2140.9	0.139	3.700	2.817	0.222	0.222	194.06	0.021	0.004
500 TRAIL DOZER	1.4	0.090	3.700	2.740	0.192	0.192	226.52	0.021	0.004
RENTAL KOBELCO	4230.4	0.165	3.700	2.264	0.011	0.011	193.09	0.021	0.004

Sheet 4: U.S. EPA Tier III and Tier IV Emission Factors

Table 4-1: U.S. EPA Tier III Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	--	--	--	--	--
50≤hp<75	75	0.09	3.7	2.74	0.192	0.192
75≤hp<100	100	0.09	3.7	2.74	0.112	0.112
100≤hp<175	175	0.09	3.7	2.32	0.112	0.112
175≤hp<300	300	0.09	2.6	2.32	0.088	0.088
300≤hp<600	600	0.09	2.6	2.32	0.088	0.088

CARB 2017 Table D-9 (pg. 235); and CalEEMod v2022.4.0 for CO.

Table 4-2: U.S EPA Tier III Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	--	--	--
50≤hp<75	75	0.000023	0.000036	0.0000141
75≤hp<100	100	0.000023	0.000036	0.0000080
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000023	0.000030	0.0000046
300≤hp<600	600	0.000023	0.000030	0.0000044

Table 4-3: U.S. EPA Tier IV (Interim) Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	0.09	4.1	4.55	0.128	0.128
50≤hp<75	75	0.09	3.7	2.74	0.112	0.112
75≤hp<100	100	0.08	3.7	2.15	0.009	0.009
100≤hp<175	175	0.08	3.7	2.15	0.009	0.009
175≤hp<300	300	0.06	2.6	1.29	0.009	0.009
300≤hp<600	600	0.06	2.6	1.29	0.009	0.009

CARB 2017 Table D-9 (pg. 235); EFs for Tier IV (Phase-In or Alt. NOx) Used Where Option Exists and CalEEMod v2022.4.0 for CO.

Table 4-4: U.S. EPA Tier IV (Interim) Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	0.000036	0.000095	0.0000096
50≤hp<75	75	0.000023	0.000036	0.0000080
75≤hp<100	100	0.000021	0.000027	0.0000009
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000017	0.000017	0.0000003
300≤hp<600	600	0.000017	0.000017	0.0000003

Sheet 5: On-Site, On-Road Vehicles Emission Factors and Emissions

Table 5-1: 2019 On-Road Vehicle Emission Factor Assignment

Make	Model	Gross Vehicle Weight Rating (lbs)	Vehicle Class	Fuel	Emission Factors (tons / mi)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 OPERATOR	16,500	MHDT	Diesel	2.95177E-07	9.75697E-07	5.88463E-06	1.44396E-07	1.38149E-07	0.001346682	1.37102E-08	2.11979E-07
INTERNATIONAL	TRANSPORT 9300	50,000	HHDT	Diesel	1.90897E-07	1.09968E-06	5.49052E-06	9.70054E-08	9.2809E-08	0.001941087	8.86668E-09	3.05544E-07
FORD	F350 RESOURCES	10,100 to 14,000	LHDT2	Diesel	2.29935E-07	6.46878E-07	2.40381E-06	5.03049E-08	4.81287E-08	0.000871754	1.068E-08	1.37222E-07
CHEVROLET	1500 ELIZ	6,700 to 7,300	MDV	Gasoline	3.12272E-07	2.93213E-06	3.62218E-07	2.36115E-09	2.17242E-09	0.000540153	3.32521E-08	2.40673E-08
FORD	F350 r FLATBED	10,100 to 14,000	LHDT2	Gasoline	4.39437E-07	3.19795E-06	6.71947E-07	2.39678E-09	2.20375E-09	0.001192808	3.66614E-08	4.39588E-08
RAM	2500 DAVID	10000	LHDT1	Gasoline	5.192E-07	3.61201E-06	7.43895E-07	2.76602E-09	2.54647E-09	0.001085672	4.29073E-08	4.73319E-08
INTERNATIONAL	WATER TRUCK	52000	HHDT	Diesel	1.90897E-07	1.09968E-06	5.49052E-06	9.70054E-08	9.2809E-08	0.001941087	8.86668E-09	3.05544E-07
FORD	F350 JOHN M	10,100 to 14,000	LHDT2	Gasoline	4.39437E-07	3.19795E-06	6.71947E-07	2.39678E-09	2.20375E-09	0.001192808	3.66614E-08	4.39588E-08
FORD	F250 ERIC	10,000 to 11,400	LHDT2	Gasoline	4.39437E-07	3.19795E-06	6.71947E-07	2.39678E-09	2.20375E-09	0.001192808	3.66614E-08	4.39588E-08
FORD	F250 JESSE/MIKE	10,000 to 11,400	LHDT2	Gasoline	4.39437E-07	3.19795E-06	6.71947E-07	2.39678E-09	2.20375E-09	0.001192808	3.66614E-08	4.39588E-08
INTERNATIONAL	DUMPTRUCK		HHDT	Diesel	1.90897E-07	1.09968E-06	5.49052E-06	9.70054E-08	9.2809E-08	0.001941087	8.86668E-09	3.05544E-07
FORD	F250 ROBERT	10,000 to 11,400	LHDT2	Gasoline	4.39437E-07	3.19795E-06	6.71947E-07	2.39678E-09	2.20375E-09	0.001192808	3.66614E-08	4.39588E-08

Table 5-2: 2019 On-Road Vehicle Emission Calculations

Make	Model	Annual VMT	Vehicle Class	Fuel	Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 (OPERATOR)	10030	MHDT	Diesel	0.002960625	0.009786245	0.059022834	0.00144829	0.001385637	13.50721678	0.000137513	0.002126154
INTERNATIONAL	TRANSPORT 9300	5231	HHDT	Diesel	0.000998583	0.005752402	0.028720917	0.000507435	0.000485484	10.15382653	4.63816E-05	0.001598301
FORD	F350 (RESOURCES)	11674	LHDT2	Diesel	0.002684257	0.007551654	0.02806206	0.000587259	0.000561854	10.17685284	0.000124679	0.001601926
CHEVROLET	1500 (ELIZ)	8944.5	MDV	Gasoline	0.002793114	0.026226466	0.003239856	2.11193E-05	1.94312E-05	4.831398293	0.000297424	0.00021527
FORD	F350 r FLATBED	1624	LHDT2	Gasoline	0.000713645	0.005193477	0.001091242	3.89236E-06	3.57888E-06	1.937119742	5.95381E-05	7.13892E-05
RAM	2500 (DAVID)	10158	LHDT1	Gasoline	0.005274036	0.036690831	0.007556488	2.80972E-05	2.58671E-05	11.02825438	0.000435852	0.000480797
INTERNATIONAL	WATER TRUCK	1382	HHDT	Diesel	0.00026382	0.001519751	0.007587901	0.000134061	0.000128262	2.682582347	1.22537E-05	0.000422262
FORD	F350 (JOHN M)	8588	LHDT2	Gasoline	0.003773882	0.027464026	0.005770681	2.05835E-05	1.89258E-05	10.24383272	0.000314848	0.000377519
FORD	F250 (ROBERT)	6797.5	LHDT2	Gasoline	0.002987071	0.02173809	0.00456756	1.62921E-05	1.498E-05	8.108110497	0.000249206	0.00029881
FORD	F250 (JESSE/MIKE)	4684	LHDT2	Gasoline	0.002058322	0.014979215	0.0031474	1.12265E-05	1.03223E-05	5.587111374	0.000171722	0.000205903
INTERNATIONAL	DUMPTRUCK	8572	HHDT	Diesel	0.00163637	0.009426418	0.047064749	0.00083153	0.000795559	16.63899847	7.60051E-05	0.002619124
FORD	F250 (KEITH)	10363	LHDT2	Gasoline	0.004553883	0.033140394	0.006963387	2.48378E-05	2.28374E-05	12.36106643	0.000379922	0.000455546
				Total	0.030697608	0.19946897	0.202795075	0.003634625	0.003472739	107.2563704	0.002305344	0.010473

Sheet 6: On-Site Small Equipment Emission Factors and Emissions

Table 6-1: On-site Small Equipment Category and Emission Factor Assignment

Make	Model	Horsepower	Fuel	OFFROAD Category	HP_Bin	Load Factor	Emission Factors							
							ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
GATOR 1*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	18.648	81.654	72.908	3.811	3.506	10179.997	0.021	0.004
GATOR 2*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	18.648	81.654	72.908	3.811	3.506	10179.997	0.021	0.004
KUBOTA 1	RTV-X1100CWL-A	24	Diesel	Agricultural - ATVs	25	0.40	1.132	3.258	2.396	0.158	0.145	284.807	0.021	0.004
KUBOTA 2*	RTV-X1100CWL-A	24	Diesel	Agricultural - ATVs	25	1.00	18.648	81.654	72.908	3.811	3.506	10179.997	0.021	0.004
Gator 855*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	18.648	81.654	72.908	3.811	3.506	10179.997	0.021	0.004
Canycom 1	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.251	1.571	1.511	0.096	0.088	206.916	0.018	0.004
Canycom 2	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.251	1.571	1.511	0.096	0.088	206.916	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Gerenac Generator	GP8000E	13	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EU2200I	3.6	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EU2200I	3.6	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EG 2500	5.5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Ryobi Generator	RYI2322VNM	5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Ryobi Generator	RYI2322VNM	5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Echo Generator	EGI-3600LN	7	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EM6500SX	11.7	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Jumping Jack	MTX-70	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Jumping Jack	MTR-40	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Vibroplate	WP 1550	4.15	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
John Deere Mower	727A	23	Gasoline	Lawn and Garden - Misc - Rear Engine Rid	Aggregate	1.00	52.758	2357.741	25.170	0.367	0.278	4990.505	0.367	0.278

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

* - Emission factors for Gator 1, Gator 2, Kubota 2, Gator 855, and John Deere Mower (727A) are based on emissions per gallon of fuel consumed (g / gal).

Table 6-2: Small Equipment Annual Emissions Estimates

Make	Model	Annual Runtime	Horsepower	Load Factor	Annual Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
GATOR 1*	XUV 855D	321	24.6	1.00	0.006598574	0.028892807	0.025798045	0.001348396	0.001240525	3.602112761	7.43069E-06	1.41537E-06
GATOR 2*	XUV 855D	156.75	24.6	1.00	0.003222201	0.014108871	0.012597644	0.000658446	0.00060577	1.758975624	3.62854E-06	6.9115E-07
KUBOTA 1	RTV-X1100CWL-A	2593.8	24	0.40	0.031058417	0.089415463	0.065773341	0.004330083	0.003983677	7.817418136	0.00057641	0.000109792
KUBOTA 2*	RTV-X1100CWL-A	840	24	1.00	0.02	0.08	0.07	0.00	0.00	9.43	0.00	0.00
Gator 855*	XUV 855D	73	24.6	1.00	0.001490332	0.006525634	0.005826661	0.000304544	0.000280181	0.813561293	1.67827E-06	3.19671E-07
Canycom 1	SC75	77	22.1	0.36	0.000169601	0.001061006	0.001020041	6.49203E-05	5.97267E-05	0.139728179	1.21552E-05	2.70116E-06
Canycom 2	SC75	47.1	22.1	0.36	0.000103743	0.000649005	0.000623947	3.9711E-05	3.65341E-05	0.085470094	7.4352E-06	1.65227E-06
Dewalt Generator	DXGNR4000	63.8	8	0.68	0.258238824	0.09896394	0.001290066	0.000108653	8.22551E-05	0.164298947	6.88647E-06	1.53033E-06
Dewalt Generator	DXGNR4000	52.6	8	0.68	0.212905363	0.08159096	0.001063596	8.95793E-05	6.78153E-05	0.135456499	5.67756E-06	1.26168E-06
Dewalt Generator	DXGNR4000	6.2	8	0.68	0.025095309	0.009617185	0.000125367	1.05588E-05	7.99344E-06	0.015966355	6.69218E-07	1.48715E-07
Gerenac Generator	GP8000E	18.9	13	0.68	0.124312851	0.047639969	0.000621021	5.23043E-05	3.95965E-05	0.079091402	3.31506E-06	7.3668E-07
Honda Generator	EU2200I	35.4	3.6	0.68	0.064433218	0.024692511	0.000321884	2.71101E-05	2.05235E-05	0.040994261	1.71824E-06	3.81832E-07
Honda Generator	EU2200I	35.4	3.6	0.68	0.064433218	0.024692511	0.000321884	2.71101E-05	2.05235E-05	0.040994261	1.71824E-06	3.81832E-07
Honda Generator	EG 2500	35.4	5.5	0.68	0.098439638	0.03772467	0.000491768	4.14182E-05	3.13553E-05	0.062630121	2.6251E-06	5.83355E-07
Ryobi Generator	RYI2322VNM	35.4	5	0.68	0.08949058	0.034295154	0.000447062	3.76529E-05	2.85048E-05	0.056936474	2.38645E-06	5.30322E-07
Ryobi Generator	RYI2322VNM	35.4	5	0.68	0.08949058	0.034295154	0.000447062	3.76529E-05	2.85048E-05	0.056936474	2.38645E-06	5.30322E-07
Echo Generator	EGI-3600LN	35.4	7	0.68	0.125286812	0.048013216	0.000625887	5.2714E-05	3.99068E-05	0.079711064	3.34103E-06	7.42451E-07
Honda Generator	EM6500SX	35.4	11.7	0.68	0.209407957	0.080250661	0.001046125	8.81078E-05	6.67013E-05	0.133231349	5.58429E-06	1.24095E-06
Jumping Jack	MTX-70	9	2.8	0.55	0.015189037	0.003503699	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Jumping Jack	MTR-40	9	2.8	0.55	0.015189037	0.003503699	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Vibroplate	WP 1550	9	4.15	0.55	0.022512323	0.005192983	0.000109938	5.31234E-05	4.01483E-05	0.009724369	4.07596E-07	9.0577E-08
John Deere Mower*	727A	1725.1	23	1.00	0.100324667	4.483477964	0.04786322	0.000697755	0.000527844	9.489938566	0.000697755	0.000527844
				Total	1.574659576	5.233714407	0.234071813	0.011670037	0.010508495	34.02238774	0.001363204	0.000656401

Note: * - Assumes XUVs, RTVs, and mower consume one gallon of gas per hour runtime.

Sheet 7: Off-site Worker and Vendor Emission Factors

Table 7-1: Worker and Vendor Trips: Emissions Assignment

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emission Factors (tons / mi)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	1.833E-07	1.833E-07	1.833E-07	1.833E-07	1.833E-07	1.833E-07	1.833E-07	1.833E-07
					LDT1	Agg	0.25	5.54E-07	5.54E-07	5.54E-07	5.54E-07	5.54E-07	5.54E-07	5.54E-07	5.54E-07
					LDT2	Agg	0.25	2.211E-07	2.211E-07	2.211E-07	2.211E-07	2.211E-07	2.211E-07	2.211E-07	2.211E-07
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	60	1140	HHDT	Diesel	0.5	1.909E-07	1.1E-06	5.491E-06	9.701E-08	9.281E-08	0.0019411	8.867E-09	3.055E-07
Harkrader and Sons Trucking	Sand	6	60	360	HHDT	Diesel	0.5	1.909E-07	1.1E-06	5.491E-06	9.701E-08	9.281E-08	0.0019411	8.867E-09	3.055E-07

Table 7-2: Worker and Vendor Trips: Emissions Calculations

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Annual Emissions (tons)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	0.0616859	0.0616859	0.0616859	0.0616859	0.0616859	0.0616859	0.0616859	0.0616859
					LDT1	Agg	0.25	0.1864786	0.1864786	0.1864786	0.1864786	0.1864786	0.1864786	0.1864786	0.1864786
					LDT2	Agg	0.25	0.074406	0.074406	0.074406	0.074406	0.074406	0.074406	0.074406	0.074406
							Worker Sub-Total	**0.3225706**	**0.3225706**	**0.3225706**	**0.3225706**	**0.3225706**	**0.3225706**	**0.3225706**	**0.3225706**
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	60	1140	HHDT	Diesel	0.5	0.0002176	0.0012536	0.0062592	0.0001106	0.0001058	2.2128393	1.011E-05	0.0003483
Harkrader and Sons Trucking	Sand	6	60	360	HHDT	Diesel	0.5	6.872E-05	0.0003959	0.0019766	3.492E-05	3.341E-05	0.6987913	3.192E-06	0.00011
							Vendor Sub-Total	**0.0002863**	**0.0016495**	**0.0082358**	**0.0001455**	**0.0001392**	**2.9116306**	**1.33E-05**	**0.0004583**
							Total	**0.3228569**	**0.3242201**	**0.3308063**	**0.3227161**	**0.3227098**	**3.2342012**	**0.3225839**	**0.3230289**

Sheet 8: OFFROAD Output

Model Output: OFFROAD2021 (v1.0.7) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2019
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horse

Region	Calendar Year	Vehicle Category	Model Year
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2019	Agricultural - ATVs	Aggregate
San Joaquin	2019	Agricultural - ATVs	Aggregate
San Joaquin	2019	Agricultural - ATVs	Aggregate
San Joaquin	2019	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2019	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2019	Agricultural - Balers (Self Propelled)	Aggregate
San Joaquin	2019	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2019	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2019	Agricultural - Construction Equipment	Aggregate
San Joaquin	2019	Agricultural - Construction Equipment	Aggregate
San Joaquin	2019	Agricultural - Construction Equipment	Aggregate
San Joaquin	2019	Agricultural - Construction Equipment	Aggregate
San Joaquin	2019	Agricultural - Construction Equipment	Aggregate
San Joaquin	2019	Agricultural - Forklifts	Aggregate
San Joaquin	2019	Agricultural - Forklifts	Aggregate
San Joaquin	2019	Agricultural - Forklifts	Aggregate
San Joaquin	2019	Agricultural - Forklifts	Aggregate
San Joaquin	2019	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2019	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2019	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Nut Harvester	Aggregate
San Joaquin	2019	Agricultural - Other Harvesters	Aggregate
San Joaquin	2019	Agricultural - Other Harvesters	Aggregate
San Joaquin	2019	Agricultural - Other Harvesters	Aggregate
San Joaquin	2019	Agricultural - Other Harvesters	Aggregate

San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2019	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2019	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2019	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2019	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2019	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2019	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Cranes	Aggregate
San Joaquin	2019	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Graders	Aggregate
San Joaquin	2019	Construction and Mining - Graders	Aggregate
San Joaquin	2019	Construction and Mining - Graders	Aggregate
San Joaquin	2019	Construction and Mining - Graders	Aggregate
San Joaquin	2019	Construction and Mining - Graders	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Dumpers/Tenders	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Excavators	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Other	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Paving Equipment	Aggregate

San Joaquin	2019	Construction and Mining - Misc - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Signal Boards	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Misc - Trenchers	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2019	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2019	Construction and Mining - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Pavers	Aggregate
San Joaquin	2019	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Rollers	Aggregate
San Joaquin	2019	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2019	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2019	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2019	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2019	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Scrapers	Aggregate

San Joaquin	2019	Construction and Mining - Scrapers	Aggregate
San Joaquin	2019	Construction and Mining - Scrapers	Aggregate
San Joaquin	2019	Construction and Mining - Scrapers	Aggregate
San Joaquin	2019	Construction and Mining - Scrapers	Aggregate
San Joaquin	2019	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2019	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2019	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2019	Construction and Mining - Trenchers	Aggregate
San Joaquin	2019	Construction and Mining - Trenchers	Aggregate
San Joaquin	2019	Construction and Mining - Trenchers	Aggregate
San Joaquin	2019	Construction and Mining - Trenchers	Aggregate
San Joaquin	2019	Construction and Mining - Trenchers	Aggregate
San Joaquin	2019	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate
San Joaquin	2019	Agricultural - ATVs	Aggregate

:power-hours

Horsepowe	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd
25	Diesel	0.005024	0.006079	0.007234	0.0175	0.012873	1.529966	0.000847
50	Diesel	0.113719	0.1376	0.163755	0.411154	0.333973	37.02098	0.030234
75	Diesel	0.06305	0.07629	0.090792	0.299808	0.51379	41.21754	0.034058
100	Diesel	0.098399	0.119063	0.141695	0.64471	0.873689	100.8049	0.060295
175	Diesel	0.061761	0.074731	0.088936	0.522849	0.686879	86.02175	0.031473
300	Diesel	0.033382	0.040392	0.04807	0.179301	0.369676	68.77038	0.016387
25	Diesel	0.001874	0.002267	0.002698	0.009926	0.008863	1.237537	0.000463
50	Diesel	0.003076	0.003722	0.00443	0.019407	0.018304	2.683274	0.000964
175	Diesel	6.23E-05	7.53E-05	8.97E-05	0.000845	0.000762	0.153847	2.90E-05
175	Diesel	0.001565	0.001894	0.002254	0.011939	0.01739	1.902604	0.000824
300	Diesel	0.000176	0.000213	0.000254	0.000903	0.001973	0.279483	8.99E-05
75	Diesel	7.32E-05	8.86E-05	0.000105	0.000463	0.000651	0.072048	3.70E-05
175	Diesel	0.000707	0.000855	0.001018	0.005822	0.007877	0.951958	0.000354
300	Diesel	0.001301	0.001574	0.001873	0.006419	0.014348	2.033788	0.00066
50	Diesel	0.000172	0.000208	0.000247	0.000719	0.000595	0.078986	4.51E-05
75	Diesel	0.000501	0.000606	0.000722	0.003166	0.004455	0.4931	0.000253
100	Diesel	0.002223	0.00269	0.003201	0.013146	0.018983	1.988782	0.001355
175	Diesel	0.005986	0.007243	0.00862	0.045233	0.070037	7.663808	0.002953
300	Diesel	0.000995	0.001204	0.001433	0.004614	0.011488	1.345981	0.000521
50	Diesel	0.002449	0.002963	0.003526	0.010181	0.008702	1.103894	0.000659
75	Diesel	0.006728	0.008141	0.009689	0.042337	0.059693	6.594527	0.003419
100	Diesel	0.002251	0.002724	0.003241	0.01465	0.019398	2.271041	0.001338
175	Diesel	0.000429	0.00052	0.000618	0.003536	0.004769	0.577122	0.000216
75	Diesel	2.76E-05	3.34E-05	3.97E-05	0.000174	0.000245	0.027158	1.39E-05
175	Diesel	0.000408	0.000493	0.000587	0.003354	0.004397	0.53784	0.000207
300	Diesel	0.000694	0.000839	0.000999	0.003557	0.00777	1.100682	0.000354
25	Diesel	0.000664	0.000804	0.000956	0.002779	0.00235	0.305425	0.000133
50	Diesel	0.002937	0.003554	0.00423	0.011796	0.009672	1.198769	0.000786
75	Diesel	0.001115	0.001349	0.001605	0.007059	0.00988	1.095592	0.00057
100	Diesel	0.009226	0.011163	0.013285	0.056263	0.078691	8.498855	0.005701
175	Diesel	0.004162	0.005036	0.005993	0.032836	0.046313	5.29637	0.002145
300	Diesel	0.002761	0.003341	0.003976	0.012934	0.030253	3.590996	0.001447
75	Diesel	0.000943	0.001141	0.001358	0.005956	0.008383	0.927772	0.000476
100	Diesel	0.004229	0.005118	0.00609	0.026879	0.036299	4.131644	0.002552
175	Diesel	0.004258	0.005152	0.006132	0.033903	0.04741	5.486626	0.002182
300	Diesel	0.001519	0.001839	0.002188	0.007645	0.016889	2.393173	0.000773

25	Diesel	2.33E-05	2.82E-05	3.36E-05	9.75E-05	8.25E-05	0.010715	4.66E-06
50	Diesel	0.001127	0.001363	0.001622	0.004714	0.00392	0.516363	0.000297
75	Diesel	0.018512	0.0224	0.026657	0.104253	0.156448	15.37211	0.010653
100	Diesel	0.000898	0.001087	0.001293	0.00574	0.007715	0.884287	0.00054
175	Diesel	0.002856	0.003456	0.004113	0.022881	0.031791	3.708058	0.001459
300	Diesel	0.002503	0.003029	0.003604	0.011882	0.027512	3.356328	0.001307
50	Diesel	0.00083	0.001004	0.001195	0.003472	0.002876	0.381604	0.000218
75	Diesel	0.00054	0.000653	0.000777	0.003413	0.004797	0.531092	0.000273
100	Diesel	0.001997	0.002417	0.002876	0.013178	0.017216	2.042349	0.001191
175	Diesel	0.000454	0.00055	0.000654	0.003515	0.005052	0.562846	0.000237
300	Diesel	0.000946	0.001144	0.001362	0.00473	0.010487	1.484378	0.000481
50	Diesel	6.42E-05	7.77E-05	9.24E-05	0.000484	0.000508	0.064059	3.26E-05
75	Diesel	3.78E-05	4.58E-05	5.45E-05	0.000668	0.000743	0.102431	3.52E-05
100	Diesel	0.000132	0.00016	0.00019	0.001909	0.001817	0.296413	0.000103
175	Diesel	0.000132	0.000159	0.00019	0.002577	0.001769	0.463523	7.73E-05
300	Diesel	0.000155	0.000187	0.000223	0.001363	0.002498	0.663647	7.11E-05
25	Diesel	1.85E-06	2.24E-06	2.67E-06	1.05E-05	9.84E-06	0.001229	7.30E-07
50	Diesel	6.00E-05	7.26E-05	8.64E-05	0.000255	0.000208	0.01992	2.18E-05
75	Diesel	2.04E-05	2.46E-05	2.93E-05	8.50E-05	0.000187	0.00988	1.72E-05
100	Diesel	0.000547	0.000662	0.000788	0.003606	0.005789	0.447705	0.000416
175	Diesel	0.001251	0.001514	0.001802	0.009463	0.015681	1.378724	0.000848
300	Diesel	0.001615	0.001954	0.002325	0.008935	0.023531	2.42661	0.000989
50	Diesel	0.000206	0.000249	0.000297	0.00085	0.000656	0.064305	7.17E-05
75	Diesel	7.07E-05	8.55E-05	0.000102	0.000277	0.000678	0.023097	4.97E-05
100	Diesel	0.003287	0.003977	0.004733	0.021662	0.033624	2.829664	0.002819
175	Diesel	0.002524	0.003054	0.003635	0.019956	0.031794	3.103984	0.00177
300	Diesel	0.002263	0.002739	0.003259	0.014285	0.034557	3.309467	0.001383
25	Diesel	1.79E-06	2.16E-06	2.57E-06	6.07E-06	4.13E-06	0.000319	5.75E-07
50	Diesel	0.002317	0.002803	0.003336	0.020225	0.018474	2.578729	0.001101
75	Diesel	9.43E-05	0.000114	0.000136	0.001408	0.001573	0.200742	9.57E-05
100	Diesel	0.001603	0.00194	0.002309	0.021142	0.019814	3.146646	0.001239
175	Diesel	0.002755	0.003334	0.003968	0.041402	0.034209	7.06807	0.001657
300	Diesel	0.002741	0.003317	0.003947	0.019885	0.040678	9.13921	0.001235
50	Diesel	6.57E-05	7.95E-05	9.46E-05	0.00025	0.000179	0.016557	2.22E-05
75	Diesel	2.35E-05	2.84E-05	3.38E-05	0.00019	0.00024	0.025758	1.67E-05
100	Diesel	0.000669	0.000809	0.000963	0.003293	0.006281	0.355004	0.000523
175	Diesel	0.004053	0.004904	0.005837	0.029636	0.048414	4.319835	0.002718
300	Diesel	0.005	0.00605	0.0072	0.024118	0.077178	9.092025	0.002567
25	Diesel	2.18E-05	2.62E-05	3.13E-05	8.94E-05	0.000165	0.000239	5.55E-06
25	Diesel	6.55E-06	7.88E-06	9.42E-06	2.6E-05	4.82E-05	7.07E-05	1.89E-06
25	Diesel	4.23E-06	5.09E-06	6.08E-06	1.74E-05	3.21E-05	4.65E-05	1.08E-06
50	Diesel	1.74E-05	2.07E-05	2.50E-05	0.000129	0.000121	0.016271	6.77E-06
25	Diesel	3.06E-06	3.68E-06	4.40E-06	1.26E-05	2.33E-05	3.36E-05	8.02E-07
25	Diesel	2.19E-05	2.63E-05	3.15E-05	8.99E-05	0.000166	0.000241	5.60E-06
25	Diesel	1.13E-05	1.36E-05	1.63E-05	4.65E-05	8.60E-05	0.000124	2.89E-06
25	Diesel	5.75E-06	6.92E-06	8.27E-06	2.36E-05	4.38E-05	6.31E-05	1.52E-06
25	Diesel	9.78E-06	1.18E-05	1.41E-05	4.01E-05	7.43E-05	0.000107	2.49E-06

25	Diesel	6.90E-05	8.29E-05	9.91E-05	0.000283	0.000524	0.000758	1.76E-05
25	Diesel	3.57E-06	4.29E-06	5.13E-06	1.46E-05	2.71E-05	3.92E-05	9.12E-07
50	Diesel	7.58E-06	9.02E-06	1.09E-05	5.59E-05	5.27E-05	0.00707	2.91E-06
25	Diesel	0.001164	0.001401	0.001674	0.004725	0.008769	0.012708	0.000315
25	Diesel	0.000104	0.000126	0.00015	0.000428	0.000793	0.001146	2.71E-05
25	Diesel	0.000102	0.000122	0.000146	0.000418	0.000774	0.001119	2.60E-05
50	Diesel	0.001581	0.001913	0.002276	0.010094	0.008657	1.069582	0.000665
75	Diesel	0.000384	0.000464	0.000553	0.004812	0.004568	0.701226	0.000283
100	Diesel	0.000615	0.000744	0.000885	0.004912	0.006732	0.654512	0.000563
175	Diesel	0.000541	0.000655	0.000779	0.007112	0.00712	1.163898	0.000353
300	Diesel	0.000432	0.000523	0.000623	0.002735	0.006494	1.043908	0.000223
50	Diesel	0.000133	0.000161	0.000192	0.001	0.000846	0.098338	6.43E-05
75	Diesel	1.37E-05	1.66E-05	1.97E-05	0.000224	0.000133	0.030928	5.35E-06
100	Diesel	7.17E-05	8.67E-05	0.000103	0.000589	0.000723	0.076129	6.10E-05
175	Diesel	0.001251	0.001514	0.001801	0.01553	0.013247	2.442091	0.000701
300	Diesel	0.002411	0.002918	0.003472	0.013883	0.028367	4.980883	0.001131
50	Diesel	0.000141	0.000171	0.000203	0.000681	0.000592	0.070713	5.25E-05
75	Diesel	0.000199	0.000241	0.000287	0.001192	0.001877	0.163518	0.000168
100	Diesel	0.000317	0.000384	0.000457	0.003462	0.00404	0.512828	0.000268
175	Diesel	0.000455	0.000551	0.000655	0.005399	0.005914	0.93999	0.000295
300	Diesel	0.000217	0.000263	0.000313	0.001445	0.004264	0.74197	0.000121
50	Diesel	8.83E-05	0.000107	0.000127	0.000668	0.000643	0.088027	4.09E-05
75	Diesel	1.70E-05	2.05E-05	2.44E-05	0.00011	0.000179	0.013145	1.36E-05
100	Diesel	0.000223	0.00027	0.000321	0.002447	0.002627	0.365621	0.000178
175	Diesel	0.000177	0.000214	0.000255	0.00233	0.002187	0.398609	0.000117
300	Diesel	0.000103	0.000125	0.000149	0.00064	0.00169	0.28726	5.91E-05
50	Diesel	0.001987	0.002404	0.002861	0.011823	0.011493	1.451897	0.000864
75	Diesel	3.52E-05	4.26E-05	5.07E-05	0.000141	0.000347	0.012336	2.42E-05
100	Diesel	0.001463	0.001771	0.002107	0.015125	0.01759	2.256329	0.001155
175	Diesel	0.00085	0.001029	0.001224	0.013067	0.012028	2.346316	0.000552
300	Diesel	0.000148	0.00018	0.000214	0.001154	0.002371	0.388382	8.19E-05
50	Diesel	0.000105	0.000127	0.000151	0.000587	0.000572	0.073596	4.12E-05
75	Diesel	5.95E-06	7.19E-06	8.56E-06	2.42E-05	5.97E-05	0.002177	4.02E-06
100	Diesel	0.001432	0.001732	0.002062	0.034728	0.025795	5.678341	0.000937
175	Diesel	0.000702	0.00085	0.001011	0.007929	0.008017	1.366973	0.000534
300	Diesel	1.57E-05	1.90E-05	2.27E-05	0.000172	0.000281	0.093286	6.26E-06
50	Diesel	0.000111	0.000134	0.00016	0.000643	0.000494	0.064429	4.12E-05
75	Diesel	0.000109	0.000132	0.000157	0.00052	0.001042	0.053896	8.34E-05
100	Diesel	0.000333	0.000403	0.000479	0.001979	0.003157	0.241752	0.000279
175	Diesel	0.000315	0.000381	0.000453	0.001988	0.003752	0.263971	0.000217
300	Diesel	0.00032	0.000387	0.000461	0.001971	0.004168	0.292659	0.000202
50	Diesel	0.000456	0.000552	0.000657	0.002406	0.001873	0.201781	0.000178
100	Diesel	0.004637	0.005611	0.006678	0.037555	0.047239	4.902698	0.003793
175	Diesel	0.007426	0.008985	0.010693	0.074967	0.085586	11.65826	0.004731
300	Diesel	0.008139	0.009848	0.011721	0.043739	0.118025	16.8874	0.003974
50	Diesel	1.92E-05	2.32E-05	2.77E-05	6.56E-05	4.75E-05	0.004106	6.51E-06

75	Diesel	5.32E-05	6.44E-05	7.66E-05	0.000242	0.000511	0.026901	4.18E-05
100	Diesel	0.000178	0.000216	0.000257	0.001388	0.002154	0.18231	0.000163
175	Diesel	0.001758	0.002127	0.002531	0.014738	0.02195	2.227611	0.001181
300	Diesel	0.002027	0.002453	0.002919	0.010928	0.028533	2.558438	0.001256
50	Diesel	0.000689	0.000833	0.000992	0.00698	0.007	1.098597	0.000287
75	Diesel	0.001781	0.002155	0.002565	0.035346	0.028563	5.683031	0.001293
100	Diesel	4.32E-05	5.23E-05	6.22E-05	0.000935	0.000838	0.145547	5.42E-05
175	Diesel	1.05E-05	1.28E-05	1.52E-05	0.000214	0.000159	0.039394	6.92E-06
300	Diesel	5.57E-06	6.74E-06	8.02E-06	6.75E-05	8.47E-05	0.036582	2.39E-06
50	Diesel	9.01E-06	1.09E-05	1.30E-05	6.84E-05	7.39E-05	0.009871	4.26E-06
75	Diesel	6.32E-06	7.65E-06	9.11E-06	5.30E-05	8.99E-05	0.007539	5.66E-06
100	Diesel	2.82E-05	3.41E-05	4.06E-05	0.000393	0.000385	0.061052	2.07E-05
175	Diesel	3.29E-05	3.99E-05	4.74E-05	0.000307	0.000435	0.052187	2.37E-05
300	Diesel	4.01E-05	4.85E-05	5.78E-05	0.000299	0.000764	0.111882	2.40E-05
50	Diesel	0.002873	0.003476	0.004137	0.019658	0.017414	2.175922	0.001247
75	Diesel	0.001031	0.001247	0.001484	0.004148	0.009804	0.404438	0.000781
100	Diesel	0.018979	0.022965	0.02733	0.235328	0.23328	34.5049	0.015447
175	Diesel	0.002588	0.003131	0.003727	0.036144	0.032237	6.039825	0.001622
300	Diesel	0.001443	0.001746	0.002078	0.008861	0.022345	3.641767	0.000737
50	Diesel	0.001032	0.001249	0.001486	0.006396	0.006256	0.769393	0.000493
75	Diesel	8.03E-05	9.71E-05	0.000116	0.000454	0.000814	0.052923	5.58E-05
100	Diesel	0.000468	0.000567	0.000674	0.003579	0.005172	0.503934	0.000397
175	Diesel	8.29E-05	0.0001	0.000119	0.000729	0.001081	0.113782	5.55E-05
300	Diesel	0.000152	0.000183	0.000218	0.00084	0.0023	0.263361	9.19E-05
Aggregate	Gasoline	0.089202	0.090107	0.098191	4.026858	0.042989	8.523436	0.000627

25	Diesel	0.001874	0.002267	0.002698	0.009926	0.008863	1.237537	0.000463

PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hp	Total_Populati	Horsepowe
0.00078	1.38E-05	1.25E-05	49764.84808	31956.73144	129.7123776	1778768
0.027815	0.000335	0.000303	1204172.925	136462.5474	1569.244232	43041312
0.031334	0.000375	0.000337	1340673.479	146487.9116	1179.755825	47920315
0.055472	0.000919	0.000825	3278857.034	148943.9258	1703.003074	1.17E+08
0.028955	0.000785	0.000704	2798009.691	192536.2165	1015.207455	1.11E+08
0.015076	0.000628	0.000563	2236878.539	123387.862	326.4357801	88885951
0.000426	1.13E-05	1.01E-05	40253.07935	40444.06364	114.7326225	1726541
0.000887	2.45E-05	2.20E-05	87278.22754	37012.67041	161.5052306	3743552
2.67E-05	1.41E-06	1.26E-06	5004.15983	4024.771222	2.410095387	238618
0.000758	1.74E-05	1.56E-05	61885.56398	27911.28344	17.84710458	2360757
8.27E-05	2.55E-06	2.29E-06	9090.675169	10029.99547	2.282693043	346783.2
3.40E-05	6.57E-07	5.90E-07	2343.49944	1947.008809	1.3426777	80414.2
0.000326	8.69E-06	7.79E-06	30964.10925	2819.471394	11.52324548	1330980
0.000607	1.86E-05	1.66E-05	66152.54622	14501.71562	12.2707705	2843541
4.15E-05	7.17E-07	6.46E-07	2569.164531	4565.496109	2.575946783	110197
0.000233	4.50E-06	4.03E-06	16038.95421	14712.71501	13.35985029	687945.4
0.001247	1.81E-05	1.63E-05	64688.66223	27746.22098	42.15536686	2774636
0.002717	6.99E-05	6.27E-05	249278.9166	36256.63058	160.4900671	11886596
0.000479	1.23E-05	1.10E-05	43780.41883	19894.43286	10.96644093	2087622
0.000606	1.00E-05	9.03E-06	35906.10853	40195.80707	48.53773553	1540090
0.003145	6.01E-05	5.40E-05	214498.6637	75304.82805	169.4937071	9200311
0.001231	2.07E-05	1.86E-05	73869.64381	50085.45524	46.16456176	3168428
0.000198	5.27E-06	4.72E-06	18771.91072	11476.59628	9.084293804	895118.3
1.28E-05	2.48E-07	2.22E-07	883.3780646	7784.017112	0.602523843	36085.71
0.00019	4.91E-06	4.40E-06	17494.20174	11977.82019	7.336114078	794468.7
0.000326	1.00E-05	9.01E-06	35801.63754	9480.187037	9.266382261	1625869
0.000122	2.77E-06	2.50E-06	9934.478846	1942.990672	24.4883531	384117.4
0.000723	1.09E-05	9.81E-06	38992.08268	27278.63685	44.76932725	1507632
0.000524	9.99E-06	8.96E-06	35636.08562	16973.33234	22.29382603	1377872
0.005245	7.75E-05	6.95E-05	276440.3174	80931.63285	142.5749555	10688585
0.001974	4.83E-05	4.33E-05	172273.8154	66418.6996	70.91200366	7405121
0.001331	3.28E-05	2.94E-05	116803.5095	18530.24506	23.40926647	5020752
0.000438	8.46E-06	7.59E-06	30177.43345	19897.2205	19.47285734	1166813
0.002348	3.77E-05	3.38E-05	134389.0239	54411.08658	66.21597798	5196162
0.002007	5.01E-05	4.49E-05	178462.2224	59518.24549	71.60714518	7671128
0.000711	2.18E-05	1.96E-05	77842.19118	13141.47045	14.19221438	3346016

4.28E-06	9.73E-08	8.77E-08	348.5330002	5371.486593	1.047814796	14237.46
0.000273	4.69E-06	4.23E-06	16795.63118	27909.73644	22.13316002	686096.1
0.009801	0.00014	0.000126	500004.9396	35488.07312	449.6535432	20425039
0.000497	8.06E-06	7.24E-06	28762.98578	9901.030545	16.07993733	1174959
0.001342	3.38E-05	3.03E-05	120611.1386	58094.34009	46.27470715	5477345
0.001202	3.06E-05	2.75E-05	109170.5098	41461.89752	24.16407651	4957789
0.000201	3.47E-06	3.12E-06	12412.33812	2819.471394	11.52324548	443660
0.000251	4.84E-06	4.35E-06	17274.71021	6118.380241	11.99091797	617458
0.001096	1.86E-05	1.67E-05	66431.01011	17801.30427	29.47652411	2374474
0.000218	5.13E-06	4.61E-06	18307.57218	13408.82296	6.005945892	727480.7
0.000442	1.35E-05	1.21E-05	48282.00805	14441.02045	9.626772293	1918563
3.00E-05	5.92E-07	5.24E-07	2083.622916	1809.568808	5.271807258	71089.75
3.24E-05	9.48E-07	8.38E-07	3331.73649	1783.036617	3.773504142	130505.7
9.51E-05	2.74E-06	2.43E-06	9641.352047	4424.1512	12.31938117	375989.3
7.11E-05	4.29E-06	3.79E-06	15076.9141	3875.350551	12.70783013	576585.7
6.54E-05	6.15E-06	5.43E-06	21586.2935	4044.080616	12.87430825	838414
6.71E-07	1.13E-08	1.01E-08	39.98527593	96.58843013	0.209082772	2414.711
2.00E-05	1.83E-07	1.63E-07	647.9336241	939.5489822	2.230216232	38738.89
1.59E-05	9.10E-08	8.08E-08	321.3517526	311.7241863	0.836331087	21467.24
0.000383	4.13E-06	3.66E-06	14562.38437	11145.36813	26.06565222	981432.5
0.00078	1.27E-05	1.13E-05	44845.43729	20551.06961	46.62545811	3005060
0.00091	2.24E-05	1.99E-05	78929.79625	23913.77507	52.41008146	5298045
6.60E-05	5.90E-07	5.26E-07	2091.644952	2035.794831	6.185554263	84989.59
4.57E-05	2.12E-07	1.89E-07	751.2605522	470.1919442	2.226799535	33762.08
0.002593	2.61E-05	2.32E-05	92039.81979	47281.47976	104.1647338	4139873
0.001629	2.87E-05	2.54E-05	100962.5672	30513.14029	69.71119655	4554171
0.001272	3.06E-05	2.71E-05	107646.2689	23503.25984	55.60813283	4854759
5.29E-07	2.90E-09	2.61E-09	10.36757163	18.91356613	0.061979231	472.8392
0.001013	2.38E-05	2.11E-05	83877.74143	106753.3565	151.3532812	3817874
8.81E-05	1.86E-06	1.64E-06	6529.491843	4455.203163	6.197923063	329075.7
0.00114	2.91E-05	2.57E-05	102350.2396	63586.99964	102.7615644	5203652
0.001524	6.54E-05	5.78E-05	229901.4836	79693.02782	139.7011858	11636391
0.001137	8.46E-05	7.48E-05	297268.9737	68557.03417	122.4089805	15044437
2.05E-05	1.52E-07	1.35E-07	538.5603498	613.8965114	1.806210047	22922.06
1.54E-05	2.38E-07	2.11E-07	837.8091514	544.8014195	1.432511417	39773.93
0.000481	3.27E-06	2.90E-06	11547.13314	6138.62204	17.25242011	550022.3
0.0025	3.99E-05	3.53E-05	140510.2775	44625.27436	98.03360739	6637383
0.002362	8.41E-05	7.44E-05	295734.2204	64509.90864	87.88146126	13972211
4.19E-06	2.27E-09	1.96E-09	7.780291597	0	1.224098264	0
1.43E-06	6.71E-10	5.78E-10	2.298062271	0	0.853989966	0
8.17E-07	4.41E-10	3.80E-10	1.511512877	0	0.31611582	0
6.23E-06	2.05E-07	1.33E-07	529.25	383.25	0.64	12647.25
6.06E-07	3.19E-10	2.75E-10	1.093421749	0	0.441827089	0
4.23E-06	2.28E-09	1.97E-09	7.825721228	0	0.695645078	0
2.18E-06	1.18E-09	1.02E-09	4.043924583	0	0.904617096	0
1.15E-06	5.99E-10	5.16E-10	2.053186846	0	0.273254775	0
1.88E-06	1.02E-09	8.78E-10	3.495208405	0	0.681146489	0

1.33E-05	7.19E-09	6.19E-09	24.64494613	0	5.421917333	0
6.89E-07	3.72E-10	3.20E-10	1.274962527	0	0.160547358	0
2.68E-06	9.05E-08	5.78E-08	229.95	142.35	0.25	5266.95
0.000238	1.21E-07	1.04E-07	413.3387856	0	72.31047434	0
2.05E-05	1.09E-08	9.37E-09	37.28906554	0	5.090587338	0
1.97E-05	1.06E-08	9.15E-09	36.38984362	0	3.64933607	0
0.000612	9.87E-06	8.75E-06	34790.05255	36889.04217	58.03541961	1391704
0.00026	6.49E-06	5.74E-06	22808.61366	14385.77584	23.36093814	1013258
0.000518	6.05E-06	5.36E-06	21289.16263	11812.86908	18.77436651	942465.9
0.000325	1.08E-05	9.52E-06	37857.84693	10628.14624	16.08357783	1681351
0.000205	9.66E-06	8.54E-06	33954.96679	6953.787471	11.25238905	1510697
5.92E-05	9.08E-07	8.05E-07	3198.612435	5090.583137	3.271985168	145562.9
4.92E-06	2.86E-07	2.53E-07	1005.971701	716.9844806	0.484738543	51004.9
5.61E-05	7.03E-07	6.23E-07	2476.224151	1405.933072	1.15125404	125364.9
0.000645	2.26E-05	2.00E-05	79433.34116	25529.74737	18.84421087	4029978
0.00104	4.61E-05	4.08E-05	162012.0466	39079.02517	31.75037459	8233268
4.83E-05	6.51E-07	5.79E-07	2300.080928	2483.423465	7.258136999	96164.85
0.000155	1.51E-06	1.34E-06	5318.699475	3412.891507	9.375093624	248301.5
0.000247	4.74E-06	4.20E-06	16680.62318	9546.954129	25.34299502	778722.6
0.000272	8.70E-06	7.69E-06	30574.854	9025.948278	24.37524342	1421841
0.000111	6.87E-06	6.07E-06	24133.87674	5055.269333	11.67350367	1124071
3.76E-05	8.13E-07	7.20E-07	2863.22846	4061.355132	8.937306566	140867.2
1.25E-05	1.21E-07	1.08E-07	427.550933	336.8884402	0.905808098	23342.36
0.000164	3.38E-06	2.99E-06	11892.47874	7258.003324	16.30454576	645982.2
0.000107	3.69E-06	3.26E-06	12965.47073	4885.081962	10.99047159	707324
5.44E-05	2.66E-06	2.35E-06	9343.642798	2165.891973	4.770589316	508097.9
0.000795	1.34E-05	1.19E-05	47225.51386	61263.71739	183.4742973	2189086
2.22E-05	1.13E-07	1.01E-07	401.2652785	296.7122785	1.30653111	20610.3
0.001063	2.09E-05	1.85E-05	73391.11176	43347.34036	135.5681566	3780640
0.000508	2.17E-05	1.92E-05	76318.0761	27373.81531	79.13845581	3936574
7.53E-05	3.60E-06	3.18E-06	12632.81792	3011.605637	10.14117004	650855.8
3.79E-05	6.79E-07	6.02E-07	2393.824364	2175.732771	8.256817658	103463.7
3.70E-06	2.00E-08	1.78E-08	70.82421847	46.35108895	0.215395243	3414.53
0.000862	5.26E-05	4.65E-05	184698.0986	92360.39795	337.8833383	8871863
0.000491	1.26E-05	1.12E-05	44463.21771	17314.97923	66.48533175	2138273
5.76E-06	8.64E-07	7.63E-07	3034.294101	693.6843859	2.871936577	145833.8
3.79E-05	5.94E-07	5.27E-07	2095.670128	2222.484133	2.426889382	92161.75
7.68E-05	4.96E-07	4.41E-07	1753.051924	1204.100978	1.775772718	85220.18
0.000257	2.23E-06	1.98E-06	7863.42016	4525.893765	5.268125731	381133.2
0.0002	2.44E-06	2.16E-06	8586.118445	2838.978617	3.906699981	420189.5
0.000186	2.70E-06	2.39E-06	9519.245802	2135.102855	3.196390893	465671.4
0.000164	1.86E-06	1.65E-06	6563.286369	7567.678935	9.131073194	314723.8
0.00349	4.53E-05	4.01E-05	159468.9191	100286.0023	113.4597541	8605069
0.004353	0.000108	9.54E-05	379205.6379	135295.3448	148.8118145	20297676
0.003656	0.000156	0.000138	549292.7465	141083.9486	137.1511872	29425660
5.99E-06	3.75E-08	3.36E-08	133.5571821	126.4095756	0.366011689	4895.834

3.84E-05	2.48E-07	2.20E-07	875.0019609	520.423048	1.403044809	35017.56
0.00015	1.68E-06	1.49E-06	5929.94178	2645.058206	4.697150014	237553.3
0.001087	2.06E-05	1.82E-05	72456.99929	17243.44889	39.65126635	2893998
0.001155	2.37E-05	2.09E-05	83217.73267	14934.47483	38.43122739	3346041
0.000264	1.02E-05	8.99E-06	35733.82353	38568.03569	127.0357607	1680865
0.001189	5.26E-05	4.65E-05	184850.6562	137694.742	400.3169533	9696683
4.98E-05	1.35E-06	1.19E-06	4734.158613	3298.30035	9.636326912	250988.2
6.37E-06	3.65E-07	3.22E-07	1281.369592	442.8864679	1.700528279	67297.31
2.20E-06	3.39E-07	2.99E-07	1189.896006	304.5321491	1.07070299	62404.25
3.92E-06	9.12E-08	8.08E-08	321.0587714	502.1268156	2.17125058	18326.33
5.21E-06	6.97E-08	6.17E-08	245.2126036	235.6729093	0.91421077	15679.82
1.90E-05	5.65E-07	5.00E-07	1985.832478	1411.58253	5.370988276	126874.3
2.18E-05	4.83E-07	4.27E-07	1697.48372	792.5005151	3.25687587	108952.2
2.21E-05	1.04E-06	9.16E-07	3639.168337	1012.059037	4.285362987	233844.9
0.001147	2.01E-05	1.78E-05	70775.72003	88640.60207	177.7904616	3360040
0.000718	3.72E-06	3.31E-06	13155.0778	9519.496834	44.78832882	689366.6
0.014211	0.000319	0.000282	1122332.841	706281.8455	1162.390321	58797481
0.001492	5.59E-05	4.94E-05	196455.9872	72294.30294	135.0464133	10357232
0.000678	3.37E-05	2.98E-05	118454.9197	30181.50503	56.000898	6223137
0.000453	7.10E-06	6.30E-06	25025.87804	21662.50346	58.29917241	864838.6
5.13E-05	4.88E-07	4.33E-07	1721.416372	934.8510399	3.643698275	66013.95
0.000365	4.66E-06	4.12E-06	16391.3367	7505.593418	23.38591802	630274.3
5.11E-05	1.05E-06	9.31E-07	3700.963243	998.6389866	3.577449216	142991.5
8.45E-05	2.44E-06	2.16E-06	8566.278659	1455.007443	4.836181347	329133.4
0.000474	0.000146	0.000201	565534.0797	0	6373.309044	0
0.000426	1.13E-05	1.01E-05	40253.07935	40444.06364	114.7326225	1726541

Table 23-1: Conversions

Days/YR	lbs / ton	grams / lbs
365	2000	453.59237

:r_Hours_hhpy	HC_g_hp-hr	TOG_g_hp-hr	NH3_g_hp-hr	ROG_g_hp-hr	CO_g_hp-hr
	0.935150782	1.346617059	0.002330501	1.131532355	3.257619043
	0.874852629	1.259787787	0.002330495	1.058571684	3.163064776
	0.435665238	0.627357938	0.002330494	0.527154938	2.071628481
	0.278010761	0.400335494	0.002330495	0.336393018	1.821519982
	0.183934279	0.264865363	0.002096303	0.222560478	1.557131564
	0.124356374	0.179073176	0.002096303	0.15047121	0.667939975
	0.359316464	0.517415815	0.001942078	0.434772976	1.903716121
	0.272106186	0.391832872	0.001942084	0.329248454	1.716539829
	0.086409092	0.124429103	0.001746921	0.104554928	1.1726069
	0.219532072	0.316126257	0.002183655	0.265633938	1.674551954
	0.168193117	0.242198929	0.002183652	0.20351455	0.862472398
	0.301459682	0.434101448	0.002427601	0.364766195	1.904573109
	0.17586399	0.253244315	0.001937901	0.21279552	1.448310062
	0.151496666	0.218155246	0.001937903	0.183310978	0.747455479
	0.516123296	0.743218748	0.00194208	0.62451024	2.159550736
	0.241167729	0.347281645	0.001942081	0.291813269	1.523658159
	0.265319684	0.382060235	0.001942076	0.321036695	1.56885488
	0.166751808	0.240122612	0.001746919	0.201769688	1.260042262
	0.157828862	0.227273429	0.001746924	0.190972795	0.731853885
	0.526485994	0.758140046	0.00194208	0.63704816	2.188853021
	0.242156057	0.348704708	0.001942079	0.293008843	1.523708061
	0.235240501	0.338746268	0.001942082	0.284640988	1.53103384
	0.15886116	0.228759819	0.001746919	0.192221682	1.308176875
	0.253226396	0.364645974	0.002039182	0.306404068	1.599844742
	0.169854366	0.244590121	0.001834265	0.205523637	1.397716778
	0.141282545	0.203446726	0.001834265	0.170951753	0.724476641
	0.572548688	0.824469662	0.002154397	0.692783541	2.39564485
	0.645100146	0.928944236	0.002154398	0.780571303	2.590666347
	0.26790632	0.385785332	0.002154399	0.324166801	1.696486415
	0.285805186	0.411559485	0.002154399	0.345824284	1.742980403
	0.186100765	0.267985082	0.001937904	0.225181916	1.468277134
	0.182091889	0.262212299	0.001937904	0.220331194	0.852990417
	0.267533685	0.385248586	0.002154398	0.323715764	1.690232789
	0.269520437	0.388109435	0.002154396	0.326119775	1.712851501
	0.183801096	0.264673565	0.001937904	0.222399332	1.463419401
	0.150363021	0.216522774	0.001937898	0.181939247	0.75657628

0.54192831	0.780378999	0.002039183	0.655734743	2.267528184
0.543731632	0.782973183	0.002039182	0.657915231	2.274880129
0.30011014	0.432158595	0.002039175	0.363133261	1.690105989
0.253136944	0.36451721	0.002039183	0.306295663	1.617697461
0.172666604	0.248639878	0.001834268	0.20892655	1.383226706
0.167171394	0.240726786	0.001834268	0.202277411	0.793546962
0.619348117	0.89186102	0.002330493	0.749411043	2.591460522
0.289486653	0.416860823	0.002330494	0.350278968	1.830382697
0.278518307	0.401066441	0.002330502	0.337007192	1.837712307
0.206859375	0.297877901	0.002096304	0.250300149	1.599814821
0.163188903	0.234991875	0.002096298	0.197458476	0.816326798
0.298957685	0.430498843	0.002441502	0.361738883	2.254588709
0.095984028	0.138216919	0.002126602	0.116140768	1.694057723
0.116184138	0.167305264	0.00213603	0.140583097	1.680815746
0.075636305	0.108916486	0.00217818	0.091520354	1.480029968
0.061104184	0.087990056	0.002144689	0.073936149	0.538487579
0.254321518	0.366224138	0.001379362	0.307729804	1.445951061
0.512932233	0.738622483	0.00139325	0.620648403	2.176145296
0.314127059	0.452341793	0.001246951	0.380093217	1.311765132
0.184612696	0.265842633	0.001235997	0.223381484	1.21666192
0.137869339	0.198531843	0.001243111	0.16682186	1.042675991
0.10091105	0.145311954	0.001240999	0.122102393	0.558420186
0.802653349	1.155821134	0.002050062	0.971211409	3.311906411
0.693408749	0.998504204	0.001853564	0.839025008	2.719921138
0.262876883	0.378542776	0.001851967	0.318081085	1.73262319
0.183532868	0.26428735	0.001846698	0.222074754	1.450932456
0.154368905	0.222291188	0.001847039	0.186786346	0.974324061
1.251613374	1.802317937	0.001826457	1.514451553	4.2528552
0.20091002	0.289310491	0.00183008	0.243101165	1.754111186
0.094862858	0.136602355	0.001652836	0.114784496	1.416919137
0.102028553	0.146921109	0.001638421	0.123454512	1.345351427
0.078401557	0.112898256	0.001645768	0.094865893	1.178119321
0.060327833	0.086872101	0.001645957	0.072996683	0.437668377
0.949051337	1.366633982	0.001957159	1.148351193	3.617114853
0.19560182	0.28166682	0.00175465	0.236678751	1.584684934
0.402683345	0.579863993	0.001748797	0.487246782	1.982576029
0.20220759	0.291178945	0.001763423	0.244671178	1.478444074
0.11849646	0.170634896	0.001763117	0.143380699	0.571559386
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0.125383689	0.180552669	0.001875097	0.15171445	1.572489623
0.215942843	0.310957511	0.001881644	0.261290865	1.725736524
0.106586778	0.153484889	0.001875609	0.128970003	1.400593064
0.094787308	0.136493653	0.00187228	0.114692614	0.59937186
0.302833546	0.43608058	0.001830441	0.366429342	2.275206289
0.089028965	0.128202176	0.00164293	0.107725196	1.453364397
0.189250077	0.272520829	0.001645352	0.22899272	1.554444778
0.10278006	0.148003332	0.001641891	0.124363937	1.276044437
0.096979599	0.139650653	0.001639153	0.117345318	0.558352097
0.485488596	0.699106195	0.001992378	0.587444093	2.344225807
0.265344448	0.382096752	0.001784317	0.321066836	1.589475602
0.134852684	0.194187661	0.001784327	0.163171399	1.471877109
0.105986158	0.152620254	0.001791258	0.128243473	1.257334147
0.063997734	0.092156679	0.001788458	0.077437097	0.425776186
0.207563431	0.298890607	0.001693133	0.251152261	1.571186038
0.240855114	0.346831931	0.001525761	0.291434829	1.556061066
0.114260377	0.164534964	0.001533544	0.138255113	1.254196131
0.082816653	0.119255737	0.001526917	0.100207832	1.090654426
0.067299391	0.09691154	0.001531843	0.081432595	0.417092126
0.300511081	0.43273583	0.001797051	0.363618362	1.788292866
0.565319541	0.814061039	0.001621786	0.684038315	2.270204363
0.128169358	0.184563883	0.001617049	0.155084877	1.32469612
0.071510507	0.102975086	0.001614929	0.086527698	1.099089784
0.075509587	0.108733967	0.001616815	0.091366793	0.587111939
0.336336927	0.484325431	0.001927301	0.406965986	1.879528569
0.576588194	0.830287115	0.001727805	0.697671549	2.350584792
0.053432348	0.07694259	0.001734172	0.064653138	1.296134161
0.108722679	0.156560824	0.001732132	0.131554514	1.227844348
0.035716377	0.05143151	0.001733183	0.043216673	0.391015346
0.398305837	0.573564573	0.001894163	0.481950745	2.308823665
0.422959233	0.609058808	0.001713553	0.511777718	2.020001789
0.289073074	0.416264775	0.00171862	0.34977848	1.719205187
0.248166755	0.357360284	0.001702147	0.300282404	1.566995118
0.227581911	0.327718294	0.001702815	0.275374696	1.401275083
0.480163886	0.691436038	0.001737152	0.580998681	2.531022683
0.178444924	0.256960673	0.001543715	0.21591833	1.445099387
0.121139499	0.174440882	0.001556229	0.146578796	1.22295625
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1.298813572	1.87028965	0.002272405	1.571565978	4.438665304

0.502907165	0.724186506	0.00208146	0.608517244	2.28513103
0.24849793	0.357837186	0.002079386	0.300683652	1.935209497
0.201098756	0.289582296	0.002085581	0.243329591	1.686241621
0.200631184	0.288908953	0.002071716	0.242763764	1.081409591
0.13565822	0.195347781	0.001770891	0.164146294	1.375006574
0.060820477	0.087581488	0.001587971	0.073592789	1.207011457
0.057014705	0.082101244	0.001571217	0.068987784	1.233594544
0.051881526	0.074709712	0.001586066	0.06277702	1.054674403
0.02955475	0.042558856	0.001588324	0.035761227	0.358355126
0.162750229	0.234359796	0.001459331	0.196928069	1.235599322
0.133550067	0.19231208	0.001302707	0.161595693	1.119637245
0.073527712	0.105879884	0.001303809	0.088968604	1.025828656
0.100138549	0.144199571	0.001297821	0.121167659	0.934138163
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0.10688306	0.153911606	0.001590041	0.129328502	1.325267703
0.082738917	0.119144017	0.001580036	0.100114063	1.155539363
0.076792645	0.110581396	0.00158558	0.092919065	0.47146457
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0.402685179	0.579868463	0.002172176	0.487249016	2.27755559
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15.41185842	22.19308074	0.083299917	18.64835108	81.6544921

NOx_g_hp-hr	PM10_g_hp-hr	PM2.5_g_hp-hr	CO2_g_hp-hr	gal/hp-hr
2.396280028	0.157755266	0.14513486	284.8072268	0.027977
2.569294277	0.232594882	0.213987292	284.8072275	0.027977
3.550215291	0.235337217	0.216510239	284.8072268	0.027977
2.468460721	0.170354232	0.156725893	284.8072281	0.027977
2.045638995	0.093732235	0.086233658	256.1869078	0.025166
1.377134386	0.06104556	0.056161917	256.1869071	0.025166
1.699805599	0.088844355	0.081736852	237.3393558	0.023314
1.618970753	0.08529202	0.0784687	237.3393558	0.023314
1.056896234	0.040309386	0.037084724	213.4890887	0.020971
2.439084589	0.115610787	0.106361969	266.8613635	0.026214
1.883942805	0.085799229	0.078935268	266.8613607	0.026214
2.680543396	0.152236717	0.140057763	296.6741935	0.029143
1.959532246	0.08816871	0.081115273	236.8289235	0.023264
1.670830099	0.076864596	0.070715484	236.8289204	0.023264
1.78856937	0.135623554	0.124773742	237.339357	0.023314
2.144435447	0.121789573	0.112046195	237.3393563	0.023314
2.26543017	0.161746644	0.148806951	237.3393566	0.023314
1.951016836	0.08226712	0.075685758	213.4890889	0.020971
1.822177636	0.082609541	0.076000803	213.4890899	0.020971
1.871040813	0.141670796	0.130337184	237.3393589	0.023314
2.148385111	0.123041842	0.113198516	237.3393562	0.023314
2.02726909	0.139823355	0.128637466	237.3393576	0.023314
1.764281197	0.079736689	0.073357783	213.4890914	0.020971
2.251661888	0.127878568	0.117648246	249.2063265	0.02448
1.83266499	0.086111477	0.079222442	224.1635447	0.02202
1.582511662	0.072071364	0.066305581	224.1635444	0.02202
2.025985474	0.114404052	0.105251831	263.2866325	0.025863
2.124366132	0.172678819	0.158864478	263.2866327	0.025863
2.374315244	0.136871298	0.125921613	263.2866341	0.025863
2.437788961	0.176612453	0.162483456	263.2866337	0.025863
2.070903497	0.095935259	0.088260454	236.8289219	0.023264
1.99519654	0.095415512	0.087782305	236.8289206	0.023264
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2.046459398	0.094169677	0.08663613	236.8289202	0.023264
1.671386085	0.076498226	0.070378427	236.8289215	0.023264

1.917638637	0.108285656	0.099622841	249.2063203	0.02448
1.891693364	0.143452944	0.131976766	249.2063216	0.02448
2.536269955	0.172698265	0.158882404	249.2063224	0.02448
2.174340368	0.152233197	0.140054507	249.2063257	0.02448
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Sheet 9: On-Road Vehicle Operational Fuel Efficiency
EMFAC2021 San Joaquin Valley Fuel Efficiency Estimates for 2019

Table 9-1: 2019 San Joaquin Valley Average Vehicle Fuel Efficiency (Gasoline)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	4.96	79.98	28.89	2.77
LDA	250,819.90	9,888,825.19	364,223.86	27.15
LDT1	25,055.36	794,541.98	35,033.70	22.68
LDT2	91,600.64	3,478,170.03	164,008.43	21.21
LHDT1	10,882.17	363,832.44	41,692.95	8.73
LHDT2	1,268.20	44,038.25	5,544.51	7.94
MCY	12,457.33	70,357.98	1,772.29	39.70
MDV	99,430.89	3,421,104.64	194,921.77	17.55
MH	1,909.44	16,666.55	3,783.59	4.40
MHDT	707.42	29,037.18	6,581.58	4.41
OBUS	217.02	10,394.65	2,279.53	4.56
SBUS	131.86	6,962.84	707.46	9.84
UBUS	46.84	3,529.22	751.16	4.70
TOTAL	494,532.04	18,127,540.93	821,329.72	22.07

Table 9-2: 2019 San Joaquin Valley Average Vehicle Fuel Efficiency (Diesel)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	7,630.3	1,128,742.51	195,544.05	5.77
LDA	855.25	29,591.14	709.98	41.68
LDT1	9.96	127.01	5.17	24.57
LDT2	191.72	8,149.45	270.02	30.18
LHDT1	9,629.49	353,141.09	22,397.67	15.77
LHDT2	3,123.56	121,395.98	9,445.02	12.85
MCY	0.00	0.00	0.00	0.00
MDV	1,319.24	55,619.87	2,379.46	23.38
MH	661.40	6,088.22	646.60	9.42
MHDT	5,752.75	257,306.49	30,925.76	8.32
OBUS	85.82	5,710.50	851.57	6.71
SBUS	481.41	11,218.49	1,386.96	8.09
UBUS	105.03	7,613.93	936.60	8.13
TOTAL	29,845.94	1,984,704.67	265498.86	7.48

Table 9-3: 2019 San Joaquin Valley Average Vehicle Fuel Efficiency (Electricity)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Energy Consumption (kWh/day)	Miles Per kWh
HHDT	0.00	0.00	0.00	0.00
LDA	5,490.94	150,493.25	51,818.93	2.90
LDT1	12.17	244.87	94.27	2.60
LDT2	87.58	2,242.82	686.38	3.27
LHDT1	0.00	0.00	0.00	0.00
LHDT2	0.00	0.00	0.00	0.00
MCY	0.00	0.00	0.00	0.00
MDV	230.11	5,346.08	1,616.73	3.31
MH	0.00	0.00	0.00	0.00
MHDT	0.00	0.00	0.00	0.00
OBUS	0.00	0.00	0.00	0.00
SBUS	0.00	0.00	0.00	0.00
UBUS	17.16	766.36	1,335.95	0.57
TOTAL	5,837.97	159,093.38	55,552.26	2.86

Sheet 10: EMFAC Output

Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2019
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissi

Region	Calendar Ye	Vehicle Cat	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT
San Joaquin	2019	HHDT	Aggregate	Aggregate	Gasoline	4.962864	79.97847	79.97847	0
San Joaquin	2019	HHDT	Aggregate	Aggregate	Diesel	7630.297	1128743	1128743	0
San Joaquin	2019	HHDT	Aggregate	Aggregate	Natural Ga	147.2935	10785.66	10785.66	0
San Joaquin	2019	LDA	Aggregate	Aggregate	Gasoline	247576.4	9801060	9801060	0
San Joaquin	2019	LDA	Aggregate	Aggregate	Diesel	855.2539	29591.14	29591.14	0
San Joaquin	2019	LDA	Aggregate	Aggregate	Electricity	2247.417	75732.01	0	75732.01
San Joaquin	2019	LDA	Aggregate	Aggregate	Plug-in Hyb	3243.526	162526.5	87765.25	74761.24
San Joaquin	2019	LDT1	Aggregate	Aggregate	Gasoline	25055.22	794538.2	794538.2	0
San Joaquin	2019	LDT1	Aggregate	Aggregate	Diesel	9.963085	127.0077	127.0077	0
San Joaquin	2019	LDT1	Aggregate	Aggregate	Electricity	12.03766	241.6772	0	241.6772
San Joaquin	2019	LDT1	Aggregate	Aggregate	Plug-in Hyb	0.136498	6.966576	3.77499	3.191586
San Joaquin	2019	LDT2	Aggregate	Aggregate	Gasoline	91516.06	3475742	3475742	0
San Joaquin	2019	LDT2	Aggregate	Aggregate	Diesel	191.7219	8149.449	8149.449	0
San Joaquin	2019	LDT2	Aggregate	Aggregate	Electricity	2.997449	106.8214	0	106.8214
San Joaquin	2019	LDT2	Aggregate	Aggregate	Plug-in Hyb	84.58486	4564.133	2428.133	2136.001
San Joaquin	2019	LHDT1	Aggregate	Aggregate	Gasoline	10882.17	363832.4	363832.4	0
San Joaquin	2019	LHDT1	Aggregate	Aggregate	Diesel	9629.49	353141.1	353141.1	0
San Joaquin	2019	LHDT2	Aggregate	Aggregate	Gasoline	1268.204	44038.25	44038.25	0
San Joaquin	2019	LHDT2	Aggregate	Aggregate	Diesel	3123.565	121396	121396	0
San Joaquin	2019	MCY	Aggregate	Aggregate	Gasoline	12457.33	70357.98	70357.98	0
San Joaquin	2019	MDV	Aggregate	Aggregate	Gasoline	99201.78	3414847	3414847	0
San Joaquin	2019	MDV	Aggregate	Aggregate	Diesel	1319.242	55619.87	55619.87	0
San Joaquin	2019	MDV	Aggregate	Aggregate	Electricity	0.994846	24.40782	0	24.40782
San Joaquin	2019	MDV	Aggregate	Aggregate	Plug-in Hyb	229.1124	11579.09	6257.417	5321.671
San Joaquin	2019	MH	Aggregate	Aggregate	Gasoline	1909.437	16666.55	16666.55	0
San Joaquin	2019	MH	Aggregate	Aggregate	Diesel	661.3999	6088.215	6088.215	0
San Joaquin	2019	MHDT	Aggregate	Aggregate	Gasoline	707.4154	29037.18	29037.18	0
San Joaquin	2019	MHDT	Aggregate	Aggregate	Diesel	5752.752	257306.5	257306.5	0
San Joaquin	2019	MHDT	Aggregate	Aggregate	Natural Ga	36.04625	2326.429	2326.429	0
San Joaquin	2019	OBUS	Aggregate	Aggregate	Gasoline	217.0227	10394.65	10394.65	0
San Joaquin	2019	OBUS	Aggregate	Aggregate	Diesel	85.82029	5710.5	5710.5	0
San Joaquin	2019	OBUS	Aggregate	Aggregate	Natural Ga	1	77.87069	77.87069	0
San Joaquin	2019	SBUS	Aggregate	Aggregate	Gasoline	131.8601	6962.84	6962.84	0
San Joaquin	2019	SBUS	Aggregate	Aggregate	Diesel	481.4091	11218.49	11218.49	0
San Joaquin	2019	SBUS	Aggregate	Aggregate	Natural Ga	77.66497	2017.982	2017.982	0
San Joaquin	2019	UBUS	Aggregate	Aggregate	Gasoline	46.84354	3529.223	3529.223	0

San Joaquin	2019	UBUS	Aggregate	Aggregate	Diesel	105.0276	7613.928	7613.928	0
San Joaquin	2019	UBUS	Aggregate	Aggregate	Electricity	17.15976	766.3601	0	766.3601
San Joaquin	2019	UBUS	Aggregate	Aggregate	Natural Ga	27.65123	1307.033	1307.033	0

ions, 1000 gallons/day for Fuel Consumption

Trips	Energy Con	NOx_RUNE	NOx_IDLEX	NOx_STREX	NOx_TOTE	PM2.5_RUN	PM2.5_IDL	PM2.5_STR	PM2.5_TOT
99.29698	0	0.002308	0	0.000267	0.002575	1.12E-06	0	2.94E-07	1.41E-06
124369.8	0	5.240832	0.701248	0.255305	6.197385	0.102974	0.001783	0	0.104757
1167.195	0	0.026696	0.002042	0	0.028737	5.31E-05	3.03E-06	0	5.61E-05
1150227	0	0.870713	0	0.441797	1.312511	0.016064	0	0.002922	0.018986
3768.692	0	0.012341	0	0	0.012341	0.000704	0	0	0.000704
11415.47	29238.8	0	0	0	0	0	0	0	0
13411.98	22580.12	0.000679	0	0.001687	0.002366	0.000165	0	3.75E-05	0.000203
108648.3	0	0.239225	0	0.075651	0.314875	0.002499	0	0.000509	0.003008
31.44554	0	0.000214	0	0	0.000214	3.34E-05	0	0	3.34E-05
51.78606	93.30734	0	0	0	0	0	0	0	0
0.564419	0.963954	2.92E-08	0	7.1E-08	1E-07	8.27E-09	0	1.88E-09	1.02E-08
423279.3	0	0.597237	0	0.268177	0.865414	0.006119	0	0.001092	0.007211
906.764	0	0.000942	0	0	0.000942	0.000129	0	0	0.000129
15.55676	41.24187	0	0	0	0	0	0	0	0
349.7584	645.1359	1.88E-05	0	4.4E-05	6.28E-05	5.27E-06	0	1.16E-06	6.42E-06
162128.1	0	0.139569	0.000494	0.13059	0.270653	0.000835	0	9.13E-05	0.000926
121126.9	0	1.108939	0.025819	0	1.134758	0.020992	0.000289	0	0.021281
18894.35	0	0.0147	5.72E-05	0.014834	0.029591	8.88E-05	0	8.26E-06	9.7E-05
39290.51	0	0.283586	0.008227	0	0.291813	0.005751	9.12E-05	0	0.005843
24914.66	0	0.055627	0	0.005229	0.060856	0.000141	0	9.72E-05	0.000238
452349.2	0	0.853481	0	0.383437	1.236918	0.006136	0	0.001283	0.007418
6364.118	0	0.008394	0	0	0.008394	0.000531	0	0	0.000531
4.593302	9.423432	0	0	0	0	0	0	0	0
947.3796	1607.303	4.84E-05	0	0.000119	0.000168	1.38E-05	0	3.17E-06	1.7E-05
191.0201	0	0.01073	0	8.28E-05	0.010813	3.63E-05	0	1.16E-07	3.64E-05
66.13999	0	0.036502	0	0	0.036502	0.000958	0	0	0.000958
14153.97	0	0.047275	6.71E-05	0.007613	0.054955	7.54E-05	0	2.32E-05	9.86E-05
69455.13	0	1.281015	0.176488	0.056651	1.514153	0.03427	0.001277	0	0.035547
344.6077	0	0.000249	0.000251	0	0.000499	3.49E-06	7.63E-07	0	4.25E-06
4342.191	0	0.01138	1.55E-05	0.002129	0.013524	9.76E-06	0	1.28E-06	1.1E-05
1020.08	0	0.044665	0.002505	0.000823	0.047992	0.001644	1.88E-05	0	0.001663
8.9	0	5.02E-06	1.62E-06	0	6.64E-06	1.45E-07	6.13E-09	0	1.51E-07
527.4402	0	0.00436	0.000133	0.000353	0.004846	1.98E-05	0	9.08E-07	2.08E-05
6970.803	0	0.069068	0.013578	0.003029	0.085675	0.000395	1.73E-05	0	0.000412
1124.589	0	0.001129	0.000449	0	0.001578	7.51E-06	1.02E-06	0	8.53E-06
187.3742	0	0.000682	0	0.000178	0.00086	4.25E-06	0	1.92E-07	4.45E-06

420.1104	0	0.031456	0	0	0.031456	6.53E-05	0	0	6.53E-05
68.63904	1335.953	0	0	0	0	0	0	0	0
110.6049	0	0.000979	0	0	0.000979	3.12E-06	0	0	3.12E-06

PM2.5_PM	PM2.5_PM	PM2.5_TOT	PM10_RUN	PM10_IDLE	PM10_STR	PM10_TOT	PM10_PMT	PM10_PMB	PM10_TOT
4.41E-07	3.64E-06	5.49E-06	1.22E-06	0	3.2E-07	1.54E-06	1.76E-06	1.04E-05	1.37E-05
0.01101	0.035272	0.15104	0.10763	0.001864	0	0.109494	0.04404	0.100778	0.254312
0.000107	0.000556	0.000719	5.77E-05	3.3E-06	0	6.1E-05	0.000428	0.001589	0.002078
0.021608	0.032323	0.072917	0.01747	0	0.003177	0.020648	0.086431	0.092353	0.199431
6.52E-05	9.79E-05	0.000867	0.000735	0	0	0.000735	0.000261	0.00028	0.001276
0.000167	0.000127	0.000294	0	0	0	0	0.000668	0.000364	0.001032
0.000358	0.000255	0.000816	0.00018	0	4.07E-05	0.000221	0.001433	0.000727	0.002381
0.001752	0.003175	0.007934	0.002717	0	0.000554	0.00327	0.007007	0.009071	0.019348
2.8E-07	5.78E-07	3.42E-05	3.49E-05	0	0	3.49E-05	1.12E-06	1.65E-06	3.76E-05
5.33E-07	4.13E-07	9.45E-07	0	0	0	0	2.13E-06	1.18E-06	3.31E-06
1.54E-08	1.09E-08	3.64E-08	9E-09	0	2.05E-09	1.1E-08	6.14E-08	3.11E-08	1.04E-07
0.007663	0.013322	0.028195	0.006653	0	0.001187	0.00784	0.030651	0.038062	0.076553
1.8E-05	2.97E-05	0.000177	0.000135	0	0	0.000135	7.19E-05	8.5E-05	0.000292
2.36E-07	1.79E-07	4.15E-07	0	0	0	0	9.42E-07	5.12E-07	1.45E-06
1.01E-05	7.13E-06	2.36E-05	5.73E-06	0	1.26E-06	6.99E-06	4.02E-05	2.04E-05	6.76E-05
0.000802	0.010949	0.012677	0.000907	0	9.9E-05	0.001006	0.003208	0.031282	0.035497
0.001168	0.010627	0.033076	0.021941	0.000302	0	0.022243	0.004671	0.030363	0.057278
9.71E-05	0.001546	0.00174	9.66E-05	0	8.98E-06	0.000106	0.000388	0.004417	0.004911
0.000401	0.004262	0.010506	0.006011	9.53E-05	0	0.006107	0.001606	0.012177	0.01989
7.76E-05	0.000326	0.000641	0.00015	0	0.000103	0.000252	0.00031	0.000931	0.001493
0.007528	0.013491	0.028438	0.006669	0	0.001394	0.008063	0.030114	0.038545	0.076721
0.000123	0.000205	0.000859	0.000555	0	0	0.000555	0.00049	0.000586	0.001632
5.38E-08	4.17E-08	9.55E-08	0	0	0	0	2.15E-07	1.19E-07	3.34E-07
2.55E-05	1.81E-05	6.06E-05	1.5E-05	0	3.45E-06	1.84E-05	0.000102	5.17E-05	0.000172
5.51E-05	0.00029	0.000381	3.94E-05	0	1.25E-07	3.95E-05	0.00022	0.000828	0.001088
2.68E-05	0.000105	0.00109	0.001002	0	0	0.001002	0.000107	0.000301	0.00141
9.6E-05	0.000505	0.000699	8.15E-05	0	2.49E-05	0.000106	0.000384	0.001442	0.001932
0.000851	0.004475	0.040873	0.035819	0.001335	0	0.037154	0.003404	0.012785	0.053343
7.69E-06	4.09E-05	5.28E-05	3.79E-06	8.3E-07	0	4.62E-06	3.08E-05	0.000117	0.000152
3.44E-05	0.00018	0.000225	1.06E-05	0	1.39E-06	1.2E-05	0.000137	0.000514	0.000664
1.89E-05	0.000133	0.001814	0.001718	1.96E-05	0	0.001738	7.55E-05	0.000379	0.002193
2.58E-07	1.39E-06	1.79E-06	1.58E-07	6.67E-09	0	1.65E-07	1.03E-06	3.96E-06	5.15E-06
1.54E-05	0.000121	0.000157	2.12E-05	0	9.71E-07	2.22E-05	6.14E-05	0.000345	0.000428
3.71E-05	0.000194	0.000643	0.000412	1.81E-05	0	0.00043	0.000148	0.000555	0.001134
6.67E-06	3.5E-05	5.02E-05	8.17E-06	1.11E-06	0	9.28E-06	2.67E-05	9.99E-05	0.000136
1.17E-05	0.00015	0.000166	4.63E-06	0	2.09E-07	4.84E-06	4.67E-05	0.000428	0.000479

5.99E-05	0.000323	0.000448	6.82E-05	0	0	6.82E-05	0.00024	0.000923	0.001231
7.51E-06	1.63E-05	2.38E-05	0	0	0	0	3E-05	4.65E-05	7.65E-05
4.32E-06	5.52E-05	6.26E-05	3.26E-06	0	0	3.26E-06	1.73E-05	0.000158	0.000178

CO2_RUNE	CO2_IDLEX	CO2_STREX	CO2_TOTEX	CH4_RUNE	CH4_IDLEX	CH4_STREX	CH4_TOTEX	N2O_RUNE	N2O_IDLEX
0.267761	0	0.005922	0.273683	7.08E-05	0	0	7.08E-05	4.49E-05	0
2062.771	128.2169	0	2190.988	0.007472	0.002536	0	0.010008	0.324698	0.020182
18.58291	1.542974	0	20.12589	0.036272	0.005383	0	0.041655	0.003788	0.000315
3322.225	0	98.59336	3420.818	0.049941	0	0.125205	0.175146	0.077191	0
7.954985	0	0	7.954985	5.84E-05	0	0	5.84E-05	0.001252	0
0	0	0	0	0	0	0	0	0	0
28.85349	0	1.016623	29.87011	0.000103	0	0.000633	0.000735	0.000128	0
319.8256	0	12.08539	331.911	0.012709	0	0.02122	0.033929	0.015613	0
0.057922	0	0	0.057922	2E-06	0	0	2E-06	9.12E-06	0
0	0	0	0	0	0	0	0	0	0
0.001242	0	4.89E-05	0.00129	4.43E-09	0	2.67E-08	3.11E-08	5.52E-09	0
1505.744	0	47.25526	1552.999	0.022863	0	0.056892	0.079755	0.040962	0
3.025503	0	0	3.025503	1.27E-05	0	0	1.27E-05	0.000476	0
0	0	0	0	0	0	0	0	0	0
0.799123	0	0.031907	0.831029	2.86E-06	0	1.66E-05	1.95E-05	3.58E-06	0
388.9938	1.485998	4.522812	395.0026	0.006736	0.001469	0.007406	0.015611	0.007664	3.6E-05
249.4799	1.476414	0	250.9564	0.00446	5.41E-05	0	0.004514	0.03927	0.000232
51.77921	0.199115	0.550837	52.52916	0.000629	0.000173	0.000813	0.001615	0.000821	4.31E-06
105.064	0.763372	0	105.8274	0.001279	1.76E-05	0	0.001297	0.016538	0.00012
15.18541	0	1.605418	16.79083	0.017306	0	0.006133	0.023439	0.003558	0
1783.595	0	60.94442	1844.54	0.03233	0	0.081221	0.113551	0.05386	0
26.6608	0	0	26.6608	5.65E-05	0	0	5.65E-05	0.004197	0
0	0	0	0	0	0	0	0	0	0
2.058474	0	0.10745	2.165924	7.34E-06	0	4.47E-05	5.21E-05	9.13E-06	0
35.83907	0	0.006947	35.84601	0.000442	0	8.76E-06	0.000451	0.000601	0
7.244872	0	0	7.244872	4.49E-05	0	0	4.49E-05	0.00114	0
61.03761	0.434353	0.882522	62.35449	0.00187	0.000172	0.001083	0.003124	0.00194	4.18E-06
331.2167	15.29324	0	346.5099	0.00332	0.000207	0	0.003528	0.052136	0.002407
2.585105	0.217721	0	2.802825	0.001931	0.000645	0	0.002576	0.000527	4.44E-05
21.34139	0.09342	0.16169	21.5965	0.000317	4.51E-05	0.0002	0.000562	0.000501	1.14E-06
9.267422	0.274071	0	9.541492	0.000193	7.35E-06	0	0.0002	0.001459	4.31E-05
0.093309	0.001542	0	0.094851	7.4E-05	3.72E-06	0	7.77E-05	1.9E-05	3.14E-07
6.292691	0.375238	0.034619	6.702548	0.000354	0.000351	5.24E-05	0.000757	0.000224	1.28E-05
14.30201	1.238306	0	15.54031	4.85E-05	4.89E-06	0	5.34E-05	0.002251	0.000195
2.836452	0.360525	0	3.196976	0.007267	0.001283	0	0.00855	0.000578	7.35E-05
7.091139	0	0.025382	7.11652	1.54E-05	0	2.52E-05	4.06E-05	6.55E-05	0

10.4942	0	0	10.4942	2.85E-05	0	0	2.85E-05	0.001652	0
0	0	0	0	0	0	0	0	0	0
1.373591	0	0	1.373591	0.000987	0	0	0.000987	0.00028	0

N2O_STREX	N2O_TOTE	ROG_RUNE	ROG_IDLEX	ROG_STREX	ROG_TOTE	ROG_DIUR	ROG_HOTS	ROG_RUNL	ROG_TOTA
4.75E-06	4.97E-05	0.000477	0	0	0.000477	6.98E-05	1.91E-05	0.000171	0.000737
0	0.344881	0.160866	0.054607	0	0.215474	0	0	0	0.215474
0	0.004103	0.001541	0.000104	0	0.001645	0	0	0	0.001645
0.048513	0.125704	0.209127	0	0.618872	0.827998	0.496988	0.147895	0.365217	1.838098
0	0.001252	0.001257	0	0	0.001257	0	0	0	0.001257
0	0	0	0	0	0	0	0	0	0
0.000317	0.000445	0.000318	0	0.002519	0.002837	0.001981	0.000592	0.000537	0.005947
0.005982	0.021595	0.059599	0	0.119653	0.179252	0.124972	0.033793	0.102341	0.440357
0	9.12E-06	4.31E-05	0	0	4.31E-05	0	0	0	4.31E-05
0	0	0	0	0	0	0	0	0	0
1.34E-08	1.89E-08	1.37E-08	0	1.06E-07	1.2E-07	7.71E-08	2.03E-08	2.1E-08	2.38E-07
0.023066	0.064028	0.099709	0	0.288054	0.387763	0.187736	0.055642	0.139621	0.770763
0	0.000476	0.000273	0	0	0.000273	0	0	0	0.000273
0	0	0	0	0	0	0	0	0	0
8.38E-06	1.2E-05	8.81E-06	0	6.57E-05	7.45E-05	4.14E-05	1.18E-05	1.17E-05	0.000139
0.009521	0.017221	0.035373	0.005657	0.038648	0.079678	0.040457	0.011807	0.056959	0.188902
0	0.039503	0.096023	0.001165	0	0.097188	0	0	0	0.097188
0.001111	0.001936	0.003096	0.000654	0.004149	0.007899	0.004321	0.001179	0.005953	0.019352
0	0.016658	0.027535	0.000378	0	0.027913	0	0	0	0.027913
0.0003	0.003858	0.122035	0	0.047008	0.169043	0.067728	0.098777	0.103222	0.43877
0.028326	0.082186	0.150733	0	0.444752	0.595485	0.229287	0.067733	0.173855	1.06636
0	0.004197	0.001216	0	0	0.001216	0	0	0	0.001216
0	0	0	0	0	0	0	0	0	0
2.25E-05	3.16E-05	2.27E-05	0	0.000178	0.000201	0.000118	3.23E-05	3.35E-05	0.000384
8.16E-06	0.000609	0.002177	0	4.07E-05	0.002218	0.010988	0.00323	6.79E-05	0.016504
0	0.00114	0.000967	0	0	0.000967	0	0	0	0.000967
0.000437	0.002381	0.010663	0.00077	0.0073	0.018732	0.004518	0.001458	0.00966	0.034369
0	0.054544	0.071484	0.004467	0	0.075951	0	0	0	0.075951
0	0.000571	2.76E-05	9.21E-06	0	3.68E-05	0	0	0	3.68E-05
0.000146	0.000648	0.001557	0.000177	0.001093	0.002827	0.000696	0.000181	0.000723	0.004427
0	0.001502	0.004148	0.000158	0	0.004307	0	0	0	0.004307
0	1.93E-05	1.06E-06	5.32E-08	0	1.11E-06	0	0	0	1.11E-06
3.42E-05	0.000271	0.0024	0.001538	0.00033	0.004268	0.00032	0.000123	0.000243	0.004953
0	0.002446	0.001044	0.000105	0	0.001149	0	0	0	0.001149
0	0.000652	0.000104	1.83E-05	0	0.000122	0	0	0	0.000122
1.73E-05	8.28E-05	5.02E-05	0	0.000106	0.000156	2.76E-05	7.42E-06	1.95E-05	0.00021

0	0.001652	0.000614	0	0	0.000614	0	0	0	0.000614
0	0	0	0	0	0	0	0	0	0
0	0.00028	6.61E-05	0	0	6.61E-05	0	0	0	6.61E-05

TOG_RUNE	TOG_IDLEX	TOG_STREX	TOG_TOTE	TOG_DIURN	TOG_HOTS	TOG_RUNL	TOG_TOTA	CO_RUNEX	CO_IDLEX
0.000696	0	0	0.000696	6.98E-05	1.91E-05	0.000171	0.000956	0.02827	0
0.183134	0.062166	0	0.2453	0	0	0	0.2453	0.601934	0.639317
0.038183	0.005525	0	0.043708	0	0	0	0.043708	0.170553	0.010746
0.30494	0	0.677578	0.982519	0.496988	0.147895	0.365217	1.992618	12.84344	0
0.001431	0	0	0.001431	0	0	0	0.001431	0.014078	0
0	0	0	0	0	0	0	0	0	0
0.000465	0	0.002758	0.003223	0.001981	0.000592	0.000537	0.006333	0.048307	0
0.086565	0	0.131	0.217565	0.124972	0.033793	0.102341	0.478671	2.534214	0
4.91E-05	0	0	4.91E-05	0	0	0	4.91E-05	0.000246	0
0	0	0	0	0	0	0	0	0	0
2E-08	0	1.16E-07	1.36E-07	7.71E-08	2.03E-08	2.1E-08	2.55E-07	2.08E-06	0
0.14442	0	0.31537	0.45979	0.187736	0.055642	0.139621	0.842789	5.785256	0
0.000311	0	0	0.000311	0	0	0	0.000311	0.001838	0
0	0	0	0	0	0	0	0	0	0
1.29E-05	0	7.19E-05	8.48E-05	4.14E-05	1.18E-05	1.17E-05	0.00015	0.001341	0
0.0507	0.008247	0.042302	0.10125	0.040457	0.011807	0.056959	0.210473	0.746897	0.04482
0.109316	0.001326	0	0.110642	0	0	0	0.110642	0.28414	0.009657
0.004517	0.000955	0.004542	0.010014	0.004321	0.001179	0.005953	0.021468	0.071108	0.00523
0.031347	0.00043	0	0.031777	0	0	0	0.031777	0.075396	0.003132
0.142731	0	0.05107	0.193801	0.067728	0.098777	0.103222	0.463528	1.313761	0
0.215353	0	0.486907	0.70226	0.229287	0.067733	0.173855	1.173135	6.914948	0
0.001384	0	0	0.001384	0	0	0	0.001384	0.017902	0
0	0	0	0	0	0	0	0	0	0
3.31E-05	0	0.000195	0.000228	0.000118	3.23E-05	3.35E-05	0.000412	0.003451	0
0.003059	0	4.45E-05	0.003103	0.010988	0.00323	6.79E-05	0.017389	0.057985	0
0.001101	0	0	0.001101	0	0	0	0.001101	0.003361	0
0.014922	0.001111	0.007972	0.024004	0.004518	0.001458	0.00966	0.03964	0.247261	0.011459
0.081379	0.005085	0	0.086464	0	0	0	0.086464	0.199972	0.051082
0.001971	0.000658	0	0.002628	0	0	0	0.002628	0.00749	0.001481
0.002272	0.000259	0.001196	0.003727	0.000696	0.000181	0.000723	0.005327	0.035811	0.001374
0.004723	0.00018	0	0.004903	0	0	0	0.004903	0.01052	0.001363
7.55E-05	3.8E-06	0	7.93E-05	0	0	0	7.93E-05	0.000296	1.22E-05
0.003038	0.002224	0.00036	0.005622	0.00032	0.000123	0.000243	0.006307	0.05965	0.01182
0.001188	0.00012	0	0.001308	0	0	0	0.001308	0.003005	0.001971
0.007416	0.00131	0	0.008726	0	0	0	0.008726	0.024135	0.001876
7.32E-05	0	0.000116	0.000189	2.76E-05	7.42E-06	1.95E-05	0.000243	0.000959	0

0.000699	0	0	0.000699	0	0	0	0.000699	0.002324	0
0	0	0	0	0	0	0	0	0	0
0.001066	0	0	0.001066	0	0	0	0.001066	0.006867	0

CO_STREX	CO_TOTEX	SOx_RUNE	SOx_IDLEX	SOx_STREX	SOx_TOTEX	NH3_RUNE	Fuel Consumption
0.000351	0.028622	2.65E-06	0	5.86E-08	2.71E-06	1.95E-06	0.028888
0	1.24125	0.019516	0.001213	0	0.020729	0.222182	195.544
0	0.181299	0	0	0	0	0.010387	2.326246
5.751445	18.59489	0.032875	0	0.000976	0.033851	0.327392	361.071
0	0.014078	7.53E-05	0	0	7.53E-05	0.000101	0.709977
0	0	0	0	0	0	0	0
0.019366	0.067673	0.000286	0	1.01E-05	0.000296	0.003329	3.152822
1.135711	3.669925	0.003165	0	0.00012	0.003284	0.032919	35.03356
0	0.000246	5.48E-07	0	0	5.48E-07	4.34E-07	0.00517
0	0	0	0	0	0	0	0
8.15E-07	2.9E-06	1.23E-08	0	4.84E-10	1.28E-08	1.75E-07	0.000136
2.612784	8.39804	0.0149	0	0.000468	0.015368	0.122861	163.9207
0	0.001838	2.86E-05	0	0	2.86E-05	2.78E-05	0.270024
0	0	0	0	0	0	0	0
0.000505	0.001846	7.91E-06	0	3.16E-07	8.22E-06	0.000111	0.087716
0.52245	1.314168	0.003849	1.47E-05	4.48E-05	0.003909	0.017944	41.69295
0	0.293797	0.002362	1.4E-05	0	0.002376	0.050097	22.39767
0.064495	0.140832	0.000512	1.97E-06	5.45E-06	0.00052	0.002182	5.544509
0	0.078528	0.000995	7.23E-06	0	0.001002	0.020398	9.445018
0.233917	1.547678	0.00015	0	1.59E-05	0.000166	0.000648	1.77229
3.097839	10.01279	0.01765	0	0.000603	0.018253	0.119423	194.6932
0	0.017902	0.000252	0	0	0.000252	0.00019	2.379457
0	0	0	0	0	0	0	0
0.001368	0.004819	2.04E-05	0	1.06E-06	2.14E-05	0.00029	0.228616
0.000815	0.058801	0.000355	0	6.87E-08	0.000355	0.000816	3.783585
0	0.003361	6.86E-05	0	0	6.86E-05	0.000723	0.6466
0.12513	0.38385	0.000604	4.3E-06	8.73E-06	0.000617	0.001413	6.581583
0	0.251053	0.003134	0.000145	0	0.003278	0.037677	30.92576
0	0.008971	0	0	0	0	0.002718	0.323964
0.023072	0.060257	0.000211	9.24E-07	1.6E-06	0.000214	0.000515	2.279533
0	0.011884	8.77E-05	2.59E-06	0	9.03E-05	0.00074	0.851571
0	0.000308	0	0	0	0	9.1E-05	0.010963
0.005926	0.077396	6.23E-05	3.71E-06	3.43E-07	6.63E-05	0.00033	0.707461
0	0.004976	0.000135	1.17E-05	0	0.000147	0.001359	1.386961
0	0.026012	0	0	0	0	0.002358	0.369522
0.002146	0.003105	7.02E-05	0	2.51E-07	7.04E-05	0.000175	0.751156

0	0.002324	9.93E-05	0	0	9.93E-05	0.001084	0.9366
0	0	0	0	0	0	0	0
0	0.006867	0	0	0	0	0.001398	0.158766

Carnegie SVRA RMA EIR

Operational Air Quality Emission Estimates and Transportation Energy Calculations
Prepared by: MIG, Inc.
November 2024

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Sheet 1: Emission Summary

Table 1-1: 2020 Conditions: Annual Exhaust Emission Totals

Construction Phase / Source	AQ Emissions (short tons)					GHG Emissions (Metric tons)			
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O	CO2e
Heavy-Duty Off-Road Equipment	0.0	0.3	0.2	0.0	0.0	38.6	0.0	0.0	38.7
Parks-Owned On- and Off-Road Vehicles	0.0	0.2	0.1	0.0	0.0	82.3	0.0	0.0	84.1
Small, Utility Off-Road Equipment	1.6	5.3	0.3	0.0	0.0	35.8	0.0	0.0	36.0
Worker and Vendor Trips	0.4	0.4	0.4	0.4	0.4	3.0	0.3	0.3	96.4
Total	2.0	6.2	0.9	0.4	0.4	159.7	0.3	0.3	255.3

Table 1-2: 2020 Conditions: Average Daily Exhaust Emission Totals

Construction Phase / Source	Emissions (pounds)				
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)
Heavy-Duty Off-Road Equipment	0.1	2.4	1.4	0.0	0.0
Parks-Owned On- and Off-Road Vehicles	0.2	1.6	0.9	0.0	0.0
Small, Utility Off-Road Equipment	12.2	40.8	2.1	0.1	0.1
Worker and Vendor Trips	2.7	2.7	2.8	2.7	2.7
Total	15.2	47.4	7.2	2.8	2.8

Sheet 2: Off-Road Heavy-Duty Equipment Emissions

Table 2-1: Existing Heavy-Duty Equipment Annual Emissions

Equipment	Annual Runtime	Horsepower	Load Factor	Emission Factor (g/hp-hr)								Emissions (short tons)							
				NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O	NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O
7130 TRACTOR	149.0	130	0.70	2.32	3.7	0.09	0.112	0.112	256.187	0.021	0.004	0.03	0.06	0.00	0.00	0.00	3.83	0.00	0.00
672G GRADER	68.0	255	0.41	1.29	2.6	0.06	0.009	0.009	514.029	0.021	0.004	0.01	0.02	0.00	0.00	0.00	4.03	0.00	0.00
430E BACKHOE	149.0	95	0.37	2.74	3.7	0.09	0.112	0.112	571.454	0.021	0.004	0.02	0.02	0.00	0.00	0.00	3.30	0.00	0.00
480 TRAIL DOZER	7.0	91	0.43	2.74	3.7	0.09	0.112	0.112	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
750J DOZER	8.0	157	0.43	2.32	3.7	0.09	0.112	0.112	514.029	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00
544K LOADER	167.0	163	0.36	2.15	3.7	0.08	0.009	0.009	571.454	0.021	0.004	0.02	0.04	0.00	0.00	0.00	6.17	0.00	0.00
E18B MINI EX	7.0	15	0.38	4.55	4.1	0.09	0.128	0.128	571.454	0.024	0.005	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
T190 SKID STEER	50.0	61	0.37	2.74	3.7	0.09	0.192	0.192	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00
500 TRAIL DOZER	0.0	80	0.43	2.74	3.7	0.09	0.192	0.192	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RENTAL KOBELCO	200.0	175	0.37	2.15	3.7	0.08	0.009	0.009	514.029	0.021	0.004	0.03	0.05	0.00	0.00	0.00	7.34	0.00	0.00
RENTAL KOBELCO	200.0	175	0.37	2.15	3.7	0.08	0.009	0.009	514.029	0.021	0.004	0.03	0.05	0.00	0.00	0.00	7.34	0.00	0.00
RENTAL BACKHOE/LOADER	200.0	100	0.37	2.15	3.7	0.08	0.009	0.009	571.454	0.021	0.004	0.02	0.03	0.00	0.00	0.00	4.66	0.00	0.00
RENTAL BACKHOE/LOADER	200.0	100	0.37	2.15	3.7	0.08	0.009	0.009	571.454	0.021	0.004	0.02	0.03	0.00	0.00	0.00	4.66	0.00	0.00
											Total	0.19	0.31	0.01	0.00	0.00	42.54	0.00	0.00

Sheet 3: Off-Road Heavy-Duty Equipment Emission Factors

Table 3-1: Equipment Category and Emissions Assignment (Default; No Runtime Hour Adjustment)

Equipment	Horsepower	Engine Tier	OFFROAD Category	HP_Bin	Load Factor	Default (Zero Hour) Emission Factors							
						ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	130	3	Agricultural - Agricultural Tractors	175	0.70	0.090	3.700	2.320	0.112	0.112	256.1869076	0.021	0.004
672G GRADER	255	4	Construction and Mining - Graders	300	0.41	0.060	2.600	1.290	0.009	0.009	514.03	0.021	0.004
430E BACKHOE	95	3	Construction and Mining - Tractors/Loaders/Back	100	0.37	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
480 TRAIL DOZER	91	3	Construction and Mining - Crawler Tractors	100	0.43	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
750J DOZER	157	3	Construction and Mining - Crawler Tractors	175	0.43	0.090	3.700	2.320	0.112	0.112	514.0285459	0.021	0.004
544K LOADER	163	4	Construction and Mining - Rubber Tired Loaders	175	0.36	0.080	3.700	2.150	0.009	0.009	571.4540783	0.021	0.004
E18B MINI EX	15	4	Construction and Mining - Excavators	50	0.38	0.090	4.100	4.550	0.128	0.128	571.4540783	0.024	0.005
T190 SKID STEER	61	3	Construction and Mining - Skid Steer Loaders	75	0.37	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
500 TRAIL DOZER	80	3	Construction and Mining - Crawler Tractors	75	0.43	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
RENTAL KOBELCO	175	4	Construction and Mining - Tractors/Loaders/Back	175	0.37	0.080	3.700	2.150	0.009	0.009	514.0285459	0.021	0.004
RENTAL KOBELCO	175	4	Construction and Mining - Tractors/Loaders/Back	175	0.37	0.080	3.700	2.150	0.009	0.009	514.0285459	0.021	0.004
RENTAL BACKHOE/LOADER	100	4	Construction and Mining - Tractors/Loaders/Back	100	0.37	0.080	3.700	2.150	0.009	0.009	571.4540783	0.021	0.004
RENTAL BACKHOE/LOADER	100	4	Construction and Mining - Tractors/Loaders/Back	100	0.37	0.080	3.700	2.150	0.009	0.009	571.4540783	0.021	0.004

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

Table 3-2: Equipment Category and Emissions Assignment (Runtime Hour Adjustment)

Equipment	Existing Runtime Hours on Equipment	Adjusted/Deteriorated Emission Factors							
		ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	459.3	0.099	3.700	2.332	0.112	0.112	256.19	0.021	0.004
672G GRADER	1941.5	0.093	2.600	1.323	0.010	0.010	514.03	0.021	0.004
430E BACKHOE	2658.9	0.151	3.700	2.836	0.133	0.133	571.45	0.021	0.004
480 TRAIL DOZER	346.7	0.098	3.700	2.752	0.115	0.115	571.45	0.021	0.004
750J DOZER	4230.4	0.175	3.700	2.434	0.114	0.114	514.03	0.021	0.004
544K LOADER	1672.1	0.113	3.700	2.195	0.010	0.010	571.45	0.021	0.004
E18B MINI EX	2200	0.169	4.100	4.759	0.149	0.149	571.45	0.024	0.005
T190 SKID STEER	2140.9	0.139	3.700	2.817	0.222	0.222	571.45	0.021	0.004
500 TRAIL DOZER	1.4	0.090	3.700	2.740	0.192	0.192	571.45	0.021	0.004
RENTAL KOBELCO	4230.4	0.152	3.700	2.222	0.010	0.010	514.03	0.021	0.004
RENTAL KOBELCO	4230.4	0.152	3.700	2.222	0.010	0.010	514.03	0.021	0.004
RENTAL BACKHOE/LOADER	4230.4	0.165	3.700	2.264	0.011	0.011	571.45	0.021	0.004
RENTAL BACKHOE/LOADER	4230.4	0.165	3.700	2.264	0.011	0.011	571.45	0.021	0.004

Sheet 4: U.S. EPA Tier III and Tier IV Emission Factors

Table 4-1: U.S. EPA Tier III Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	--	--	--	--	--
50≤hp<75	75	0.09	3.7	2.74	0.192	0.192
75≤hp<100	100	0.09	3.7	2.74	0.112	0.112
100≤hp<175	175	0.09	3.7	2.32	0.112	0.112
175≤hp<300	300	0.09	2.6	2.32	0.088	0.088
300≤hp<600	600	0.09	2.6	2.32	0.088	0.088

CARB 2017 Table D-9 (pg. 235); and CalEEMod v2022.4.0 for CO.

Table 4-2: U.S EPA Tier III Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	--	--	--
50≤hp<75	75	0.000023	0.000036	0.0000141
75≤hp<100	100	0.000023	0.000036	0.0000080
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000023	0.000030	0.0000046
300≤hp<600	600	0.000023	0.000030	0.0000044

Table 4-3: U.S. EPA Tier IV (Interim) Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	0.09	4.1	4.55	0.128	0.128
50≤hp<75	75	0.09	3.7	2.74	0.112	0.112
75≤hp<100	100	0.08	3.7	2.15	0.009	0.009
100≤hp<175	175	0.08	3.7	2.15	0.009	0.009
175≤hp<300	300	0.06	2.6	1.29	0.009	0.009
300≤hp<600	600	0.06	2.6	1.29	0.009	0.009

CARB 2017 Table D-9 (pg. 235); EFs for Tier IV (Phase-In or Alt. NOx) Used Where Option Exists and CalEEMod v2022.4.0 for CO.

Table 4-4: U.S. EPA Tier IV (Interim) Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	0.000036	0.000095	0.0000096
50≤hp<75	75	0.000023	0.000036	0.0000080
75≤hp<100	100	0.000021	0.000027	0.0000009
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000017	0.000017	0.0000003
300≤hp<600	600	0.000017	0.000017	0.0000003

Sheet 5: On-Site, On-Road Vehicles Emission Factors and Emissions

Table 5-1: 2020 On-Road Vehicle Emission Factor Assignment

Make	Model	Gross Vehicle Weight Rating (lbs)	Vehicle Class	Fuel	Emission Factors (tons / mi)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 OPERATOR	16,500	MHDT	Diesel	1.52139E-07	5.93601E-07	4.00934E-06	6.96965E-08	6.66815E-08	0.001317844	7.06646E-09	2.07627E-07
INTERNATIONAL	TRANSPORT 9300	50,000	HHDT	Diesel	1.27336E-07	9.36937E-07	4.35968E-06	6.25617E-08	5.98553E-08	0.001942614	5.91444E-09	3.0606E-07
FORD	F350 RESOURCES	10,100 to 14,000	LHDT2	Diesel	2.26767E-07	6.42695E-07	2.30686E-06	4.97898E-08	4.76359E-08	0.000870445	1.05329E-08	1.37139E-07
CHEVROLET	1500 ELIZ	6,700 to 7,300	MDV	Gasoline	3.47119E-07	2.89446E-06	3.48186E-07	2.39595E-09	2.20408E-09	0.000537652	3.44208E-08	2.33577E-08
FORD	F350 r FLATBED	10,100 to 14,000	LHDT2	Gasoline	4.88908E-07	3.34463E-06	7.06533E-07	2.31292E-09	2.12664E-09	0.001185514	3.82499E-08	4.58456E-08
RAM	2500 DAVID	10000	LHDT1	Gasoline	5.71537E-07	3.6554E-06	7.74571E-07	2.61292E-09	2.40332E-09	0.001077662	4.38512E-08	4.88921E-08
INTERNATIONAL	WATER TRUCK	52000	HHDT	Diesel	1.27336E-07	9.36937E-07	4.35968E-06	6.25617E-08	5.98553E-08	0.001942614	5.91444E-09	3.0606E-07
FORD	F350 JOHN M	10,100 to 14,000	LHDT2	Gasoline	4.88908E-07	3.34463E-06	7.06533E-07	2.31292E-09	2.12664E-09	0.001185514	3.82499E-08	4.58456E-08
FORD	F250 ERIC	10,000 to 11,400	LHDT2	Gasoline	4.88908E-07	3.34463E-06	7.06533E-07	2.31292E-09	2.12664E-09	0.001185514	3.82499E-08	4.58456E-08
FORD	F250 JESSE/MIKE	10,000 to 11,400	LHDT2	Gasoline	4.88908E-07	3.34463E-06	7.06533E-07	2.31292E-09	2.12664E-09	0.001185514	3.82499E-08	4.58456E-08
INTERNATIONAL	DUMPTRUCK		HHDT	Diesel	1.27336E-07	9.36937E-07	4.35968E-06	6.25617E-08	5.98553E-08	0.001942614	5.91444E-09	3.0606E-07
FORD	F250 ROBERT	10,000 to 11,400	LHDT2	Gasoline	4.88908E-07	3.34463E-06	7.06533E-07	2.31292E-09	2.12664E-09	0.001185514	3.82499E-08	4.58456E-08
FORD	F350 FLATBED	10,100 to 14,000	LHDT2	Diesel	2.26767E-07	6.42695E-07	2.30686E-06	4.97898E-08	4.76359E-08	0.000870445	1.05329E-08	1.37139E-07

Table 6-2: 2020 On-Road Vehicle Emission Calculations

Make	Model	Annual VMT	Vehicle Class	Fuel	Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 (OPERATOR)	6999	MHDT	Diesel	0.001064821	0.004154614	0.028061352	0.000487806	0.000466703	9.223589079	4.94582E-05	0.00145318
INTERNATIONAL	TRANSPORT 9300	1781	HHDT	Diesel	0.000226786	0.001668686	0.007764595	0.000111422	0.000106602	3.45979504	1.05336E-05	0.000545092
FORD	F350 (RESOURCES)	10144	LHDT2	Diesel	0.002300322	0.0065195	0.023400764	0.000505068	0.000483219	8.829795507	0.000106846	0.001391138
CHEVROLET	1500 (ELIZ)	8944.5	MDV	Gasoline	0.003104807	0.025889454	0.003114348	2.14306E-05	1.97144E-05	4.80902646	0.000307877	0.000208923
FORD	F350 r FLATBED	4341	LHDT2	Gasoline	0.002122351	0.014519056	0.003067061	1.00404E-05	9.23175E-06	5.146316171	0.000166043	0.000199016
RAM	2500 (DAVID)	10158	LHDT1	Gasoline	0.005805672	0.037131559	0.007868088	2.65421E-05	2.4413E-05	10.94689088	0.000445441	0.000496646
INTERNATIONAL	WATER TRUCK	2280	HHDT	Diesel	0.000290327	0.002136217	0.009940076	0.000142641	0.00013647	4.429159288	1.34849E-05	0.000697816
FORD	F350 (JOHN M)	5879	LHDT2	Gasoline	0.002874292	0.019663103	0.004153709	1.35976E-05	1.25025E-05	6.969636667	0.000224871	0.000269526
FORD	F250 (ROBERT)	6797.5	LHDT2	Gasoline	0.003323354	0.02273515	0.00480266	1.57221E-05	1.44559E-05	8.058531254	0.000260004	0.000311635
FORD	F250 (JESSE/MIKE)	6359	LHDT2	Gasoline	0.003108968	0.021268528	0.004492845	1.47078E-05	1.35233E-05	7.538683375	0.000243231	0.000291532
INTERNATIONAL	DUMPTRUCK	445	HHDT	Diesel	5.66647E-05	0.000416937	0.001940059	2.78399E-05	2.66356E-05	0.864463107	2.63193E-06	0.000136197
FORD	F250 (KEITH)	13861	LHDT2	Gasoline	0.006776758	0.046359972	0.009793257	3.20593E-05	2.94774E-05	16.43240923	0.000530182	0.000635466
FORD	F350 FLATBED	4634	LHDT2	Diesel	0.001050837	0.002978249	0.010689978	0.000230726	0.000220745	4.033642782	4.88094E-05	0.000635502
				Total	0.03210596	0.205441025	0.119088791	0.001639602	0.001563693	90.74193884	0.002409413	0.007271668

Sheet 6: On-Site Small Equipment Emission Factors and Emissions

Table 6-1: On-site Small Equipment Category and Emission Factor Assignment

Make	Model	Horsepower	Fuel	OFFROAD Category	HP_Bin	Load Factor	Emission Factors							
							ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
GATOR 1*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	17.612	80.634	71.965	3.654	3.361	10179.997	0.021	0.004
GATOR 2*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	17.612	80.634	71.965	3.654	3.361	10179.997	0.021	0.004
KUBOTA 1	RTV-X1100CWL-A	24	Diesel	Agricultural - ATVs	25	0.40	1.107	3.234	2.372	0.154	0.142	284.807	0.021	0.004
KUBOTA 2*	RTV-X1100CWL-A	24	Diesel	Agricultural - ATVs	25	1.00	17.612	80.634	71.965	3.654	3.361	10179.997	0.021	0.004
Gator 855*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	17.612	80.634	71.965	3.654	3.361	10179.997	0.021	0.004
Canycom 1	SC75	22.1	Gasoline	Construction and Mining - Paving Equipment	50	0.36	0.825	4.371	3.967	0.227	0.209	571.454	0.018	0.004
Canycom 2	SC75	22.1	Gasoline	Construction and Mining - Paving Equipment	50	0.36	0.825	4.371	3.967	0.227	0.209	571.454	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Dewalt Generator	DXGNR4000	8	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Gerenac Generator	GP8000E	13	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EU2200I	3.6	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EU2200I	3.6	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EG 2500	5.5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Ryobi Generator	RYI2322VNM	5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Ryobi Generator	RYI2322VNM	5	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Echo Generator	EGI-3600LN	7	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Honda Generator	EM6500SX	11.7	Gasoline	N/A; CalEEMod - Generator Sets	25	0.68	674.990	258.674	3.372	0.284	0.215	429.448	0.018	0.004
Jumping Jack	MTX-70	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Jumping Jack	MTR-40	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Vibroplate	WP 1550	4.15	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
John Deere Mower	727A	23	Gasoline	Lawn and Garden - Misc - Rear Engine Riding	Aggregate	1.00	49.899	2361.600	24.347	0.319	0.241	4994.210	0.319	0.241

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

* - Emission factors for Gator 1, Gator 2, Kubota 2, Gator 855, and John Deere Mower (727A) are based on emissions per gallon of fuel consumed.

Table 6-2: Small Equipment Annual Emissions Estimates

Make	Model	Annual Runtime	Horsepower	Load Factor	Annual Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
GATOR 1*	XUV 855D	321	24.6	1.00	0.006232038	0.02853164	0.025464344	0.001292824	0.001189398	3.602112762	7.43069E-06	1.41537E-06
GATOR 2*	XUV 855D	156.75	24.6	1.00	0.003043215	0.01393251	0.012434692	0.000631309	0.000580804	1.758975624	3.62854E-06	6.9115E-07
KUBOTA 1	RTV-X1100CWL-A	4272.4	24	0.40	0.050030078	0.14622138	0.107241974	0.006962205	0.006405229	12.87652764	0.000949439	0.000180846
KUBOTA 2*	RTV-X1100CWL-A	840	24	1.00	0.02	0.07	0.07	0.00	0.00	9.43	0.00	0.00
Gator 855*	XUV 855D	73	24.6	1.00	0.001407548	0.00644406	0.005751293	0.000291993	0.000268634	0.813561293	1.67827E-06	3.19671E-07
Canycom 1	SC75	77	22.1	0.36	0.000556823	0.00295147	0.002679149	0.000153383	0.000141113	0.385897046	1.21552E-05	2.70116E-06
Canycom 2	SC75	47.1	22.1	0.36	0.000340602	0.00180538	0.001638804	9.38228E-05	8.63169E-05	0.236048713	7.4352E-06	1.65227E-06
Dewalt Generator	DXGNR4000	63.8	8	0.68	0.258238824	0.09896394	0.001290066	0.000108653	8.22551E-05	0.164298947	6.88647E-06	1.53033E-06
Dewalt Generator	DXGNR4000	52.6	8	0.68	0.212905363	0.08159096	0.001063596	8.95793E-05	6.78153E-05	0.135456499	5.67756E-06	1.26168E-06
Dewalt Generator	DXGNR4000	6.2	8	0.68	0.025095309	0.00961719	0.000125367	1.05588E-05	7.99344E-06	0.015966355	6.69218E-07	1.48715E-07
Gerenac Generator	GP8000E	18.9	13	0.68	0.124312851	0.04763997	0.000621021	5.23043E-05	3.95965E-05	0.079091402	3.31506E-06	7.3668E-07
Honda Generator	EU2200I	35.4	3.6	0.68	0.064433218	0.02469251	0.000321884	2.71101E-05	2.05235E-05	0.040994261	1.71824E-06	3.81832E-07
Honda Generator	EU2200I	35.4	3.6	0.68	0.064433218	0.02469251	0.000321884	2.71101E-05	2.05235E-05	0.040994261	1.71824E-06	3.81832E-07
Honda Generator	EG 2500	35.4	5.5	0.68	0.098439638	0.03772467	0.000491768	4.14182E-05	3.13553E-05	0.062630121	2.6251E-06	5.83355E-07
Ryobi Generator	RYI2322VNM	35.4	5	0.68	0.08949058	0.03429515	0.000447062	3.76529E-05	2.85048E-05	0.056936474	2.38645E-06	5.30322E-07
Ryobi Generator	RYI2322VNM	35.4	5	0.68	0.08949058	0.03429515	0.000447062	3.76529E-05	2.85048E-05	0.056936474	2.38645E-06	5.30322E-07
Echo Generator	EGI-3600LN	35.4	7	0.68	0.125286812	0.04801322	0.000625887	5.2714E-05	3.99068E-05	0.079711064	3.34103E-06	7.42451E-07
Honda Generator	EM6500SX	35.4	11.7	0.68	0.209407957	0.08025066	0.001046125	8.81078E-05	6.67013E-05	0.133231349	5.58429E-06	1.24095E-06
Jumping Jack	MTX-70	9	2.8	0.55	0.015189037	0.0035037	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Jumping Jack	MTR-40	9	2.8	0.55	0.015189037	0.0035037	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Vibroplate	WP 1550	9	4.15	0.55	0.022512323	0.00519298	0.000109938	5.31234E-05	4.01483E-05	0.009724369	4.07596E-07	9.0577E-08
John Deere Mower*	727A	1725.1	23	1.00	0.09488786	4.49081519	0.046298909	0.000607212	0.000458339	9.496983551	0.000607212	0.000458339
				Total	1.587231049	5.29934018	0.275204842	0.01411351	0.012770282	39.48528971	0.001645689	0.000657949

Note: * - Assumes XUVs, RTVs, and mower consume one gallon of gas per hour runtime.

Sheet 7: Off-site Worker and Vendor Emission Factors

Table 7-1: Worker and Vendor Trips: Emissions Assignment

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emission Factors (tons / mi)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	1.991E-07	1.991E-07	1.991E-07	1.991E-07	1.991E-07	1.991E-07	1.991E-07	1.991E-07
					LDT1	Agg	0.25	6.042E-07	6.042E-07	6.042E-07	6.042E-07	6.042E-07	6.042E-07	6.042E-07	6.042E-07
					LDT2	Agg	0.25	2.4E-07	2.4E-07	2.4E-07	2.4E-07	2.4E-07	2.4E-07	2.4E-07	2.4E-07
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	60	1140	HHDT	Diesel	0.5	1.273E-07	9.369E-07	4.36E-06	6.256E-08	5.986E-08	0.0019426	5.914E-09	3.061E-07
Harkrader and Sons Trucking	Sand	6	60	360	HHDT	Diesel	0.5	1.273E-07	9.369E-07	4.36E-06	6.256E-08	5.986E-08	0.0019426	5.914E-09	3.061E-07

Table 7-2: Worker and Vendor Trips: Emissions Calculations

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emissions (tons)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	0.0670204	0.0670204	0.0670204	0.0670204	0.0670204	0.0670204	0.0670204	0.0670204
					LDT1	Agg	0.25	0.2033757	0.2033757	0.2033757	0.2033757	0.2033757	0.2033757	0.2033757	0.2033757
					LDT2	Agg	0.25	0.0807738	0.0807738	0.0807738	0.0807738	0.0807738	0.0807738	0.0807738	0.0807738
							Worker Sub-Total	**0.3511699**	**0.3511699**	**0.3511699**	**0.3511699**	**0.3511699**	**0.3511699**	**0.3511699**	**0.3511699**
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	60	1140	HHDT	Diesel	0.5	0.0001452	0.0010681	0.00497	7.132E-05	6.824E-05	2.2145796	6.742E-06	0.0003489
Harkrader and Sons Trucking	Sand	6	60	360	HHDT	Diesel	0.5	4.584E-05	0.0003373	0.0015695	2.252E-05	2.155E-05	0.6993409	2.129E-06	0.0001102
							Vendor Sub-Total	**0.000191**	**0.0014054**	**0.0065395**	**9.384E-05**	**8.978E-05**	**2.9139206**	**8.872E-06**	**0.0004591**
							Total	**0.3513609**	**0.3525753**	**0.3577094**	**0.3512637**	**0.3512596**	**3.2650904**	**0.3511787**	**0.351629**

Sheet 8: OFFROAD Output

Model Output: OFFROAD2021 (v1.0.7) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2020
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horse

Region	Calendar Year	Vehicle Category	Model Year
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2020	Agricultural - ATVs	Aggregate
San Joaquin	2020	Agricultural - ATVs	Aggregate
San Joaquin	2020	Agricultural - ATVs	Aggregate
San Joaquin	2020	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2020	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2020	Agricultural - Balers (Self Propelled)	Aggregate
San Joaquin	2020	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2020	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2020	Agricultural - Construction Equipment	Aggregate
San Joaquin	2020	Agricultural - Construction Equipment	Aggregate
San Joaquin	2020	Agricultural - Construction Equipment	Aggregate
San Joaquin	2020	Agricultural - Construction Equipment	Aggregate
San Joaquin	2020	Agricultural - Construction Equipment	Aggregate
San Joaquin	2020	Agricultural - Forklifts	Aggregate
San Joaquin	2020	Agricultural - Forklifts	Aggregate
San Joaquin	2020	Agricultural - Forklifts	Aggregate
San Joaquin	2020	Agricultural - Forklifts	Aggregate
San Joaquin	2020	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2020	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2020	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Nut Harvester	Aggregate
San Joaquin	2020	Agricultural - Other Harvesters	Aggregate
San Joaquin	2020	Agricultural - Other Harvesters	Aggregate
San Joaquin	2020	Agricultural - Other Harvesters	Aggregate
San Joaquin	2020	Agricultural - Other Harvesters	Aggregate

San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2020	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2020	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2020	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2020	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2020	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2020	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Cranes	Aggregate
San Joaquin	2020	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Graders	Aggregate
San Joaquin	2020	Construction and Mining - Graders	Aggregate
San Joaquin	2020	Construction and Mining - Graders	Aggregate
San Joaquin	2020	Construction and Mining - Graders	Aggregate
San Joaquin	2020	Construction and Mining - Graders	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Dumpers/Tenders	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Excavators	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Other	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Paving Equipment	Aggregate

San Joaquin	2020	Construction and Mining - Misc - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Signal Boards	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Misc - Trenchers	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2020	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2020	Construction and Mining - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Pavers	Aggregate
San Joaquin	2020	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Rollers	Aggregate
San Joaquin	2020	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2020	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2020	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2020	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2020	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Scrapers	Aggregate

San Joaquin	2020	Construction and Mining - Scrapers	Aggregate
San Joaquin	2020	Construction and Mining - Scrapers	Aggregate
San Joaquin	2020	Construction and Mining - Scrapers	Aggregate
San Joaquin	2020	Construction and Mining - Scrapers	Aggregate
San Joaquin	2020	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2020	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2020	Construction and Mining - Trenchers	Aggregate
San Joaquin	2020	Construction and Mining - Trenchers	Aggregate
San Joaquin	2020	Construction and Mining - Trenchers	Aggregate
San Joaquin	2020	Construction and Mining - Trenchers	Aggregate
San Joaquin	2020	Construction and Mining - Trenchers	Aggregate
San Joaquin	2020	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate

San Joaquin	2020	Agricultural - ATVs	Aggregate

epower-hours

HorsepoweFuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd
25 Diesel	0.004869	0.005892	0.007012	0.017219	0.012629	1.516375	0.00082
50 Diesel	0.109542	0.132545	0.15774	0.403659	0.325092	36.65575	0.029063
75 Diesel	0.060973	0.073778	0.087802	0.295798	0.498459	40.88907	0.032814
100 Diesel	0.092588	0.112032	0.133327	0.6358	0.8257	100.0423	0.057313
175 Diesel	0.058044	0.070234	0.083584	0.51549	0.637662	85.24025	0.029178
300 Diesel	0.030541	0.036955	0.04398	0.170295	0.326558	67.96037	0.014448
25 Diesel	0.001759	0.002128	0.002532	0.009742	0.008695	1.229967	0.000441
50 Diesel	0.00285	0.003449	0.004105	0.019058	0.017675	2.671437	0.000888
175 Diesel	5.72E-05	6.92E-05	8.24E-05	0.000836	0.000687	0.152282	2.61E-05
175 Diesel	0.001485	0.001797	0.002139	0.011673	0.01631	1.868693	0.000774
300 Diesel	0.000167	0.000202	0.000241	0.000866	0.001842	0.275699	8.4E-05
75 Diesel	6.97E-05	8.43E-05	0.0001	0.000451	0.000622	0.070669	3.47E-05
175 Diesel	0.00067	0.000811	0.000965	0.005674	0.007356	0.933731	0.000331
300 Diesel	0.001231	0.00149	0.001773	0.00617	0.013274	2.002508	0.000614
50 Diesel	0.000168	0.000203	0.000241	0.000714	0.000585	0.079031	4.33E-05
75 Diesel	0.000478	0.000578	0.000688	0.003094	0.004265	0.484825	0.000238
100 Diesel	0.00209	0.002529	0.00301	0.012914	0.017975	1.965625	0.001289
175 Diesel	0.005523	0.006682	0.007952	0.044253	0.0646	7.544762	0.002726
300 Diesel	0.000951	0.001151	0.001369	0.004467	0.010831	1.341204	0.000493
50 Diesel	0.002329	0.002818	0.003354	0.009935	0.008406	1.088643	0.000621
75 Diesel	0.006438	0.00779	0.00927	0.041594	0.057385	6.518711	0.003228
100 Diesel	0.002127	0.002574	0.003063	0.014342	0.01823	2.236969	0.001268
175 Diesel	0.000412	0.000498	0.000593	0.003486	0.004503	0.57248	0.000203
75 Diesel	2.65E-05	3.21E-05	3.82E-05	0.000172	0.000236	0.02688	1.32E-05
175 Diesel	0.000388	0.000469	0.000558	0.0033	0.00412	0.531795	0.000194
300 Diesel	0.000656	0.000794	0.000945	0.0034	0.007233	1.082814	0.00033
25 Diesel	0.000649	0.000785	0.000934	0.002765	0.002334	0.305903	0.00013
50 Diesel	0.002845	0.003443	0.004097	0.011688	0.009484	1.198085	0.000755
75 Diesel	0.001071	0.001296	0.001542	0.006966	0.009541	1.087712	0.000539
100 Diesel	0.00885	0.010709	0.012745	0.055851	0.075398	8.479599	0.0055
175 Diesel	0.004015	0.004858	0.005782	0.032607	0.044095	5.287264	0.002044
300 Diesel	0.002634	0.003188	0.003794	0.012464	0.028453	3.550003	0.001366
75 Diesel	0.000907	0.001098	0.001306	0.005874	0.008097	0.92038	0.000452
100 Diesel	0.004045	0.004895	0.005825	0.026554	0.034518	4.104412	0.002447
175 Diesel	0.004057	0.004909	0.005842	0.033237	0.044562	5.408078	0.002051
300 Diesel	0.001442	0.001745	0.002077	0.007352	0.015725	2.362905	0.000722

25	Diesel	2.25E-05	2.72E-05	3.24E-05	9.59E-05	8.1E-05	0.010614	4.5E-06
50	Diesel	0.00109	0.001319	0.00157	0.004651	0.003823	0.513277	0.000283
75	Diesel	0.017665	0.021375	0.025438	0.102506	0.150125	15.18198	0.010082
100	Diesel	0.000861	0.001042	0.001239	0.00568	0.007347	0.879954	0.000519
175	Diesel	0.002745	0.003322	0.003953	0.022624	0.030133	3.687037	0.001383
300	Diesel	0.002389	0.002891	0.003441	0.011458	0.025883	3.322718	0.001234
50	Diesel	0.000794	0.00096	0.001143	0.003383	0.002769	0.374298	0.000205
75	Diesel	0.000513	0.000621	0.000739	0.003325	0.004577	0.520474	0.000256
100	Diesel	0.001895	0.002293	0.002729	0.012928	0.01621	2.015399	0.001133
175	Diesel	0.000431	0.000522	0.000621	0.003434	0.004733	0.552512	0.000223
300	Diesel	0.000899	0.001087	0.001294	0.004557	0.009766	1.467378	0.00045
50	Diesel	0.000121	0.000146	0.000174	0.00061	0.000527	0.06232	4.17E-05
75	Diesel	0.00017	0.000206	0.000245	0.001522	0.001671	0.240537	9.44E-05
100	Diesel	0.00021	0.000254	0.000303	0.001265	0.00161	0.181861	0.000141
175	Diesel	0.001208	0.001462	0.00174	0.008406	0.011022	1.299223	0.000631
300	Diesel	0.001311	0.001587	0.001888	0.004652	0.013601	1.524831	0.000714
25	Diesel	1.39E-06	1.68E-06	2E-06	3.39E-06	2.33E-06	0.00019	2.53E-07
50	Diesel	1.26E-05	1.53E-05	1.82E-05	4.39E-05	4.3E-05	0.004594	3.97E-06
75	Diesel	3.67E-05	4.44E-05	5.28E-05	0.000144	0.000293	0.018876	2.59E-05
100	Diesel	9.09E-05	0.00011	0.000131	0.000408	0.000745	0.05517	6.38E-05
175	Diesel	0.000648	0.000784	0.000933	0.003582	0.006622	0.511468	0.000406
300	Diesel	0.00135	0.001634	0.001944	0.006334	0.014759	1.878771	0.000852
50	Diesel	0.000118	0.000142	0.000169	0.000372	0.000311	0.03031	3.89E-05
75	Diesel	0.000417	0.000505	0.000601	0.001713	0.003194	0.22183	0.000287
100	Diesel	0.00127	0.001536	0.001828	0.006277	0.009469	0.888136	0.000813
175	Diesel	0.002686	0.00325	0.003868	0.02183	0.026232	3.37883	0.001516
300	Diesel	0.00296	0.003581	0.004262	0.013034	0.030526	4.088515	0.001745
25	Diesel	7.15E-07	8.65E-07	1.03E-06	1.78E-06	1.36E-06	0.000111	1.48E-07
50	Diesel	0.003593	0.004348	0.005174	0.029455	0.026556	3.965203	0.001337
75	Diesel	0.001435	0.001736	0.002066	0.018698	0.017925	3.147862	0.000564
100	Diesel	0.001665	0.002015	0.002398	0.015169	0.015035	2.38989	0.001193
175	Diesel	0.00752	0.009099	0.010829	0.083359	0.069513	13.5473	0.003507
300	Diesel	0.007546	0.009131	0.010867	0.033944	0.075884	14.30609	0.00358
50	Diesel	4.75E-05	5.75E-05	6.84E-05	0.000136	0.000111	0.010015	1.52E-05
75	Diesel	9.15E-05	0.000111	0.000132	0.000276	0.000646	0.030372	6.52E-05
100	Diesel	0.000227	0.000275	0.000327	0.000725	0.001644	0.081209	0.000159
175	Diesel	0.002446	0.00296	0.003523	0.010421	0.023927	1.336186	0.001551
300	Diesel	0.002639	0.003194	0.003801	0.012488	0.030505	5.098009	0.001451
25	Diesel	2.18E-05	2.63E-05	3.14E-05	8.96E-05	0.000166	0.00024	5.57E-06
25	Diesel	6.56E-06	7.89E-06	9.42E-06	2.62E-05	4.87E-05	7.1E-05	1.84E-06
25	Diesel	4.3E-06	5.17E-06	6.18E-06	1.77E-05	3.27E-05	4.72E-05	1.1E-06
50	Diesel	1.56E-05	1.86E-05	2.25E-05	0.000129	0.000119	0.016383	5.99E-06
25	Diesel	3.09E-06	3.72E-06	4.45E-06	1.27E-05	2.35E-05	3.4E-05	8.03E-07
25	Diesel	2.22E-05	2.67E-05	3.19E-05	9.1E-05	0.000169	0.000244	5.67E-06
25	Diesel	1.15E-05	1.38E-05	1.65E-05	4.72E-05	8.74E-05	0.000126	2.94E-06
25	Diesel	5.82E-06	7E-06	8.37E-06	2.39E-05	4.43E-05	6.39E-05	1.53E-06
25	Diesel	9.91E-06	1.19E-05	1.43E-05	4.07E-05	7.53E-05	0.000109	2.53E-06

25	Diesel	6.97E-05	8.39E-05	0.0001	0.000286	0.00053	0.000766	1.78E-05
25	Diesel	3.65E-06	4.39E-06	5.25E-06	1.5E-05	2.77E-05	4.01E-05	9.33E-07
50	Diesel	6.84E-06	8.13E-06	9.84E-06	5.56E-05	5.17E-05	0.007294	2.57E-06
25	Diesel	0.001168	0.001405	0.001679	0.004755	0.008827	0.01277	0.00031
25	Diesel	0.000106	0.000127	0.000152	0.000435	0.000805	0.001163	2.73E-05
25	Diesel	0.000103	0.000124	0.000148	0.000423	0.000783	0.001132	2.63E-05
50	Diesel	0.001848	0.002237	0.002662	0.007404	0.006007	0.619197	0.000562
75	Diesel	0.000737	0.000892	0.001062	0.003835	0.00524	0.540301	0.000431
100	Diesel	0.000623	0.000754	0.000898	0.003796	0.004658	0.53988	0.000394
175	Diesel	0.001678	0.00203	0.002416	0.019353	0.014194	2.975713	0.000785
300	Diesel	0.000987	0.001194	0.001421	0.0039	0.009619	1.285885	0.000524
50	Diesel	5.41E-05	6.54E-05	7.78E-05	0.000296	0.000253	0.027915	1.93E-05
75	Diesel	4.13E-05	5E-05	5.95E-05	0.000202	0.000334	0.02766	2.85E-05
100	Diesel	2E-05	2.42E-05	2.87E-05	0.000103	0.000128	0.01422	8.91E-06
175	Diesel	0.000707	0.000855	0.001018	0.005045	0.006083	0.729022	0.000397
300	Diesel	0.001759	0.002129	0.002533	0.006409	0.017392	1.615973	0.001045
50	Diesel	0.000191	0.000231	0.000274	0.000656	0.000542	0.057454	5.51E-05
75	Diesel	0.000333	0.000403	0.000479	0.001989	0.002633	0.299098	0.000183
100	Diesel	0.000328	0.000397	0.000472	0.002213	0.002626	0.32775	0.000203
175	Diesel	0.000808	0.000977	0.001163	0.006885	0.007242	1.104008	0.000383
300	Diesel	0.000582	0.000704	0.000838	0.002918	0.00591	1.354864	0.000258
50	Diesel	0.000185	0.000224	0.000267	0.001187	0.001078	0.15522	6.17E-05
75	Diesel	0.000104	0.000126	0.00015	0.000732	0.000882	0.112634	5.28E-05
100	Diesel	0.000185	0.000224	0.000266	0.001182	0.001501	0.17407	0.00012
175	Diesel	0.000644	0.000779	0.000928	0.007645	0.005921	1.240179	0.000307
300	Diesel	0.000294	0.000356	0.000423	0.001308	0.003101	0.55052	0.000146
50	Diesel	0.002762	0.003342	0.003977	0.012902	0.011491	1.448816	0.000872
75	Diesel	0.000507	0.000614	0.00073	0.003744	0.004728	0.592431	0.000292
100	Diesel	0.001083	0.001311	0.00156	0.006051	0.008412	0.873626	0.000703
175	Diesel	0.003297	0.003989	0.004747	0.032818	0.030529	5.298454	0.001578
300	Diesel	0.000411	0.000497	0.000592	0.001567	0.004547	0.429451	0.000254
50	Diesel	4.91E-05	5.94E-05	7.07E-05	0.000334	0.000319	0.048635	1.8E-05
75	Diesel	0.000657	0.000795	0.000946	0.01102	0.010526	1.944533	0.000234
100	Diesel	0.000997	0.001206	0.001435	0.007996	0.009086	1.275703	0.000664
175	Diesel	0.003933	0.004759	0.005663	0.050946	0.040055	8.595035	0.001828
300	Diesel	5.44E-05	6.58E-05	7.83E-05	0.000239	0.000572	0.062232	3.4E-05
50	Diesel	3.99E-05	4.83E-05	5.75E-05	0.000111	8.93E-05	0.007781	1.11E-05
75	Diesel	4.87E-05	5.89E-05	7.01E-05	0.000196	0.000352	0.02552	3.2E-05
100	Diesel	9.27E-05	0.000112	0.000134	0.000428	0.000673	0.059245	6.67E-05
175	Diesel	0.000207	0.000251	0.000299	0.001318	0.001987	0.194116	0.00012
300	Diesel	0.000215	0.00026	0.00031	0.000968	0.002025	0.237643	0.000134
50	Diesel	0.000251	0.000304	0.000361	0.000948	0.000767	0.08404	7.94E-05
75	Diesel	0.00067	0.000811	0.000965	0.004525	0.00567	0.688811	0.000376
100	Diesel	0.001257	0.001521	0.001811	0.007632	0.009591	1.100736	0.000795
175	Diesel	0.007524	0.009103	0.010834	0.057113	0.06908	8.57308	0.004093
300	Diesel	0.009081	0.010988	0.013076	0.04105	0.088345	16.36544	0.004423
50	Diesel	1.05E-05	1.27E-05	1.51E-05	2.62E-05	2.15E-05	0.001792	2.84E-06

75	Diesel	3.59E-05	4.35E-05	5.17E-05	0.000172	0.000276	0.025427	2.23E-05
100	Diesel	3.4E-05	4.12E-05	4.9E-05	0.000204	0.000283	0.030151	2.15E-05
175	Diesel	0.000496	0.0006	0.000714	0.002107	0.004823	0.222973	0.000341
300	Diesel	0.004495	0.005438	0.006472	0.017211	0.04878	3.615654	0.002959
50	Diesel	0.002712	0.003281	0.003905	0.012698	0.011067	1.428258	0.000821
75	Diesel	0.005501	0.006656	0.007922	0.063454	0.063345	10.62982	0.002232
100	Diesel	0.003296	0.003988	0.004746	0.033657	0.032001	5.350417	0.002215
175	Diesel	0.00043	0.00052	0.000619	0.009182	0.004251	1.603114	0.000147
300	Diesel	6.95E-05	8.41E-05	0.0001	0.000334	0.000651	0.128338	3.51E-05
50	Diesel	5.02E-05	6.07E-05	7.22E-05	0.000172	0.00014	0.013835	1.47E-05
75	Diesel	2.47E-05	2.99E-05	3.56E-05	0.000166	0.000217	0.024908	1.46E-05
100	Diesel	4.1E-05	4.96E-05	5.9E-05	0.000216	0.000308	0.030157	3.14E-05
175	Diesel	0.000117	0.000141	0.000168	0.000913	0.00106	0.139158	6.39E-05
300	Diesel	0.000141	0.000171	0.000203	0.000514	0.001419	0.157986	7.99E-05
25	Diesel	2.8E-07	3.39E-07	4.04E-07	2.9E-06	2.54E-06	0.000363	1.78E-07
50	Diesel	0.004163	0.005038	0.005995	0.015376	0.012789	1.393957	0.001255
75	Diesel	0.006442	0.007795	0.009277	0.043498	0.055053	6.701576	0.003503
100	Diesel	0.015654	0.018942	0.022542	0.105022	0.122914	15.69111	0.009555
175	Diesel	0.009503	0.011498	0.013684	0.105228	0.088626	17.05367	0.004549
300	Diesel	0.003698	0.004475	0.005325	0.017544	0.036747	7.186884	0.001819
50	Diesel	0.000878	0.001062	0.001264	0.003957	0.003637	0.447963	0.000279
75	Diesel	0.000211	0.000255	0.000303	0.00099	0.001637	0.139472	0.000138
100	Diesel	0.000306	0.000371	0.000441	0.001181	0.002083	0.156559	0.000185
175	Diesel	0.000311	0.000376	0.000447	0.001823	0.002926	0.258892	0.000177
300	Diesel	0.000182	0.00022	0.000262	0.000651	0.002025	0.157573	0.000114
Aggregate	Gasoline	0.083792	0.084597	0.092233	4.003773	0.041278	8.467009	0.000541

25	Diesel	0.001759	0.002128	0.002532	0.009742	0.008695	1.229967	0.000441

PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hpy	Total_Populati	Horsepowe
0.000754	1.37E-05	1.24E-05	49322.79207	32336.7209	128.6437067	1762967
0.026738	0.000332	0.0003	1192293.286	138007.2576	1554.355142	42616693
0.030189	0.000372	0.000335	1329989.464	148174.8158	1170.471618	47538431
0.052728	0.000912	0.000819	3254051.624	150645.2637	1689.705949	1.16E+08
0.026844	0.000778	0.000697	2772590.116	194410.7548	1006.39554	1.1E+08
0.013292	0.000621	0.000556	2210531.436	123934.5975	322.6108551	87839007
0.000406	1.12E-05	1.01E-05	40006.84272	41329.12384	114.0314997	1715980
0.000817	2.43E-05	2.19E-05	86893.205	37362.3758	160.8029079	3727037
2.4E-05	1.39E-06	1.25E-06	4953.253277	4040.99067	2.385364406	236190.5
0.000712	1.7E-05	1.53E-05	60782.54439	28322.21621	17.52909393	2318680
7.73E-05	2.52E-06	2.26E-06	8967.584279	10168.4084	2.251971837	342087.7
3.19E-05	6.44E-07	5.78E-07	2298.630909	1973.877334	1.316970804	78874.59
0.000304	8.52E-06	7.64E-06	30371.26954	2858.379648	11.30262176	1305497
0.000565	1.83E-05	1.64E-05	65135.12296	14707.03171	12.08231688	2799807
3.98E-05	7.18E-07	6.47E-07	2570.61675	4628.499485	2.577402761	110259.3
0.000219	4.42E-06	3.97E-06	15769.78324	14915.74838	13.13470416	676400
0.001186	1.79E-05	1.61E-05	63935.43	28077.90377	41.67060746	2742329
0.002508	6.88E-05	6.17E-05	245406.7459	36622.93413	158.0516922	11701956
0.000453	1.22E-05	1.1E-05	43625.05109	19809.02867	10.92432015	2080214
0.000571	9.89E-06	8.91E-06	35410.0499	40744.36699	47.88418101	1518813
0.00297	5.94E-05	5.33E-05	212032.6318	76150.15861	167.5388994	9094537
0.001167	2.04E-05	1.83E-05	72761.37238	50911.01167	45.48639586	3120892
0.000187	5.22E-06	4.68E-06	18620.92939	11646.67984	9.013765514	887918.9
1.21E-05	2.45E-07	2.2E-07	874.3133206	7891.435399	0.596341093	35715.41
0.000178	4.85E-06	4.35E-06	17297.57829	12150.02589	7.25445621	785539.4
0.000303	9.88E-06	8.86E-06	35220.45638	9611.012022	9.118145351	1599476
0.000119	2.78E-06	2.5E-06	9950.031615	1969.803633	24.52669063	384718.7
0.000695	1.09E-05	9.8E-06	38969.84553	27484.72461	44.74615992	1506772
0.000496	9.92E-06	8.9E-06	35379.76003	17209.30143	22.15210239	1367961
0.00506	7.73E-05	6.94E-05	275813.9656	81685.95616	142.2795592	10664367
0.00188	4.82E-05	4.33E-05	171977.614	67113.35996	70.79270493	7392389
0.001257	3.24E-05	2.9E-05	115470.1299	18737.87615	23.14204662	4963438
0.000416	8.39E-06	7.53E-06	29936.9816	20171.80006	19.3177318	1157516
0.002252	3.74E-05	3.36E-05	133503.2647	54939.13946	65.78233967	5161914
0.001887	4.93E-05	4.43E-05	175907.3179	60085.94278	70.5851722	7561306
0.000664	2.16E-05	1.93E-05	76857.65751	13328.01498	14.01694681	3303696

4.14E-06	9.64E-08	8.69E-08	345.2474287	5445.61209	1.037796952	14103.24
0.00026	4.66E-06	4.2E-06	16695.22865	28221.62453	21.99855427	681994.7
0.009275	0.000138	0.000124	493820.8551	35908.90002	444.1102102	20172421
0.000477	8.02E-06	7.2E-06	28622.06828	10019.59449	15.99055599	1169202
0.001272	3.36E-05	3.02E-05	119927.4023	58584.49374	46.02028459	5446294
0.001135	3.03E-05	2.72E-05	108077.2822	41771.34271	23.92456758	4908142
0.000189	3.4E-06	3.06E-06	12174.69192	2858.379648	11.30262179	435165.7
0.000236	4.75E-06	4.26E-06	16929.32443	6214.521304	11.75189261	605112.7
0.001042	1.84E-05	1.65E-05	65554.42592	18052.15365	29.08890482	2343142
0.000205	5.04E-06	4.52E-06	17971.43215	13683.56138	5.896762278	714123.6
0.000414	1.34E-05	1.2E-05	47729.06956	14585.29971	9.516763779	1896591
3.84E-05	5.9E-07	0	2025.10412	1818.780778	3.800875972	36110.69
8.69E-05	2.28E-06	0	7816.285748	4378.614699	8.853259886	139376.3
0.00013	1.72E-06	0	5909.605748	2399.934968	4.681566746	105377.3
0.000581	1.23E-05	0	42218.47718	11960.04399	18.5408584	836922.1
0.000657	1.44E-05	0	49549.63717	8690.342859	14.5082217	982252.1
2.33E-07	1.8E-09	0	6.175065362	17.45712376	0.092704292	110.1108
3.66E-06	4.35E-08	0	149.2698393	228.9505544	1.205155796	2661.708
2.38E-05	1.79E-07	0	613.3676836	615.3486545	3.569115242	10937.28
5.87E-05	5.23E-07	0	1792.752763	1286.876036	6.999174046	31967.51
0.000374	4.85E-06	0	16620.25091	7814.464424	31.47310713	329473.2
0.000784	1.78E-05	0	61050.99456	17464.91051	70.82607909	1210250
3.58E-05	2.87E-07	0	984.9294896	1045.412953	3.986284556	17562.79
0.000264	2.1E-06	0	7208.395069	4488.943169	15.80608179	128536.6
0.000748	8.41E-06	0	28860.13241	13617.0809	39.77014127	514620.1
0.001395	3.2E-05	0	109795.667	37398.00204	81.67248125	2176545
0.001605	3.87E-05	0	132857.0014	27879.6674	66.14451234	2633704
1.36E-07	1.05E-09	0	3.61796982	21.2216793	0.046352146	64.51391
0.00123	3.76E-05	0	128849.9712	170326.9838	346.3895871	2297591
0.000519	2.98E-05	0	102290.3392	77797.95634	143.2744833	1823992
0.001097	2.26E-05	0	77659.89018	40672.68765	75.41494154	1384794
0.003226	0.000128	0	440221.8471	156661.228	214.285971	8726781
0.003293	0.000136	0	464879.001	103171.0724	159.6367908	9215575
1.4E-05	9.49E-08	0	325.4539065	393.4132147	1.715029402	5803.338
6E-05	2.88E-07	0	986.9437899	702.3217058	3.291002366	17598.71
0.000146	7.69E-07	0	2638.895607	1349.584515	5.701313958	47055.52
0.001427	1.27E-05	0	43419.61168	14523.50858	48.53069686	860732.9
0.001335	4.83E-05	0	165660.6859	35320.61317	90.85020616	3283991
4.21E-06	2.28E-09	1.96E-09	7.803629719	0	1.227770123	0
1.39E-06	6.74E-10	5.8E-10	2.309017475	0	0.86751199	0
8.3E-07	4.48E-10	3.86E-10	1.536795319	0	0.321403354	0
5.51E-06	2.08E-07	1.34E-07	532.9	386.9	0.66	12767.7
6.07E-07	3.23E-10	2.78E-10	1.105445512	0	0.446780632	0
4.28E-06	2.31E-09	1.99E-09	7.92515596	0	0.704484038	0
2.22E-06	1.2E-09	1.03E-09	4.108511942	0	0.919065147	0
1.16E-06	6.07E-10	5.23E-10	2.079623046	0	0.276845044	0
1.91E-06	1.03E-09	8.9E-10	3.54294592	0	0.690449575	0

1.35E-05	7.27E-09	6.26E-09	24.91609607	0	5.481570573	0
7.05E-07	3.81E-10	3.28E-10	1.304286035	0	0.164239868	0
2.37E-06	9.18E-08	5.97E-08	237.25	146	0.26	5402
0.000234	1.21E-07	1.04E-07	415.3600357	0	72.97465961	0
2.06E-05	1.1E-08	9.51E-09	37.84121263	0	5.166245795	0
1.99E-05	1.07E-08	9.25E-09	36.81691856	0	3.692165006	0
0.000517	5.87E-06	0	20120.90867	22398.5109	37.26712538	358786.4
0.000397	5.12E-06	0	17557.17245	12266.4381	20.11683136	313071.1
0.000363	5.11E-06	0	17543.48651	8486.584558	13.3030659	312827
0.000723	2.82E-05	0	96696.32403	30417.08766	29.43361271	1916869
0.000482	1.22E-05	0	41785.04569	8877.13759	11.49533221	828330
1.78E-05	2.64E-07	0	907.10591	1514.153557	2.410311592	16175.08
2.62E-05	2.62E-07	0	898.802903	622.6339707	1.205155796	16027.02
8.2E-06	1.35E-07	0	462.0815318	253.6722887	0.417169314	8239.617
0.000365	6.91E-06	0	23689.68911	7828.119782	8.992316324	469614.9
0.000961	1.53E-05	0	52511.31897	11907.34737	17.84557621	1040963
5.07E-05	5.44E-07	0	1866.968805	2139.947297	6.164835418	33290.89
0.000168	2.83E-06	0	9719.244351	6235.847695	15.99149037	173308.9
0.000187	3.1E-06	0	10650.29677	5398.90825	12.28331869	189911
0.000352	1.05E-05	0	35874.93223	12099.03043	21.73915647	711170.2
0.000237	1.28E-05	0	44026.53521	9123.587571	16.08419466	872764.4
5.68E-05	1.47E-06	0	5043.910584	6778.360065	17.05758973	89940.6
4.86E-05	1.07E-06	0	3660.054562	2767.433691	6.72106117	65264.34
0.00011	1.65E-06	0	5656.423945	3245.881928	7.64810409	100862.6
0.000282	1.17E-05	0	40299.84567	16432.89715	24.70569382	798888
0.000134	5.21E-06	0	17889.24828	4216.974577	7.833512674	354629.3
0.000803	1.37E-05	0	47079.5383	63205.06448	173.357026	839499.8
0.000269	5.61E-06	0	19251.13286	13368.06075	35.22763096	343277
0.000647	8.28E-06	0	28388.61834	15531.02836	41.80963569	506212.2
0.001452	5.02E-05	0	172174.1809	67656.77136	113.2846448	3413112
0.000234	4.07E-06	0	13955.07604	3257.791944	7.509047652	276639.8
1.66E-05	4.61E-07	0	1580.395098	1593.956407	5.747666104	28180.85
0.000216	1.84E-05	0	63187.92628	40030.43651	117.4099858	1126737
0.000611	1.21E-05	0	41454.19434	21460.85877	67.2106117	739191.3
0.001682	8.14E-05	0	279297.1517	114377.575	235.8397188	5536675
3.13E-05	5.9E-07	0	2022.239168	478.7882177	1.436916526	40088.06
1.02E-05	7.37E-08	0	252.8546476	290.345575	0.834338628	4508.783
2.94E-05	2.42E-07	0	829.268895	599.6688765	1.39056438	14787.13
6.14E-05	5.61E-07	0	1925.162266	989.9622811	2.3176073	34328.57
0.00011	1.84E-06	0	6307.819224	2189.870984	3.847228118	125043.7
0.000123	2.25E-06	0	7722.248892	1677.678429	3.105593782	153082.8
7.3E-05	7.96E-07	0	2730.902802	3431.690341	7.138230484	48696.15
0.000346	6.52E-06	0	22383.02038	16688.77491	31.8439243	399123.3
0.000731	1.04E-05	0	35768.61127	20521.93029	38.65768976	637808.7
0.003765	8.12E-05	0	278583.7339	104059.6088	144.3869348	5522532
0.004069	0.000155	0	531797.7826	129909.071	182.7665117	10542146
2.61E-06	1.7E-08	0	58.21766147	52.21201044	0.23176073	1038.109

2.05E-05	2.41E-07	0	826.2477049	473.2332935	1.807733694	14733.25
1.97E-05	2.86E-07	0	979.7507566	441.399146	1.436916526	17470.45
0.000314	2.11E-06	0	7245.534198	2000.066424	8.714203448	143632.6
0.002722	3.43E-05	0	117491.2918	20283.57192	68.69388037	2329100
0.000755	1.35E-05	0	46411.48849	53286.9721	136.3680135	827587.4
0.002053	0.000101	0	345417.9782	248347.3683	531.2882975	6159328
0.002038	5.07E-05	0	173862.7366	100010.4885	207.3331491	3100237
0.000136	1.52E-05	0	52093.48059	24920.44586	35.92291315	1032680
3.23E-05	1.22E-06	0	4170.353077	1073.444066	1.946790132	82671.4
1.35E-05	1.31E-07	0	449.5578422	726.6702068	1.575972964	8016.3
1.34E-05	2.36E-07	0	809.3800173	752.3757061	1.529620818	14432.48
2.89E-05	2.86E-07	0	979.9427093	674.2108056	1.436916526	17473.87
5.88E-05	1.32E-06	0	4521.948327	2248.568547	3.47641095	89641.29
7.35E-05	1.5E-06	0	5133.791008	1423.274029	2.642072322	101770.2
1.63E-07	3.44E-09	0	11.79431804	24.7133526	0.092704292	210.3106
0.001155	1.32E-05	0	45296.8846	58409.93115	149.7174316	807712.4
0.003223	6.35E-05	0	217768.8971	158588.1354	353.6205218	3883151
0.008791	0.000149	0	509885.4126	280829.8113	587.0962812	9092032
0.004185	0.000162	0	554161.9887	234738.3121	348.290025	10985485
0.001674	6.81E-05	0	233539.0382	57095.78754	95.85623793	4629584
0.000257	4.24E-06	0	14556.62492	12442.28027	40.23366273	259566.8
0.000127	1.32E-06	0	4532.180769	2612.234843	8.80690774	80815.68
0.000171	1.48E-06	0	5087.406986	2074.681297	7.230934776	90716.2
0.000163	2.45E-06	0	8412.749717	2684.403901	7.230934776	166771
0.000105	1.49E-06	0	5120.350978	904.4587316	2.78112876	101503.8
0.000409	0.000144	0.000199	561373.3663	0	6318.542912	0

0.000406	1.12E-05	1.01E-05	40006.84272	41329.12384	114.0314997	1715980

Table 23-1: Conversions

Days/YR	lbs / ton	grams / lbs
365	2000	453.59237

er_Hours_hhpy	HC_g_hp-hr	TOG_g_hp-hr	NH3_g_hp-hr	ROG_g_hp-hr	CO_g_hp-hr
	0.914530198	1.316923483	0.002330495	1.106581539	3.234171959
	0.851114203	1.225604456	0.002330495	1.029848185	3.136346075
	0.424701483	0.611570136	0.002330495	0.513888794	2.060337494
	0.263586394	0.379564408	0.002330495	0.318939538	1.81004018
	0.174450588	0.251208846	0.002096303	0.211085211	1.549289089
	0.115130217	0.165787512	0.002096303	0.139307563	0.641954121
	0.339357309	0.488674524	0.001942079	0.410622343	1.879919513
	0.253235885	0.364659675	0.001942079	0.306415421	1.693208872
	0.08020362	0.115493214	0.00174692	0.09704638	1.171722009
	0.212098755	0.305422208	0.002183649	0.256639494	1.667034575
	0.161700295	0.232848425	0.002183649	0.195657356	0.83798004
	0.292448725	0.421126164	0.002427599	0.353862954	1.893263132
	0.170021628	0.244831145	0.001937903	0.205726171	1.43925503
	0.145627723	0.20970392	0.001937903	0.176209544	0.729737996
	0.50334186	0.724812275	0.001942079	0.609043649	2.144898336
	0.233958981	0.336900933	0.001942079	0.283090368	1.514610497
	0.252362711	0.363402302	0.001942079	0.305358881	1.559305452
	0.156266909	0.225024348	0.00174692	0.189082959	1.252198635
	0.151367799	0.217969631	0.00174692	0.183155036	0.71101066
	0.507825798	0.731269148	0.001942079	0.614469216	2.165972789
	0.234393365	0.337526445	0.001942079	0.283615971	1.514409136
	0.225664668	0.324957123	0.001942079	0.273054248	1.521714033
	0.153499711	0.221039585	0.00174692	0.185734651	1.300085808
	0.245656939	0.353745995	0.002039183	0.297244898	1.590341033
	0.163428726	0.235337365	0.001834266	0.197748758	1.390827237
	0.135828252	0.195592682	0.001834266	0.164352184	0.703903243
	0.558369992	0.804052786	0.002154398	0.675627693	2.379390602
	0.625285222	0.900410719	0.002154398	0.75659512	2.568472484
	0.259236968	0.373301233	0.002154398	0.31367673	1.686096027
	0.274798807	0.395710282	0.002154398	0.332506555	1.734145005
	0.179845252	0.258977164	0.001937903	0.217612756	1.460565301
	0.17574886	0.253078359	0.001937903	0.21265612	0.831490822
	0.259536711	0.373732865	0.002154398	0.314039422	1.680196285
	0.259488783	0.373663848	0.002154398	0.313981428	1.703393907
	0.177657787	0.255827213	0.001937903	0.214965922	1.455504601
	0.144545296	0.208145226	0.001937903	0.174899809	0.736836485

0.52850894	0.761052873	0.002039183	0.63949582	2.252143229
0.529296851	0.762187463	0.002039183	0.640449188	2.25796358
0.289967006	0.417552489	0.002039183	0.350860077	1.682592183
0.243767971	0.351025879	0.002039183	0.294959246	1.608707745
0.166904934	0.240343105	0.001834266	0.20195497	1.375469987
0.161200391	0.232128564	0.001834266	0.195052473	0.772999552
0.604010175	0.86977465	0.002330495	0.730852307	2.573877861
0.280742233	0.404268817	0.002330495	0.3396981	1.819508977
0.267803954	0.385637693	0.002330495	0.324042784	1.826938139
0.199887044	0.287837344	0.002096303	0.241863323	1.592128473
0.156880731	0.225908254	0.002096303	0.189825685	0.795522143
1.107728669	1.595129283	0	1.340351689	5.592857896
0.404813182	0.582930981	0	0.48982395	3.616985428
0.660503734	0.951125377	0	0.799209518	3.975990849
0.478071693	0.688423238	0	0.578466748	3.325885344
0.442039847	0.636537379	0	0.534868214	1.568177832
4.176966906	6.014832345	0	5.054129956	10.20201801
1.569765805	2.260462759	0	1.899416624	5.456567088
1.110824438	1.599587191	0	1.34409757	4.354121435
0.941887565	1.356318094	0	1.139683954	4.228632687
0.651472308	0.938120124	0	0.788281493	3.599762057
0.369366871	0.531888294	0	0.446933914	1.732890462
2.217760504	3.193575125	0	2.683490209	7.016560011
1.074274	1.54695456	0	1.29987154	4.413833833
0.816946216	1.17640255	0	0.988504921	4.039112744
0.408633462	0.588432185	0	0.494446489	3.321066153
0.372101366	0.535825967	0	0.450242653	1.638639587
3.669962342	5.284745772	0	4.440654434	9.139906214
0.517810043	0.745646462	0	0.626550152	4.245033205
0.260510015	0.375134422	0	0.315217118	3.394373266
0.398147168	0.573331922	0	0.481758074	3.627072091
0.285335403	0.41088298	0	0.345255837	3.16289956
0.271148935	0.390454466	0	0.328090211	1.219623038
2.711933604	3.905184389	0	3.281439661	7.774729153
1.721308893	2.478684806	0	2.08278376	5.185041546
1.600337813	2.304486451	0	1.936408754	5.102814092
0.941144413	1.355247955	0	1.13878474	4.008973901
0.266126193	0.383221717	0	0.322012693	1.259122648
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.405778877	0.584321584	0.003476787	0.4829104	3.337867643
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.418980676	0.603332173	0.003658446	0.49862163	3.407298607
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
1.705935642	2.456547324	0	2.064182126	6.832713927
0.779677785	1.122736011	0	0.94341012	4.056392049
0.659782479	0.950086769	0	0.798336799	4.017734848
0.289870516	0.417413542	0	0.350743324	3.343108534
0.394538074	0.568134827	0	0.47739107	1.55894852
1.106476332	1.593325918	0	1.338836362	6.063275085
0.854086288	1.229884255	0	1.033444409	4.17637038
0.802310234	1.155326738	0	0.970795384	4.12216659
0.498413154	0.717714942	0	0.603079917	3.557389753
0.559576122	0.805789616	0	0.677087108	2.038811536
1.895093753	2.728935004	0	2.293063441	6.529083986
0.635735367	0.915458929	0	0.769239794	3.8004948
0.572014704	0.823701174	0	0.692137792	3.858287855
0.376039488	0.541496862	0	0.45500778	3.205525444
0.220893279	0.318086321	0	0.267280867	1.107248233
0.681462647	0.981306212	0	0.824569803	4.370665504
0.528638076	0.761238829	0	0.639652072	3.711734365
0.607375786	0.874621132	0	0.734924701	3.880412084
0.266993873	0.384471177	0	0.323062586	3.168567071
0.27434062	0.395050492	0	0.33195215	1.22112459
1.089246889	1.56851552	0	1.317988736	5.089022545
0.48915726	0.704386455	0	0.591880285	3.611225669
0.708559619	1.020325852	0	0.85735714	3.957939755
0.319844049	0.46057543	0	0.387011299	3.183786204
0.491847001	0.708259682	0	0.595134872	1.876099649
0.576844862	0.830656601	0	0.697982283	3.923043983
0.193139662	0.278121113	0	0.233698991	3.2385366
0.446483518	0.642936266	0	0.540245057	3.581939312
0.235203453	0.338692973	0	0.284596178	3.046838145
0.449397176	0.647131934	0	0.543770583	1.976398807
2.932875009	4.223340013	0	3.548778761	8.178609462
1.089633008	1.569071532	0	1.31845594	4.387569819
0.894577804	1.288192038	0	1.082439143	4.124745964
0.548992483	0.790549176	0	0.664280905	3.491290807
0.464903358	0.669460836	0	0.562533063	2.094511382
1.705817009	2.456376494	0	2.064038581	6.448892867
0.555999642	0.800639485	0	0.672759567	3.753915159
0.652739054	0.939944238	0	0.789814255	3.961970518
0.451100477	0.649584688	0	0.545831578	3.424392797
0.285225436	0.410724628	0	0.345122778	1.289360146
3.347948346	4.821045618	0	4.051017498	8.360206297

0.807454231	1.162734092	0	0.977019619	3.86933466
0.645097484	0.928940377	0	0.780567956	3.870085454
1.142814393	1.645652727	0	1.382805416	4.856474013
0.638982519	0.920134827	0	0.773168847	2.446813918
1.084999772	1.562399672	0	1.312849724	5.08042933
0.295735292	0.42585882	0	0.357839703	3.411260708
0.352046203	0.506946532	0	0.425975906	3.594728248
0.137812808	0.198450443	0	0.166753497	2.944115631
0.278460279	0.400982802	0	0.336936937	1.339441036
2.071525349	2.982996503	0	2.506545672	7.108905364
0.56766388	0.817435987	0	0.686873295	3.802441057
0.776672439	1.118408312	0	0.939773651	4.088841942
0.431021227	0.620670566	0	0.521535684	3.372511868
0.458490756	0.660226689	0	0.554773815	1.672924517
0.441300831	0.635473196	0	0.533974005	4.570974992
1.706737839	2.457702488	0	2.065152785	6.303546179
0.549356967	0.791074033	0	0.66472193	3.709136397
0.570108919	0.820956843	0	0.689831792	3.824806021
0.286430224	0.412459523	0	0.346580571	3.171766854
0.2644913	0.380867472	0	0.320034473	1.254830835
1.119884189	1.612633232	0	1.355059868	5.048219797
0.863092313	1.242852931	0	1.044341699	4.056848801
1.117971786	1.609879372	0	1.352745861	4.312200122
0.616848894	0.888262408	0	0.746387162	3.620045376
0.59256467	0.853293125	0	0.717003251	2.123227384
49.42410741	54.40279942	0.117423119	49.89899041	2361.599724

14.55576721	20.96030473	0.083299976	17.6124783	80.63380419

NOx_g_hp-hr	PM10_g_hp-hr	PM2.5_g_hp-hr	CO2_g_hp-hr	gal/hp-hr
2.372012881	0.153992326	0.14167294	284.8072279	0.027977
2.525897676	0.225812161	0.207747188	284.8072276	0.027977
3.471946078	0.22856291	0.210277878	284.8072276	0.027977
2.350659157	0.163162453	0.150109456	284.8072275	0.027977
1.916471693	0.087694339	0.080678792	256.1869076	0.025166
1.231008221	0.054465068	0.050107862	256.1869074	0.025166
1.677818408	0.085182793	0.07836817	237.339356	0.023314
1.57032078	0.078897955	0.072586119	237.3393564	0.023314
0.963138246	0.036523447	0.033601572	213.4890884	0.020971
2.329192029	0.110539289	0.101696146	266.8613611	0.026214
1.782697098	0.081279991	0.074777592	266.8613621	0.026214
2.610130479	0.145642285	0.133990902	296.6741976	0.029143
1.865706257	0.08387639	0.07716628	236.8289195	0.023264
1.569873128	0.072662397	0.066849405	236.828921	0.023264
1.755820968	0.129979656	0.119581283	237.3393579	0.023314
2.088104359	0.116513831	0.107192725	237.3393527	0.023314
2.170439737	0.155684633	0.143229863	237.339357	0.023314
1.827941788	0.077140319	0.070969093	213.4890902	0.020971
1.724026242	0.07844621	0.072170513	213.4890892	0.020971
1.83266835	0.135336158	0.124509266	237.3393576	0.023314
2.089317808	0.117524183	0.108122248	237.3393561	0.023314
1.934184705	0.134574126	0.123808196	237.3393558	0.023314
1.679084562	0.075819769	0.069754188	213.4890895	0.020971
2.19250967	0.122339531	0.112552369	249.206323	0.02448
1.736509315	0.081629307	0.075098962	224.1635436	0.02202
1.497465601	0.068275195	0.062813179	224.1635429	0.02202
2.008954876	0.111540217	0.102617	263.2866366	0.025863
2.084125708	0.165983982	0.152705264	263.2866344	0.025863
2.309502682	0.130555633	0.120111181	263.2866329	0.025863
2.34107065	0.170768359	0.157106891	263.2866334	0.025863
1.975139455	0.091544379	0.084220829	236.8289213	0.023264
1.898136689	0.091133327	0.083842661	236.8289223	0.023264
2.316387809	0.129251789	0.118911646	263.2866327	0.025863
2.214240859	0.157000071	0.144440066	263.2866334	0.025863
1.951458683	0.089831961	0.082645404	236.8289215	0.023264
1.57608736	0.072392636	0.066601225	236.8289214	0.023264

1.901518015	0.10557516	0.097129147	249.2063233	0.02448
1.856156443	0.137392966	0.126401529	249.2063227	0.02448
2.464238782	0.165490387	0.152251156	249.2063225	0.02448
2.080639574	0.146965582	0.135208335	249.2063255	0.02448
1.832018021	0.084058824	0.077334118	224.1635447	0.02202
1.746152168	0.083225297	0.076567273	224.1635436	0.02202
2.106985077	0.155975575	0.143497528	284.8072326	0.027977
2.504538296	0.140144206	0.12893267	284.8072285	0.027977
2.290661746	0.160039973	0.147236775	284.8072277	0.027977
2.194798732	0.103205785	0.094949322	256.186907	0.025166
1.705059846	0.078508184	0.07222753	256.1869078	0.025166
4.831159352	0.382740043	0.35212084	571.4540783	0.05608
3.969061012	0.224355168	0.206406755	571.4540783	0.05608
5.058616077	0.444570658	0.409005005	571.4540783	0.05608
4.360602089	0.249720303	0.229742679	514.0285459	0.050445
4.584896407	0.240609162	0.221360429	514.0285459	0.050445
6.999928172	0.759992202	0.699192825	571.4540783	0.05608
5.350933843	0.494263754	0.454722653	571.4540783	0.05608
8.878025324	0.784472617	0.721714808	571.4540783	0.05608
7.717420676	0.661183207	0.60828855	571.4540783	0.05608
6.654741187	0.40850912	0.375828391	514.0285459	0.050445
4.038094451	0.233240565	0.21458132	514.0285459	0.050445
5.862995798	0.732926718	0.67429258	571.4540783	0.05608
8.227093607	0.740452153	0.681215981	571.4540783	0.05608
6.092628414	0.523417012	0.481543651	571.4540783	0.05608
3.990751259	0.230596461	0.212148744	514.0285459	0.050445
3.837922438	0.219391581	0.201840255	514.0285459	0.050445
6.999928172	0.759992202	0.699192825	571.4540783	0.05608
3.827168412	0.192631584	0.177221057	571.4540783	0.05608
3.254072196	0.102466565	0.09426924	571.4540783	0.05608
3.595176916	0.285217895	0.262400464	571.4540783	0.05608
2.637551448	0.133062717	0.1224177	514.0285459	0.050445
2.726578212	0.128614847	0.118325659	514.0285459	0.050445
6.322630123	0.869007411	0.799486818	571.4540783	0.05608
12.15691897	1.226851877	1.128703727	571.4540783	0.05608
11.56506188	1.120209874	1.030593084	571.4540783	0.05608
9.204500522	0.596629438	0.548899083	514.0285459	0.050445
3.075798307	0.146307019	0.134602457	514.0285459	0.050445
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5.541612728	0.455907446	0.41943485	571.4540783	0.05608
4.930814682	0.41736579	0.383976527	571.4540783	0.05608
2.45186715	0.135676551	0.124822427	514.0285459	0.050445
3.845225609	0.209450767	0.192694706	514.0285459	0.050445
5.171302323	0.395685754	0.364030893	571.4540783	0.05608
6.910615701	0.589415531	0.542262289	571.4540783	0.05608
5.127622315	0.358168312	0.329514847	571.4540783	0.05608
4.289412775	0.279601015	0.257232934	514.0285459	0.050445
5.532216491	0.332304523	0.305720161	514.0285459	0.050445
5.389163726	0.548252569	0.504392363	571.4540783	0.05608
5.030644744	0.34914622	0.321214522	571.4540783	0.05608
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3.967406967	0.227137002	0.208966042	571.4540783	0.05608
4.47624254	0.268034274	0.246591532	571.4540783	0.05608
4.928597268	0.394023387	0.362501516	571.4540783	0.05608
2.454040109	0.127116644	0.116947312	514.0285459	0.050445
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4.532197395	0.344133864	0.316603155	571.4540783	0.05608
4.560688154	0.281671447	0.259137731	571.4540783	0.05608
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2.961759669	0.153127125	0.140876955	514.0285459	0.050445
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2.395520358	0.109343263	0.100595802	514.0285459	0.050445
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6.488714737	0.643298805	0.5918349	571.4540783	0.05608
5.260836991	0.317721553	0.292303829	514.0285459	0.050445
4.381095819	0.289403177	0.266250923	514.0285459	0.050445
5.217846536	0.539678877	0.496504567	571.4540783	0.05608
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4.979252724	0.412537793	0.37953477	571.4540783	0.05608
4.14192204	0.245398641	0.22576675	514.0285459	0.050445
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6.853756322	0.905917068	0.833443703	571.4540783	0.05608

6.206299555	0.500074458	0.460068501	571.4540783	0.05608
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6.934952992	0.420659884	0.387007093	514.0285459	0.050445
4.4279059	0.328534492	0.302251732	571.4540783	0.05608
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3.417878253	0.23653949	0.217616331	571.4540783	0.05608
1.362990465	0.047241995	0.043462636	514.0285459	0.050445
2.60707394	0.140524538	0.129282575	514.0285459	0.050445
5.77320489	0.606815767	0.558270506	571.4540783	0.05608
4.967763997	0.335033195	0.308230539	571.4540783	0.05608
5.838357486	0.595247921	0.547628087	571.4540783	0.05608
3.916093763	0.235936238	0.217061339	514.0285459	0.050445
4.61775792	0.2599326	0.239137992	514.0285459	0.050445
3.998680603	0.27975004	0.257370037	571.4540783	0.05608
5.243021767	0.514578881	0.473412571	571.4540783	0.05608
4.694488964	0.298735156	0.274836344	571.4540783	0.05608
4.476411941	0.347982004	0.320143444	571.4540783	0.05608
2.671351013	0.137122389	0.126152598	514.0285459	0.050445
2.628273302	0.130123622	0.119713732	514.0285459	0.050445
4.640099432	0.356207612	0.327711003	571.4540783	0.05608
6.706281527	0.564268343	0.519126875	571.4540783	0.05608
7.604166602	0.676814613	0.622669444	571.4540783	0.05608
5.809735544	0.352225471	0.324047433	514.0285459	0.050445
6.605951706	0.372957239	0.34312066	514.0285459	0.050445
24.34735937	0.319316496	0.24102822	4994.209916	

71.96525175	3.653673805	3.36137989	10179.99708

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Sheet 9: On-Road Vehicle Operational Fuel Efficiency
EMFAC2021 San Joaquin Valley Fuel Efficiency Estimates for 2020

Table 9-1: 2020 San Joaquin Valley Average Vehicle Fuel Efficiency (Gasoline)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	3.89	54.75	19.61	2.79
LDA	250,197.75	8,380,893.35	307,044.09	27.30
LDT1	24,119.17	651,886.14	28,647.85	22.76
LDT2	92,856.38	3,019,032.21	140,532.86	21.48
LHDT1	10,571.19	300,636.48	34,163.76	8.80
LHDT2	1,243.71	36,404.43	4,550.95	8.00
MCY	12,337.65	57,751.87	1,481.41	38.98
MDV	98,169.15	2,862,897.76	162,195.15	17.65
MH	1,800.61	13,244.67	3,005.56	4.41
MHDT	643.55	23,577.18	5,308.73	4.44
OBUS	206.27	8,117.68	1,779.72	4.56
SBUS	122.62	5,540.51	557.32	9.94
UBUS	47.50	3,578.82	761.73	4.70
TOTAL	492,319.43	15,363,615.85	690,048.73	22.26

Table 9-2: 2020 San Joaquin Valley Average Vehicle Fuel Efficiency (Diesel)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	7,769.0	1,132,184.89	196,471.34	5.76
LDA	819.51	23,667.13	565.47	41.85
LDT1	8.87	93.14	3.80	24.54
LDT2	207.06	7,467.18	245.00	30.48
LHDT1	9,457.34	288,320.75	18,313.87	15.74
LHDT2	3,141.52	101,322.22	7,878.46	12.86
MCY	0.00	0.00	0.00	0.00
MDV	1,339.25	46,817.04	1,996.64	23.45
MH	656.04	5,028.04	534.14	9.41
MHDT	5,620.84	258,788.81	30,465.26	8.49
OBUS	83.86	5,756.09	837.64	6.87
SBUS	482.44	11,166.50	1,378.91	8.10
UBUS	104.43	7,124.18	835.03	8.53
TOTAL	29,690.20	1,887,735.98	259525.56	7.27

Table 9-3: 2020 San Joaquin Valley Average Vehicle Fuel Efficiency (Electricity)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Energy Consumption (kWh/day)	Miles Per kWh
HHDT	0.00	0.00	0.00	0.00
LDA	7,015.47	184,546.12	65,094.21	2.84
LDT1	12.59	258.67	98.02	2.64
LDT2	162.36	3,599.39	1,116.43	3.22
LHDT1	0.00	0.00	0.00	0.00
LHDT2	0.00	0.00	0.00	0.00
MCY	0.00	0.00	0.00	0.00
MDV	285.76	5,788.71	1,810.70	3.20
MH	0.00	0.00	0.00	0.00
MHDT	0.00	0.00	0.00	0.00
OBUS	0.00	0.00	0.00	0.00
SBUS	0.00	0.00	0.00	0.00
UBUS	17.16	766.36	1,335.95	0.57
TOTAL	7,493.34	194,959.24	69,455.30	2.81

Sheet 10: EMFAC Output

Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissi

Region	Calendar Ye	Vehicle Cat	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT
San Joaquin	2020	HHDT	Aggregate	Aggregate	Gasoline	3.888482	54.75296	54.75296	0
San Joaquin	2020	HHDT	Aggregate	Aggregate	Diesel	7769.04	1132185	1132185	0
San Joaquin	2020	HHDT	Aggregate	Aggregate	Natural Ga	171.2461	11983.22	11983.22	0
San Joaquin	2020	LDA	Aggregate	Aggregate	Gasoline	246442.7	8295815	8295815	0
San Joaquin	2020	LDA	Aggregate	Aggregate	Diesel	819.5131	23667.13	23667.13	0
San Joaquin	2020	LDA	Aggregate	Aggregate	Electricity	3260.427	111308.5	0	111308.5
San Joaquin	2020	LDA	Aggregate	Aggregate	Plug-in Hyb	3755.042	158315.9	85078.21	73237.66
San Joaquin	2020	LDT1	Aggregate	Aggregate	Gasoline	24118.18	651862.2	651862.2	0
San Joaquin	2020	LDT1	Aggregate	Aggregate	Diesel	8.87498	93.14199	93.14199	0
San Joaquin	2020	LDT1	Aggregate	Aggregate	Electricity	11.60602	236.686	0	236.686
San Joaquin	2020	LDT1	Aggregate	Aggregate	Plug-in Hyb	0.983017	45.89318	23.91371	21.97947
San Joaquin	2020	LDT2	Aggregate	Aggregate	Gasoline	92705.57	3015418	3015418	0
San Joaquin	2020	LDT2	Aggregate	Aggregate	Diesel	207.0582	7467.18	7467.18	0
San Joaquin	2020	LDT2	Aggregate	Aggregate	Electricity	11.56052	348.6524	0	348.6524
San Joaquin	2020	LDT2	Aggregate	Aggregate	Plug-in Hyb	150.804	6864.747	3614.013	3250.734
San Joaquin	2020	LHDT1	Aggregate	Aggregate	Gasoline	10571.19	300636.5	300636.5	0
San Joaquin	2020	LHDT1	Aggregate	Aggregate	Diesel	9457.339	288320.8	288320.8	0
San Joaquin	2020	LHDT2	Aggregate	Aggregate	Gasoline	1243.708	36404.43	36404.43	0
San Joaquin	2020	LHDT2	Aggregate	Aggregate	Diesel	3141.516	101322.2	101322.2	0
San Joaquin	2020	MCY	Aggregate	Aggregate	Gasoline	12337.65	57751.87	57751.87	0
San Joaquin	2020	MDV	Aggregate	Aggregate	Gasoline	97908.04	2857016	2857016	0
San Joaquin	2020	MDV	Aggregate	Aggregate	Diesel	1339.252	46817.04	46817.04	0
San Joaquin	2020	MDV	Aggregate	Aggregate	Electricity	24.64348	741.6242	0	741.6242
San Joaquin	2020	MDV	Aggregate	Aggregate	Plug-in Hyb	261.1117	10929.27	5882.188	5047.083
San Joaquin	2020	MH	Aggregate	Aggregate	Gasoline	1800.614	13244.67	13244.67	0
San Joaquin	2020	MH	Aggregate	Aggregate	Diesel	656.0405	5028.045	5028.045	0
San Joaquin	2020	MHDT	Aggregate	Aggregate	Gasoline	643.5474	23577.18	23577.18	0
San Joaquin	2020	MHDT	Aggregate	Aggregate	Diesel	5620.841	258788.8	258788.8	0
San Joaquin	2020	MHDT	Aggregate	Aggregate	Natural Ga	40.4475	2432.171	2432.171	0
San Joaquin	2020	OBUS	Aggregate	Aggregate	Gasoline	206.267	8117.675	8117.675	0
San Joaquin	2020	OBUS	Aggregate	Aggregate	Diesel	83.86442	5756.088	5756.088	0
San Joaquin	2020	OBUS	Aggregate	Aggregate	Natural Ga	1.39016	90.13768	90.13768	0
San Joaquin	2020	SBUS	Aggregate	Aggregate	Gasoline	122.6152	5540.506	5540.506	0
San Joaquin	2020	SBUS	Aggregate	Aggregate	Diesel	482.4362	11166.5	11166.5	0
San Joaquin	2020	SBUS	Aggregate	Aggregate	Natural Ga	80.3734	2069.97	2069.97	0
San Joaquin	2020	UBUS	Aggregate	Aggregate	Gasoline	47.50185	3578.821	3578.821	0

San Joaqui	2020	UBUS	Aggregate	Aggregate	Diesel	104.4255	7124.181	7124.181	0
San Joaqui	2020	UBUS	Aggregate	Aggregate	Electricity	17.15976	766.3601	0	766.3601
San Joaqui	2020	UBUS	Aggregate	Aggregate	Natural Ga	30.35904	1932.919	1932.919	0

ions, 1000 gallons/day for Fuel Consumption

Trips	Energy Cor	NOx_RUNE	NOx_IDLEX	NOx_STRE	NOx_TOTE	PM2.5_RU	PM2.5_IDL	PM2.5_STF	PM2.5_TO
77.80075	0	0.001454	0	0.000157	0.001611	7.27E-07	0	2.26E-07	9.53E-07
127111.8	0	3.920952	0.712906	0.30211	4.935967	0.066732	0.001036	0	0.067767
1384.798	0	0.025874	0.002335	0	0.028209	5.23E-05	3.8E-06	0	5.61E-05
1142654	0	0.644405	0	0.414743	1.059148	0.01353	0	0.002836	0.016366
3582.981	0	0.009028	0	0	0.009028	0.00053	0	0	0.00053
16527.13	42974.25	0	0	0	0	0	0	0	0
15527.1	22119.96	0.00066	0	0.001953	0.002613	0.00016	0	4.33E-05	0.000203
104367.4	0	0.178001	0	0.06922	0.247221	0.001935	0	0.000462	0.002398
27.51718	0	0.000156	0	0	0.000156	2.44E-05	0	0	2.44E-05
49.7959	91.38033	0	0	0	0	0	0	0	0
4.064777	6.638455	1.85E-07	0	5.11E-07	6.97E-07	3.92E-08	0	1.02E-08	4.94E-08
428686.1	0	0.448837	0	0.248503	0.69734	0.005239	0	0.001076	0.006316
978.3727	0	0.000765	0	0	0.000765	0.000105	0	0	0.000105
59.78584	134.6086	0	0	0	0	0	0	0	0
623.5746	981.8185	2.8E-05	0	7.84E-05	0.000106	7.06E-06	0	1.85E-06	8.91E-06
157495	0	0.106349	0.000475	0.12604	0.232864	0.000644	0	7.8E-05	0.000723
118961.4	0	0.870545	0.025013	0	0.895558	0.016922	0.000282	0	0.017204
18529.39	0	0.011237	5.54E-05	0.014429	0.025721	6.99E-05	0	7.5E-06	7.74E-05
39516.32	0	0.225617	0.008119	0	0.233736	0.004735	9.17E-05	0	0.004827
24675.3	0	0.04522	0	0.005027	0.050247	0.000116	0	9.31E-05	0.000209
444993.5	0	0.642305	0	0.352467	0.994772	0.005072	0	0.001225	0.006297
6408.079	0	0.006584	0	0	0.006584	0.000435	0	0	0.000435
127.2962	286.3281	0	0	0	0	0	0	0	0
1079.697	1524.37	4.56E-05	0	0.000136	0.000181	1.27E-05	0	3.54E-06	1.62E-05
180.1334	0	0.007981	0	7.89E-05	0.00806	2.71E-05	0	9.63E-08	2.72E-05
65.60405	0	0.029707	0	0	0.029707	0.000773	0	0	0.000773
12876.1	0	0.033198	6.14E-05	0.006839	0.040098	4.87E-05	0	1.19E-05	6.06E-05
67977.07	0	0.820961	0.134809	0.081801	1.037572	0.016641	0.000615	0	0.017256
367.1865	0	0.000254	0.000288	0	0.000542	3.71E-06	9.03E-07	0	4.62E-06
4126.99	0	0.008523	1.47E-05	0.002031	0.010569	7.69E-06	0	1.23E-06	8.91E-06
995.3751	0	0.029539	0.001974	0.001196	0.032708	0.000768	7.23E-06	0	0.000775
12.37242	0	5.81E-06	2.25E-06	0	8.06E-06	1.68E-07	8.52E-09	0	1.77E-07
490.4608	0	0.001462	0.000125	0.000346	0.001933	6.1E-06	0	3.51E-07	6.45E-06
6985.676	0	0.066126	0.013403	0.003163	0.082692	0.000362	1.57E-05	0	0.000377
1163.807	0	0.001125	0.000464	0	0.001589	7.71E-06	1.07E-06	0	8.78E-06
190.0074	0	0.000773	0	0.000191	0.000964	4.32E-06	0	1.95E-07	4.52E-06

417.7021	0	0.016128	0	0	0.016128	5.5E-05	0	0	5.5E-05
68.63904	1335.953	0	0	0	0	0	0	0	0
121.4361	0	0.000446	0	0	0.000446	7.02E-07	0	0	7.02E-07

PM2.5_PM	PM2.5_PM	PM2.5_TO	PM10_RUI	PM10_IDLI	PM10_STR	PM10_TOT	PM10_PM	PM10_PMI	PM10_TOT
3.02E-07	2.45E-06	3.7E-06	7.9E-07	0	2.46E-07	1.04E-06	1.21E-06	6.99E-06	9.23E-06
0.011043	0.034623	0.113433	0.069749	0.001082	0	0.070831	0.044172	0.098923	0.213927
0.000119	0.00061	0.000785	5.68E-05	4.14E-06	0	6.1E-05	0.000476	0.001742	0.002279
0.018289	0.027466	0.062121	0.014715	0	0.003084	0.017799	0.073157	0.078474	0.169429
5.22E-05	7.89E-05	0.000661	0.000554	0	0	0.000554	0.000209	0.000225	0.000988
0.000245	0.000187	0.000433	0	0	0	0	0.000982	0.000535	0.001517
0.000349	0.000249	0.000801	0.000174	0	4.71E-05	0.000221	0.001396	0.00071	0.002327
0.001437	0.002617	0.006452	0.002105	0	0.000503	0.002607	0.005748	0.007478	0.015834
2.05E-07	4.25E-07	2.51E-05	2.55E-05	0	0	2.55E-05	8.21E-07	1.21E-06	2.76E-05
5.22E-07	4.04E-07	9.26E-07	0	0	0	0	2.09E-06	1.15E-06	3.24E-06
1.01E-07	7.19E-08	2.22E-07	4.26E-08	0	1.11E-08	5.37E-08	4.05E-07	2.05E-07	6.64E-07
0.006648	0.011599	0.024562	0.005698	0	0.00117	0.006868	0.026591	0.03314	0.0666
1.65E-05	2.76E-05	0.000149	0.00011	0	0	0.00011	6.58E-05	7.87E-05	0.000254
7.69E-07	5.85E-07	1.35E-06	0	0	0	0	3.07E-06	1.67E-06	4.75E-06
1.51E-05	1.08E-05	3.48E-05	7.67E-06	0	2.02E-06	9.69E-06	6.05E-05	3.07E-05	0.000101
0.000663	0.009047	0.010432	0.000701	0	8.48E-05	0.000786	0.002651	0.025849	0.029286
0.000953	0.008676	0.026834	0.017688	0.000295	0	0.017982	0.003814	0.02479	0.046586
8.03E-05	0.001278	0.001436	7.6E-05	0	8.16E-06	8.42E-05	0.000321	0.003652	0.004057
0.000335	0.003557	0.008719	0.004949	9.58E-05	0	0.005045	0.00134	0.010164	0.016549
6.37E-05	0.000267	0.00054	0.000123	0	9.86E-05	0.000222	0.000255	0.000764	0.00124
0.006299	0.011363	0.023959	0.005514	0	0.001332	0.006845	0.025195	0.032465	0.064505
0.000103	0.000176	0.000714	0.000454	0	0	0.000454	0.000413	0.000504	0.001371
1.64E-06	1.24E-06	2.88E-06	0	0	0	0	6.54E-06	3.55E-06	1.01E-05
2.41E-05	1.71E-05	5.75E-05	1.38E-05	0	3.84E-06	1.76E-05	9.64E-05	4.9E-05	0.000163
4.38E-05	0.00023	0.000301	2.94E-05	0	1.04E-07	2.96E-05	0.000175	0.000658	0.000862
2.22E-05	8.7E-05	0.000882	0.000808	0	0	0.000808	8.87E-05	0.000249	0.001145
7.8E-05	0.00041	0.000548	5.29E-05	0	1.3E-05	6.59E-05	0.000312	0.001171	0.001549
0.000856	0.004501	0.022613	0.017394	0.000643	0	0.018037	0.003423	0.012859	0.034319
8.04E-06	4.28E-05	5.55E-05	4.04E-06	9.82E-07	0	5.02E-06	3.22E-05	0.000122	0.00016
2.68E-05	0.000141	0.000176	8.36E-06	0	1.33E-06	9.69E-06	0.000107	0.000402	0.000519
1.9E-05	0.000132	0.000926	0.000802	7.55E-06	0	0.00081	7.61E-05	0.000376	0.001263
2.98E-07	1.6E-06	2.08E-06	1.83E-07	9.27E-09	0	1.92E-07	1.19E-06	4.58E-06	5.97E-06
1.22E-05	9.6E-05	0.000115	6.64E-06	0	3.82E-07	7.02E-06	4.89E-05	0.000274	0.00033
3.69E-05	0.000194	0.000608	0.000378	1.64E-05	0	0.000394	0.000148	0.000553	0.001095
6.85E-06	3.59E-05	5.15E-05	8.38E-06	1.17E-06	0	9.55E-06	2.74E-05	0.000102	0.000139
1.18E-05	0.000152	0.000168	4.7E-06	0	2.12E-07	4.91E-06	4.73E-05	0.000434	0.000486

5.48E-05	0.000302	0.000412	5.75E-05	0	0	5.75E-05	0.000219	0.000864	0.00114
7.51E-06	1.63E-05	2.38E-05	0	0	0	0	3E-05	4.65E-05	7.65E-05
1.04E-05	8.18E-05	9.29E-05	7.34E-07	0	0	7.34E-07	4.16E-05	0.000234	0.000276

CO2_RUNE	CO2_IDLE	CO2_STRE	CO2_TOTE	CH4_RUNE	CH4_IDLE	CH4_STRE	CH4_TOTE	N2O_RUNI	N2O_IDLE
0.181235	0	0.004758	0.185993	4.72E-05	0	3.01E-09	4.72E-05	2.87E-05	0
2064.966	134.4314	0	2199.398	0.004141	0.002555	0	0.006696	0.325336	0.02118
20.3458	1.819101	0	22.1649	0.036934	0.006199	0	0.043133	0.004148	0.000371
2786.204	0	96.35895	2882.563	0.036708	0	0.115221	0.151929	0.058552	0
6.330123	0	0	6.330123	4.47E-05	0	0	4.47E-05	0.000997	0
0	0	0	0	0	0	0	0	0	0
28.05028	0	1.172132	29.22241	9.81E-05	0	0.000717	0.000815	0.000119	0
260.2689	0	11.39843	271.6673	0.009263	0	0.01898	0.028243	0.01164	0
0.042488	0	0	0.042488	1.47E-06	0	0	1.47E-06	6.69E-06	0
0	0	0	0	0	0	0	0	0	0
0.007896	0	0.000341	0.008237	2.78E-08	0	1.89E-07	2.17E-07	3.41E-08	0
1284.679	0	46.78426	1331.463	0.017091	0	0.053132	0.070223	0.031281	0
2.742691	0	0	2.742691	1.08E-05	0	0	1.08E-05	0.000432	0
0	0	0	0	0	0	0	0	0	0
1.192894	0	0.056495	1.249388	4.19E-06	0	2.9E-05	3.32E-05	5.14E-06	0
318.131	1.439968	4.41359	323.9845	0.004986	0.001397	0.0068	0.013183	0.005736	3.39E-05
203.5717	1.442888	0	205.0146	0.003598	5.31E-05	0	0.003651	0.032073	0.000227
42.42549	0.194787	0.537676	43.15796	0.000463	0.000165	0.000764	0.001392	0.000619	4.07E-06
87.43219	0.763246	0	88.19543	0.00105	1.77E-05	0	0.001067	0.013775	0.00012
12.48196	0	1.566638	14.0486	0.013988	0	0.005915	0.019903	0.002895	0
1476.958	0	59.12144	1536.08	0.02411	0	0.074231	0.098341	0.040539	0
22.35135	0	0	22.35135	4.74E-05	0	0	4.74E-05	0.003521	0
0	0	0	0	0	0	0	0	0	0
1.940324	0	0.122111	2.062435	6.77E-06	0	4.98E-05	5.66E-05	8.24E-06	0
28.49608	0	0.006445	28.50253	0.000315	0	7.9E-06	0.000323	0.000454	0
5.979373	0	0	5.979373	3.7E-05	0	0	3.7E-05	0.000942	0
49.21657	0.394181	0.733434	50.34418	0.001191	0.00016	0.000794	0.002145	0.001367	3.96E-06
326.3255	14.7177	0	341.0432	0.001707	0.000122	0	0.001829	0.051413	0.002319
2.719582	0.252402	0	2.971984	0.002054	0.00073	0	0.002785	0.000554	5.15E-05
16.63549	0.088757	0.153305	16.87756	0.000235	4.22E-05	0.000185	0.000462	0.000372	1.06E-06
9.11228	0.264701	0	9.376981	9.95E-05	4.99E-06	0	0.000104	0.001436	4.17E-05
0.107932	0.002138	0	0.11007	8.57E-05	5.17E-06	0	9.08E-05	2.2E-05	4.36E-07
4.907368	0.34756	0.030311	5.285239	3.72E-05	0.000331	3.45E-05	0.000403	0.000102	1.24E-05
14.19681	1.239349	0	15.43616	4.69E-05	4.72E-06	0	5.17E-05	0.002237	0.000195
2.897633	0.374346	0	3.271979	0.007363	0.001318	0	0.008681	0.000591	7.63E-05
7.197869	0	0.025787	7.223657	1.56E-05	0	2.71E-05	4.26E-05	7.21E-05	0

9.347792	0	0	9.347792	2.48E-05	0	0	2.48E-05	0.001473	0
0	0	0	0	0	0	0	0	0	0
2.261124	0	0	2.261124	0.004011	0	0	0.004011	0.000461	0

N2O_STRE	N2O_TOTE	ROG_RUNI	ROG_IDLE	ROG_STRE	ROG_TOTE	ROG_DIUR	ROG_HOTS	ROG_RUNI	ROG_TOTA
2.87E-06	3.16E-05	0.000318	0	1.64E-08	0.000318	5.44E-05	1.49E-05	0.000134	0.000521
0	0.346516	0.089162	0.055006	0	0.144168	0	0	0	0.144168
0	0.004518	0.001471	0.000114	0	0.001585	0	0	0	0.001585
0.046048	0.1046	0.153179	0	0.569826	0.723004	0.485368	0.140845	0.35329	1.702506
0	0.000997	0.000962	0	0	0.000962	0	0	0	0.000962
0	0	0	0	0	0	0	0	0	0
0.000353	0.000473	0.00031	0	0.002916	0.003226	0.002218	0.000698	0.000615	0.006758
0.005508	0.017148	0.043446	0	0.107638	0.151084	0.11756	0.030965	0.094455	0.394065
0	6.69E-06	3.16E-05	0	0	3.16E-05	0	0	0	3.16E-05
0	0	0	0	0	0	0	0	0	0
9.4E-08	1.28E-07	8.72E-08	0	7.63E-07	8.51E-07	4.08E-07	1.23E-07	1.22E-07	1.5E-06
0.021775	0.053056	0.0733	0	0.269291	0.342591	0.189932	0.053818	0.140341	0.726681
0	0.000432	0.000233	0	0	0.000233	0	0	0	0.000233
0	0	0	0	0	0	0	0	0	0
1.44E-05	1.95E-05	1.32E-05	0	0.000117	0.00013	6.85E-05	2.02E-05	2E-05	0.000239
0.008929	0.014699	0.025861	0.005443	0.035604	0.066908	0.039247	0.010966	0.054704	0.171825
0	0.0323	0.077467	0.001144	0	0.078612	0	0	0	0.078612
0.001046	0.001669	0.002284	0.000634	0.003944	0.006863	0.004155	0.001115	0.005666	0.017798
0	0.013895	0.022596	0.00038	0	0.022977	0	0	0	0.022977
0.000286	0.003181	0.09871	0	0.045573	0.144283	0.067523	0.09787	0.102812	0.412488
0.026194	0.066733	0.112834	0	0.409643	0.522477	0.230488	0.065561	0.173199	0.991725
0	0.003521	0.00102	0	0	0.00102	0	0	0	0.00102
0	0	0	0	0	0	0	0	0	0
2.45E-05	3.28E-05	2.14E-05	0	0.000203	0.000224	0.000133	3.75E-05	3.85E-05	0.000433
7.91E-06	0.000462	0.001494	0	3.55E-05	0.00153	0.01038	0.002917	6.32E-05	0.01489
0	0.000942	0.000797	0	0	0.000797	0	0	0	0.000797
0.000402	0.001773	0.006356	0.000699	0.004902	0.011956	0.00377	0.00101	0.007946	0.024682
0	0.053732	0.036746	0.002626	0	0.039372	0	0	0	0.039372
0	0.000606	2.94E-05	1.04E-05	0	3.98E-05	0	0	0	3.98E-05
0.000136	0.000509	0.001166	0.000168	0.001025	0.00236	0.000693	0.000176	0.000721	0.003951
0	0.001477	0.002141	0.000108	0	0.002249	0	0	0	0.002249
0	2.24E-05	1.22E-06	7.39E-08	0	1.3E-06	0	0	0	1.3E-06
3.37E-05	0.000148	0.000176	0.001435	0.000194	0.001805	0.000142	3.94E-05	8.92E-05	0.002075
0	0.002432	0.00101	0.000102	0	0.001112	0	0	0	0.001112
0	0.000667	0.000105	1.88E-05	0	0.000124	0	0	0	0.000124
1.8E-05	9.01E-05	5.09E-05	0	0.000114	0.000165	2.98E-05	7.99E-06	2.08E-05	0.000224

0	0.001473	0.000534	0	0	0.000534	0	0	0	0.000534
0	0	0	0	0	0	0	0	0	0
0	0.000461	7.47E-05	0	0	7.47E-05	0	0	0	7.47E-05

TOG_RUNE	TOG_IDLEX	TOG_STRE	TOG_TOTE	TOG_DIUR	TOG_HOTS	TOG_RUNI	TOG_TOTA	CO_RUNEX	CO_IDLEX
0.000464	0	1.79E-08	0.000464	5.44E-05	1.49E-05	0.000134	0.000667	0.019004	0
0.101504	0.062621	0	0.164125	0	0	0	0.164125	0.354372	0.706414
0.038769	0.006355	0	0.045124	0	0	0	0.045124	0.180646	0.012376
0.223408	0	0.623882	0.84729	0.485368	0.140845	0.35329	1.826792	10.03744	0
0.001096	0	0	0.001096	0	0	0	0.001096	0.011107	0
0	0	0	0	0	0	0	0	0	0
0.000453	0	0.003193	0.003646	0.002218	0.000698	0.000615	0.007177	0.046947	0
0.063347	0	0.117849	0.181196	0.11756	0.030965	0.094455	0.424176	1.907136	0
3.59E-05	0	0	3.59E-05	0	0	0	3.59E-05	0.00018	0
0	0	0	0	0	0	0	0	0	0
1.27E-07	0	8.36E-07	9.63E-07	4.08E-07	1.23E-07	1.22E-07	1.62E-06	1.33E-05	0
0.106895	0	0.294838	0.401733	0.189932	0.053818	0.140341	0.785824	4.555007	0
0.000266	0	0	0.000266	0	0	0	0.000266	0.00165	0
0	0	0	0	0	0	0	0	0	0
1.92E-05	0	0.000128	0.000147	6.85E-05	2.02E-05	2E-05	0.000256	0.002001	0
0.037542	0.007941	0.038979	0.084462	0.039247	0.010966	0.054704	0.189378	0.552459	0.043589
0.088191	0.001303	0	0.089494	0	0	0	0.089494	0.228929	0.009484
0.003333	0.000926	0.004319	0.008577	0.004155	0.001115	0.005666	0.019513	0.054023	0.005134
0.025725	0.000433	0	0.026157	0	0	0	0.026157	0.061969	0.00315
0.115791	0	0.049515	0.165306	0.067523	0.09787	0.102812	0.433511	1.068053	0
0.161708	0	0.448477	0.610185	0.230488	0.065561	0.173199	1.079433	5.395237	0
0.001161	0	0	0.001161	0	0	0	0.001161	0.015505	0
0	0	0	0	0	0	0	0	0	0
3.13E-05	0	0.000222	0.000253	0.000133	3.75E-05	3.85E-05	0.000462	0.003251	0
0.002134	0	3.88E-05	0.002173	0.01038	0.002917	6.32E-05	0.015533	0.038856	0
0.000908	0	0	0.000908	0	0	0	0.000908	0.002765	0
0.009274	0.001019	0.005367	0.015661	0.00377	0.00101	0.007946	0.028387	0.140176	0.010493
0.041832	0.00299	0	0.044822	0	0	0	0.044822	0.109146	0.044471
0.002097	0.000745	0	0.002842	0	0	0	0.002842	0.007883	0.00176
0.001702	0.000246	0.001122	0.00307	0.000693	0.000176	0.000721	0.004661	0.026675	0.001306
0.002438	0.000122	0	0.00256	0	0	0	0.00256	0.005709	0.001237
8.74E-05	5.28E-06	0	9.27E-05	0	0	0	9.27E-05	0.000343	1.7E-05
0.000257	0.002094	0.000212	0.002563	0.000142	3.94E-05	8.92E-05	0.002834	0.004141	0.011098
0.00115	0.000116	0	0.001266	0	0	0	0.001266	0.002928	0.002017
0.007514	0.001345	0	0.008859	0	0	0	0.008859	0.024328	0.001986
7.43E-05	0	0.000125	0.000199	2.98E-05	7.99E-06	2.08E-05	0.000258	0.001035	0

0.000608	0	0	0.000608	0	0	0	0.000608	0.001575	0
0	0	0	0	0	0	0	0	0	0
0.004113	0	0	0.004113	0	0	0	0.004113	0.043867	0

CO_STREX	CO_TOTEX	SOx_RUNE	SOx_IDLEX	SOx_STREX	SOx_TOTE	NH3_RUNE	Fuel Consumption
0.000349	0.019353	1.79E-06	0	4.7E-08	1.84E-06	1.4E-06	0.019613
0	1.060786	0.019554	0.001273	0	0.020827	0.240509	196.4713
0	0.193021	0	0	0	0	0.011611	2.561924
5.32668	15.36412	0.027544	0	0.000953	0.028497	0.283276	303.9626
0	0.011107	6E-05	0	0	6E-05	8.09E-05	0.565467
0	0	0	0	0	0	0	0
0.02242	0.069367	0.000277	0	1.16E-05	0.000289	0.003345	3.081466
1.016648	2.923783	0.002573	0	0.000113	0.002686	0.02679	28.64698
0	0.00018	4.03E-07	0	0	4.03E-07	3.18E-07	0.003795
0	0	0	0	0	0	0	0
5.87E-06	1.91E-05	7.81E-08	0	3.37E-09	8.14E-08	1.11E-06	0.000869
2.453874	7.008881	0.0127	0	0.000463	0.013163	0.109226	140.4011
0	0.00165	2.6E-05	0	0	2.6E-05	2.55E-05	0.245003
0	0	0	0	0	0	0	0
0.0009	0.002902	1.18E-05	0	5.59E-07	1.24E-05	0.000166	0.131746
0.502899	1.098947	0.003145	1.42E-05	4.36E-05	0.003203	0.014839	34.16376
0	0.238413	0.001929	1.37E-05	0	0.001943	0.042114	18.31387
0.062602	0.121759	0.000419	1.93E-06	5.32E-06	0.000427	0.001804	4.550953
0	0.065119	0.000828	7.23E-06	0	0.000836	0.017462	7.878463
0.231522	1.299574	0.000123	0	1.55E-05	0.000139	0.000534	1.481407
2.874266	8.269503	0.014601	0	0.000584	0.015186	0.101325	161.9777
0	0.015505	0.000212	0	0	0.000212	0.00016	1.996637
0	0	0	0	0	0	0	0
0.001559	0.00481	1.92E-05	0	1.21E-06	2.04E-05	0.000272	0.217481
0.000747	0.039603	0.000282	0	6.37E-08	0.000282	0.00065	3.005556
0	0.002765	5.67E-05	0	0	5.67E-05	0.000617	0.534135
0.113064	0.263733	0.000487	3.9E-06	7.25E-06	0.000498	0.001159	5.308731
0	0.153617	0.00309	0.000139	0	0.003229	0.047071	30.46526
0	0.009644	0	0	0	0	0.002842	0.343516
0.02173	0.049711	0.000164	8.77E-07	1.52E-06	0.000167	0.000402	1.779717
0	0.006947	8.63E-05	2.51E-06	0	8.88E-05	0.000986	0.837642
0	0.00036	0	0	0	0	0.000105	0.012722
0.005076	0.020315	4.85E-05	3.44E-06	3E-07	5.22E-05	0.000275	0.557322
0	0.004945	0.000134	1.17E-05	0	0.000146	0.001402	1.378906
0	0.026314	0	0	0	0	0.002419	0.378191
0.002176	0.003211	7.12E-05	0	2.55E-07	7.14E-05	0.000178	0.761726

0	0.001575	8.86E-05	0	0	8.86E-05	0.001108	0.835035
0	0	0	0	0	0	0	0
0	0.043867	0	0	0	0	0.002067	0.261351

Carnegie SVRA RMA EIR

Operational Air Quality Emission Estimates and Transportation Energy Calculations
Prepared by: MIG, Inc.
November 2024

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Sheet 1: Emissions Summary

Table 1-1: 2021 Conditions: Annual Exhaust Emission Totals

Construction Phase / Source	AQ Emissions (short tons)					GHG Emissions (Metric tons)			
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O	CO2e
Heavy-Duty Off-Road Equipment	0.0	0.2	0.1	0.0	0.0	30.4	0.0	0.0	30.5
Parks-Owned On- and Off-Road Vehicles	0.0	0.1	0.1	0.0	0.0	63.8	0.0	0.0	65.3
Small, Utility Off-Road Equipment	0.1	0.3	0.0	0.0	0.0	5.0	0.0	0.0	5.0
Worker and Vendor Trips	0.3	0.3	0.3	0.3	0.3	2.9	0.3	0.3	79.8
Total	0.4	0.9	0.6	0.3	0.3	102.1	0.3	0.3	180.6

Table 1-2: 2021 Conditions: Average Daily Exhaust Emission Totals

Construction Phase / Source	Emissions (pounds)				
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)
Heavy-Duty Off-Road Equipment	0.0	1.9	1.1	0.0	0.0
Parks-Owned On- and Off-Road Vehicles	0.2	1.1	0.7	0.0	0.0
Small, Utility Off-Road Equipment	0.5	2.0	0.3	0.0	0.0
Worker and Vendor Trips	2.2	2.2	2.3	2.2	2.2
Total	2.9	7.1	4.4	2.3	2.3

Sheet 2: Off-Road Heavy-Duty Equipment Emissions

Table 2-1: Existing Heavy-Duty Equipment Emissions

Equipment	Annual Runtime	Horsepower	Load Factor	Emission Factor (g/hp-hr)								Emissions (short tons)							
				NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O	NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O
7130 TRACTOR	149.0	130	0.70	2.32	3.7	0.09	0.112	0.112	256.19	0.021	0.004	0.03	0.06	0.00	0.00	0.00	3.83	0.00	0.00
672G GRADER	152.2	255	0.41	1.29	2.6	0.06	0.009	0.009	514.03	0.021	0.004	0.02	0.05	0.00	0.00	0.00	9.02	0.00	0.00
430E BACKHOE	149.0	95	0.37	2.74	3.7	0.09	0.112	0.112	571.45	0.021	0.004	0.02	0.02	0.00	0.00	0.00	3.30	0.00	0.00
480 TRAIL DOZER	2.4	91	0.43	2.74	3.7	0.09	0.112	0.112	571.45	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
750J DOZER	155.3	157	0.43	2.32	3.7	0.09	0.112	0.112	514.03	0.021	0.004	0.03	0.04	0.00	0.00	0.00	5.94	0.00	0.00
544K LOADER	167.0	163	0.36	2.15	3.7	0.08	0.009	0.009	571.45	0.021	0.004	0.02	0.04	0.00	0.00	0.00	6.17	0.00	0.00
E18B MINI EX	7.0	15	0.38	4.55	4.1	0.09	0.128	0.128	571.45	0.024	0.005	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
T190 SKID STEER	50.0	61	0.37	2.74	3.7	0.09	0.192	0.192	571.45	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00
500 TRAIL DOZER	0.0	80	0.43	2.74	3.7	0.09	0.192	0.192	571.45	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KOBELCO	200.0	106	0.37	2.15	3.7	0.08	0.009	0.009	514.03	0.021	0.004	0.02	0.03	0.00	0.00	0.00	4.44	0.00	0.00
											Total	0.15	0.24	0.01	0.00	0.00	33.50	0.00	0.00

Sheet 3: Off-Road Heavy-Duty Equipment Emission Factors

Table 3-1: Equipment Category and Emissions Assignment (Default; No Runtime Hour Adjustment)

Equipment	Horsepower	Engine Tier	OFFROAD Category	HP_Bin	Load Factor	Default Emission Factors							
						ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	130	3	Agricultural - Agricultural Tractors	175	0.70	0.090	3.700	2.320	0.112	0.112	256.1869073	0.021	0.004
672G GRADER	255	4	Construction and Mining - Graders	300	0.41	0.060	2.600	1.290	0.009	0.009	514.03	0.021	0.004
430E BACKHOE	95	3	Construction and Mining - Tractors/Loaders/Bac	100	0.37	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
480 TRAIL DOZER	91	3	Construction and Mining - Crawler Tractors	100	0.43	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
750J DOZER	157	3	Construction and Mining - Crawler Tractors	175	0.43	0.090	3.700	2.320	0.112	0.112	514.0285459	0.021	0.004
544K LOADER	163	4	Construction and Mining - Rubber Tired Loaders	175	0.36	0.080	3.700	2.150	0.009	0.009	571.4540783	0.021	0.004
E18B MINI EX	15	4	Construction and Mining - Excavators	50	0.38	0.090	4.100	4.550	0.128	0.128	571.4540783	0.024	0.005
T190 SKID STEER	61	3	Construction and Mining - Skid Steer Loaders	75	0.37	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
500 TRAIL DOZER	80	3	Construction and Mining - Crawler Tractors	75	0.43	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
KOBELCO	106	4	Construction and Mining - Tractors/Loaders/Bac	175	0.37	0.080	3.700	2.150	0.009	0.009	514.0285459	0.021	0.004

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

Table 3-2: Equipment Category and Emissions Assignment (Runtime Hour Adjustment)

Equipment	Existing Runtime Hours on Equipment	Adjusted Emission Factors							
		ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	459.3	0.099	3.700	2.332	0.112	0.112	256.19	0.021	0.004
672G GRADER	1941.5	0.093	2.600	1.323	0.010	0.010	514.03	0.021	0.004
430E BACKHOE	2658.9	0.151	3.700	2.836	0.133	0.133	571.45	0.021	0.004
480 TRAIL DOZER	346.7	0.098	3.700	2.752	0.115	0.115	571.45	0.021	0.004
750J DOZER	4230.4	0.175	3.700	2.434	0.114	0.114	514.03	0.021	0.004
544K LOADER	1672.1	0.113	3.700	2.195	0.010	0.010	571.45	0.021	0.004
E18B MINI EX	2200	0.169	4.100	4.759	0.149	0.149	571.45	0.024	0.005
T190 SKID STEER	2140.9	0.139	3.700	2.817	0.222	0.222	571.45	0.021	0.004
500 TRAIL DOZER	1.4	0.090	3.700	2.740	0.192	0.192	571.45	0.021	0.004
KOBELCO	4230.4	0.165	3.700	2.264	0.011	0.011	514.03	0.021	0.004

Sheet 4: U.S. EPA Tier III and Tier IV Emission Factors

Table 4-1: U.S. EPA Tier III Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	--	--	--	--	--
50≤hp<75	75	0.09	3.7	2.74	0.192	0.192
75≤hp<100	100	0.09	3.7	2.74	0.112	0.112
100≤hp<175	175	0.09	3.7	2.32	0.112	0.112
175≤hp<300	300	0.09	2.6	2.32	0.088	0.088
300≤hp<600	600	0.09	2.6	2.32	0.088	0.088

CARB 2017 Table D-9 (pg. 235); and CalEEMod v2022.4.0 for CO.

Table 4-2: U.S EPA Tier III Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	--	--	--
50≤hp<75	75	0.000023	0.000036	0.0000141
75≤hp<100	100	0.000023	0.000036	0.0000080
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000023	0.000030	0.0000046
300≤hp<600	600	0.000023	0.000030	0.0000044

Table 4-3: U.S. EPA Tier IV (Interim) Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	0.09	4.1	4.55	0.128	0.128
50≤hp<75	75	0.09	3.7	2.74	0.112	0.112
75≤hp<100	100	0.08	3.7	2.15	0.009	0.009
100≤hp<175	175	0.08	3.7	2.15	0.009	0.009
175≤hp<300	300	0.06	2.6	1.29	0.009	0.009
300≤hp<600	600	0.06	2.6	1.29	0.009	0.009

CARB 2017 Table D-9 (pg. 235); EFs for Tier IV (Phase-In or Alt. NOx) Used Where Option Exists and CalEEMod v2022.4.0 for CO.

Table 4-4: U.S. EPA Tier IV (Interim) Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	0.000036	0.000095	0.0000096
50≤hp<75	75	0.000023	0.000036	0.0000080
75≤hp<100	100	0.000021	0.000027	0.0000009
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000017	0.000017	0.0000003
300≤hp<600	600	0.000017	0.000017	0.0000003

Sheet 5: On-Site, On-Road Vehicles Emission Factors and Emissions

Table 5-1: 2021 On-road Vehicle Emission Factor Assignment

Make	Model	Gross Vehicle Weight Rating (lbs)	Vehicle Class	Fuel	Emission Factors (tons / mi)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 OPERATOR	16,500	MHDT	Diesel	8.11085E-08	3.91151E-07	2.98681E-06	3.29318E-08	3.15072E-08	0.001313344	3.76728E-09	2.06918E-07
INTERNATIONAL	TRANSPORT 9300	50,000	HHDT	Diesel	9.60502E-08	8.57475E-07	3.72967E-06	4.52476E-08	4.32902E-08	0.001932167	4.46128E-09	3.04414E-07
FORD	F350 RESOURCES	10,100 to 14,000	LHDT2	Diesel	2.22674E-07	6.29592E-07	2.19283E-06	4.90812E-08	4.6958E-08	0.000867193	1.03428E-08	1.36627E-07
CHEVROLET	1500 ELIZ	6,700 to 7,300	MDV	Gasoline	2.93562E-07	2.56323E-06	2.98979E-07	2.27982E-09	2.097E-09	0.000528301	2.90412E-08	2.08218E-08
FORD	F350 r FLATBED	10,100 to 14,000	LHDT2	Gasoline	4.24483E-07	2.95664E-06	6.24105E-07	2.17361E-09	1.99855E-09	0.001170662	3.33371E-08	4.1632E-08
RAM	2500 DAVID	10000	LHDT1	Gasoline	4.91944E-07	3.25948E-06	6.80269E-07	2.43205E-09	2.23618E-09	0.001060739	3.8252E-08	4.41007E-08
INTERNATIONAL	WATER TRUCK	52000	HHDT	Diesel	9.60502E-08	8.57475E-07	3.72967E-06	4.52476E-08	4.32902E-08	0.001932167	4.46128E-09	3.04414E-07
FORD	F350 JOHN M	10,100 to 14,000	LHDT2	Gasoline	4.24483E-07	2.95664E-06	6.24105E-07	2.17361E-09	1.99855E-09	0.001170662	3.33371E-08	4.1632E-08
FORD	F250 ERIC	10,000 to 11,400	LHDT2	Gasoline	4.24483E-07	2.95664E-06	6.24105E-07	2.17361E-09	1.99855E-09	0.001170662	3.33371E-08	4.1632E-08
FORD	F250 JESSE/MIKE	10,000 to 11,400	LHDT2	Gasoline	4.24483E-07	2.95664E-06	6.24105E-07	2.17361E-09	1.99855E-09	0.001170662	3.33371E-08	4.1632E-08
INTERNATIONAL	DUMPTRUCK		HHDT	Diesel	9.60502E-08	8.57475E-07	3.72967E-06	4.52476E-08	4.32902E-08	0.001932167	4.46128E-09	3.04414E-07
FORD	F250 ROBERT	10,000 to 11,400	LHDT2	Gasoline	4.24483E-07	2.95664E-06	6.24105E-07	2.17361E-09	1.99855E-09	0.001170662	3.33371E-08	4.1632E-08
FORD	F350 FLATBED	10,100 to 14,000	LHDT2	Diesel	2.22674E-07	6.29592E-07	2.19283E-06	4.90812E-08	4.6958E-08	0.000867193	1.03428E-08	1.36627E-07

Table 5-2: 2021 On-road Vehicle Emission Calculations

Make	Model	Annual VMT	Vehicle Class	Fuel	Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 (OPERATOR)	3623	MHDT	Diesel	0.000293856	0.001417139	0.010821228	0.000119312	0.000114151	4.758246565	1.36489E-05	0.000749664
INTERNATIONAL	TRANSPORT 9300	495	HHDT	Diesel	4.75449E-05	0.00042445	0.001846185	2.23976E-05	2.14287E-05	0.95642268	2.20834E-06	0.000150685
FORD	F350 (RESOURCES)	11164	LHDT2	Diesel	0.002485934	0.007028768	0.024480794	0.000547943	0.000524239	9.681337266	0.000115467	0.001525299
CHEVROLET	1500 (ELIZ)	8193	MDV	Gasoline	0.002405155	0.02100054	0.002449536	1.86786E-05	1.71808E-05	4.32836713	0.000237935	0.000170593
FORD	F350 r FLATBED	1827	LHDT2	Gasoline	0.00077553	0.005401788	0.001140239	3.97119E-06	3.65136E-06	2.138799866	6.09069E-05	7.60617E-05
RAM	2500 (DAVID)	7819	LHDT1	Gasoline	0.003846509	0.02548584	0.005319026	1.90162E-05	1.74847E-05	8.293918779	0.000299093	0.000344823
INTERNATIONAL	WATER TRUCK	2012	HHDT	Diesel	0.000193253	0.001725239	0.007504088	9.10382E-05	8.71E-05	3.887520065	8.9761E-06	0.00061248
FORD	F350 (JOHN M)	4784	LHDT2	Gasoline	0.002030725	0.014144582	0.002985716	1.03986E-05	9.56109E-06	5.600448033	0.000159485	0.000199168
FORD	F250 (ROBERT)	4299	LHDT2	Gasoline	0.001824851	0.01271061	0.002683026	9.34435E-06	8.59179E-06	5.032676859	0.000143316	0.000178976
FORD	F250 (JESSE/MIKE)	5415	LHDT2	Gasoline	0.002298574	0.016010224	0.003379526	1.17701E-05	1.08222E-05	6.339135891	0.00018052	0.000225437
INTERNATIONAL	DUMPTRUCK	426	HHDT	Diesel	4.09174E-05	0.000365284	0.001588838	1.92755E-05	1.84416E-05	0.823103155	1.90051E-06	0.00012968
FORD	F250 (KEITH)	9352.4	LHDT2	Gasoline	0.003969932	0.027651712	0.005836876	2.03285E-05	1.86913E-05	10.94850129	0.000311782	0.000389359
FORD	F350 FLATBED	8723	LHDT2	Diesel	0.001942386	0.005491933	0.019128087	0.000428136	0.000409615	7.564520331	9.02201E-05	0.001191793
				Total	0.022155169	0.138858109	0.089163165	0.001321609	0.001260958	70.35299791	0.001625458	0.00594402

Sheet 6: On-Site Small Equipment Emission Factors and Emissions

Table 6-1: On-site Small Equipment Category and Emission Factor Assignment

Make	Model	Horsepower	Fuel	OFFROAD Category	HP_Bin	Load Factor	Emission Factors							
							ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
GATOR 1*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	16.747	79.890	71.171	3.521	3.239	10179.997	0.021	0.004
GATOR 2*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	16.747	79.890	71.171	3.521	3.239	10179.997	0.021	0.004
Gator 855*	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	1.00	16.747	79.890	71.171	3.521	3.239	10179.997	0.021	0.004
Canycom 1	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.784	4.371	3.903	0.213	0.196	571.454	0.018	0.004
Canycom 2	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.784	4.371	3.903	0.213	0.196	571.454	0.018	0.004
Jumping Jack	MTX-70	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Jumping Jack	MTR-40	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Vibroplate	WP 1550	4.15	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
John Deere Mower	727A	23	Gasoline	Lawn and Garden - Misc - Rear Engine Rid	Aggregate	1.00	47.504	2365.534	23.540	0.276	0.208	4996.466	0.276	0.208

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

* - Emission factors for Gator 1, Gator 2, Gator 855, and John Deere Mower (727A) are based on emissions per gallon of gasoline consumed.

Table 6-2: Small Equipment Annual Emissions Estimates

Make	Model	Annual Runtime	Horsepower	Load Factor	Annual Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
GATOR 1*	XUV 855D	135	24.6	1.00	0.002492	0.011889	0.010591126	0.000523942	0.000482027	1.514907236	3.12506E-06	5.95249E-07
GATOR 2*	XUV 855D	257.3	24.6	1.00	0.00475	0.022659	0.020185902	0.000998595	0.000918707	2.887300977	5.95612E-06	1.1345E-06
Gator 855*	XUV 855D	2	24.6	1.00	3.14E-05	0.00015	0.00013337	6.59779E-06	6.06996E-06	0.01907661	3.93525E-08	7.49572E-09
Canycom 1	SC75	77	22.1	0.36	0.00053	0.002952	0.002635794	0.000143996	0.000132476	0.385897046	1.21552E-05	2.70116E-06
Canycom 2	SC75	47.1	22.1	0.36	0.000324	0.001806	0.001612284	8.80805E-05	8.10341E-05	0.236048713	7.4352E-06	1.65227E-06
Jumping Jack	MTX-70	9	2.8	0.55	0.015189	0.003504	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Jumping Jack	MTR-40	9	2.8	0.55	0.015189	0.003504	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Vibroplate	WP 1550	9	4.15	0.55	0.022512	0.005193	0.000109938	5.31234E-05	4.01483E-05	0.009724369	4.07596E-07	9.0577E-08
John Deere Mower*	727A	78.0	23	1.00	0.004084	0.203389	0.002024012	2.37042E-05	1.78959E-05	0.429597882	2.37042E-05	1.78959E-05
				Total	0.065102	0.255045	0.037440776	0.001909723	0.001732534	5.495674872	5.33727E-05	2.41994E-05

Note: * - Assumes XUVs and mower consume one gallon of gas per hour runtime.

Sheet 7: Off-site Worker and Vendor Emission Factors

Table 7-1: Worker and Vendor Trips: Emissions Assignment

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emission Factors (tons / mi)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	1.631E-07	1.631E-07	1.631E-07	1.631E-07	1.631E-07	1.631E-07	1.631E-07	1.631E-07
					LDT1	Agg	0.25	4.992E-07	4.992E-07	4.992E-07	4.992E-07	4.992E-07	4.992E-07	4.992E-07	4.992E-07
					LDT2	Agg	0.25	1.965E-07	1.965E-07	1.965E-07	1.965E-07	1.965E-07	1.965E-07	1.965E-07	1.965E-07
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	20	380	HHDT	Diesel	0.5	9.605E-08	8.575E-07	3.73E-06	4.525E-08	4.329E-08	0.0019322	4.461E-09	3.044E-07
Harkrader and Sons Trucking	Sand	6	20	120	HHDT	Diesel	0.5	9.605E-08	8.575E-07	3.73E-06	4.525E-08	4.329E-08	0.0019322	4.461E-09	3.044E-07

Table 7-2: Worker and Vendor Trips: Emissions Calculations

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emissions (tons)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	0.0548915	0.0548915	0.0548915	0.0548915	0.0548915	0.0548915	0.0548915	0.0548915
					LDT1	Agg	0.25	0.1680129	0.1680129	0.1680129	0.1680129	0.1680129	0.1680129	0.1680129	0.1680129
					LDT2	Agg	0.25	0.0661327	0.0661327	0.0661327	0.0661327	0.0661327	0.0661327	0.0661327	0.0661327
							Worker Sub-Total	**0.2890371**	**0.2890371**	**0.2890371**	**0.2890371**	**0.2890371**	**0.2890371**	**0.2890371**	**0.2890371**
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	19	60	1140	HHDT	Diesel	0.5	0.0001095	0.0009775	0.0042518	5.158E-05	4.935E-05	2.2026704	5.086E-06	0.000347
Harkrader and Sons Trucking	Sand	6	60	360	HHDT	Diesel	0.5	3.458E-05	0.0003087	0.0013427	1.629E-05	1.558E-05	0.6955801	1.606E-06	0.0001096
							Vendor Sub-Total	**0.0001441**	**0.0012862**	**0.0055945**	**6.787E-05**	**6.494E-05**	**2.8982505**	**6.692E-06**	**0.0004566**

							Total	**0.2891812**	**0.2903233**	**0.2946316**	**0.289105**	**0.289102**	**3.1872877**	**0.2890438**	**0.2894937**

Sheet 8: OFFROAD Output

Model Output: OFFROAD2021 (v1.0.7) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horse

Region	Calendar Year	Vehicle Category	Model Yea
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2021	Agricultural - ATVs	Aggregate
San Joaquin	2021	Agricultural - ATVs	Aggregate
San Joaquin	2021	Agricultural - ATVs	Aggregate
San Joaquin	2021	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2021	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2021	Agricultural - Balers (Self Propelled)	Aggregate
San Joaquin	2021	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2021	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2021	Agricultural - Construction Equipment	Aggregate
San Joaquin	2021	Agricultural - Construction Equipment	Aggregate
San Joaquin	2021	Agricultural - Construction Equipment	Aggregate
San Joaquin	2021	Agricultural - Construction Equipment	Aggregate
San Joaquin	2021	Agricultural - Construction Equipment	Aggregate
San Joaquin	2021	Agricultural - Forklifts	Aggregate
San Joaquin	2021	Agricultural - Forklifts	Aggregate
San Joaquin	2021	Agricultural - Forklifts	Aggregate
San Joaquin	2021	Agricultural - Forklifts	Aggregate
San Joaquin	2021	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2021	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2021	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Nut Harvester	Aggregate
San Joaquin	2021	Agricultural - Other Harvesters	Aggregate
San Joaquin	2021	Agricultural - Other Harvesters	Aggregate
San Joaquin	2021	Agricultural - Other Harvesters	Aggregate
San Joaquin	2021	Agricultural - Other Harvesters	Aggregate

San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2021	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2021	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2021	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2021	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2021	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2021	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Cranes	Aggregate
San Joaquin	2021	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Graders	Aggregate
San Joaquin	2021	Construction and Mining - Graders	Aggregate
San Joaquin	2021	Construction and Mining - Graders	Aggregate
San Joaquin	2021	Construction and Mining - Graders	Aggregate
San Joaquin	2021	Construction and Mining - Graders	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Dumpers/Tenders	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Excavators	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Other	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Paving Equipment	Aggregate

San Joaquin	2021	Construction and Mining - Misc - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Signal Boards	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Misc - Trenchers	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2021	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2021	Construction and Mining - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Pavers	Aggregate
San Joaquin	2021	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Rollers	Aggregate
San Joaquin	2021	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2021	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2021	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2021	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2021	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Scrapers	Aggregate

San Joaquin	2021	Construction and Mining - Scrapers	Aggregate
San Joaquin	2021	Construction and Mining - Scrapers	Aggregate
San Joaquin	2021	Construction and Mining - Scrapers	Aggregate
San Joaquin	2021	Construction and Mining - Scrapers	Aggregate
San Joaquin	2021	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2021	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2021	Construction and Mining - Trenchers	Aggregate
San Joaquin	2021	Construction and Mining - Trenchers	Aggregate
San Joaquin	2021	Construction and Mining - Trenchers	Aggregate
San Joaquin	2021	Construction and Mining - Trenchers	Aggregate
San Joaquin	2021	Construction and Mining - Trenchers	Aggregate
San Joaquin	2021	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate

San Joaquin	2021	Agricultural - ATVs	Aggregate

:power-hours

Horsepowe	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd
25	Diesel	0.004715	0.005705	0.006789	0.016936	0.012392	1.503002	0.000793
50	Diesel	0.10544	0.127583	0.151834	0.396205	0.316359	36.29554	0.027885
75	Diesel	0.058926	0.0713	0.084853	0.291817	0.48341	40.56592	0.031577
100	Diesel	0.086667	0.104867	0.1248	0.626581	0.775747	99.29199	0.054177
175	Diesel	0.054648	0.066124	0.078693	0.508714	0.590594	84.47107	0.027078
300	Diesel	0.028608	0.034616	0.041196	0.164333	0.293757	67.16307	0.013077
25	Diesel	0.001662	0.002011	0.002393	0.009594	0.008547	1.22251	0.000423
50	Diesel	0.002672	0.003233	0.003847	0.018805	0.017157	2.659757	0.000822
175	Diesel	5.33E-05	6.45E-05	7.67E-05	0.000828	0.000623	0.150743	2.37E-05
175	Diesel	0.001409	0.001704	0.002028	0.011413	0.015252	1.835411	0.000726
300	Diesel	0.000158	0.000191	0.000228	0.000829	0.001719	0.271967	7.83E-05
75	Diesel	6.62E-05	8.01E-05	9.53E-05	0.00044	0.000593	0.069316	3.25E-05
175	Diesel	0.000635	0.000768	0.000915	0.00553	0.006838	0.915854	0.000308
300	Diesel	0.001165	0.001409	0.001677	0.005931	0.012278	1.971734	0.000571
50	Diesel	0.000163	0.000198	0.000235	0.000709	0.000575	0.079077	4.13E-05
75	Diesel	0.000455	0.000551	0.000656	0.003024	0.004081	0.476708	0.000223
100	Diesel	0.001964	0.002376	0.002828	0.01269	0.016995	1.94277	0.001225
175	Diesel	0.005092	0.006161	0.007332	0.043331	0.05944	7.427744	0.00251
300	Diesel	0.000909	0.0011	0.001309	0.004329	0.010193	1.336495	0.000466
50	Diesel	0.002213	0.002678	0.003187	0.009693	0.008124	1.073649	0.000583
75	Diesel	0.006154	0.007446	0.008862	0.040862	0.055134	6.443973	0.003043
100	Diesel	0.002008	0.00243	0.002892	0.014041	0.017079	2.203461	0.001199
175	Diesel	0.000394	0.000477	0.000568	0.003437	0.004232	0.567927	0.000192
75	Diesel	2.54E-05	3.08E-05	3.66E-05	0.000169	0.000228	0.026606	1.25E-05
175	Diesel	0.000369	0.000446	0.000531	0.003246	0.003844	0.525821	0.000181
300	Diesel	0.000619	0.000749	0.000892	0.003245	0.006734	1.065281	0.000307
25	Diesel	0.000633	0.000765	0.000911	0.002748	0.002318	0.306382	0.000127
50	Diesel	0.002754	0.003332	0.003965	0.011577	0.009302	1.197434	0.000723
75	Diesel	0.001028	0.001244	0.001481	0.006874	0.009212	1.080149	0.00051
100	Diesel	0.008485	0.010267	0.012219	0.055446	0.072077	8.461026	0.005295
175	Diesel	0.003871	0.004684	0.005574	0.032378	0.041834	5.278373	0.001944
300	Diesel	0.002513	0.00304	0.003618	0.012014	0.026724	3.509547	0.001288
75	Diesel	0.000872	0.001055	0.001256	0.005791	0.007816	0.91309	0.000428
100	Diesel	0.003866	0.004678	0.005567	0.026233	0.032728	4.077617	0.002341
175	Diesel	0.003863	0.004674	0.005562	0.032582	0.041729	5.330947	0.001927
300	Diesel	0.001367	0.001654	0.001969	0.007064	0.014641	2.333119	0.000674

25	Diesel	2.17E-05	2.63E-05	3.13E-05	9.43E-05	7.96E-05	0.010514	4.34E-06
50	Diesel	0.001053	0.001274	0.001517	0.004585	0.003732	0.510229	0.000268
75	Diesel	0.01686	0.020401	0.024279	0.1008	0.144112	14.99439	0.009529
100	Diesel	0.000824	0.000997	0.001187	0.005621	0.006975	0.875689	0.000497
175	Diesel	0.002637	0.00319	0.003797	0.022367	0.02845	3.666285	0.001309
300	Diesel	0.00228	0.002758	0.003283	0.011049	0.024323	3.289551	0.001163
50	Diesel	0.000758	0.000917	0.001092	0.003293	0.002669	0.367131	0.000192
75	Diesel	0.000487	0.000589	0.000701	0.003239	0.004364	0.510076	0.00024
100	Diesel	0.001797	0.002174	0.002587	0.012682	0.015212	1.988958	0.001073
175	Diesel	0.000409	0.000494	0.000588	0.003354	0.004421	0.542374	0.000208
300	Diesel	0.000853	0.001032	0.001228	0.004387	0.009094	1.450612	0.00042
50	Diesel	0.000112	0.000135	0.000161	0.000599	0.000512	0.062169	3.88E-05
75	Diesel	0.000163	0.000197	0.000235	0.001516	0.001619	0.239531	8.68E-05
100	Diesel	0.000194	0.000235	0.00028	0.00125	0.0015	0.181314	0.000132
175	Diesel	0.001088	0.001317	0.001567	0.00835	0.009769	1.303691	0.000558
300	Diesel	0.0012	0.001452	0.001728	0.00447	0.012046	1.534739	0.000634
25	Diesel	1.37E-06	1.66E-06	1.98E-06	3.35E-06	2.27E-06	0.000186	2.47E-07
50	Diesel	1.16E-05	1.4E-05	1.67E-05	4.24E-05	4.12E-05	0.004604	3.63E-06
75	Diesel	3.45E-05	4.17E-05	4.97E-05	0.000142	0.00028	0.019049	2.42E-05
100	Diesel	8.36E-05	0.000101	0.00012	0.000404	0.000689	0.056073	5.92E-05
175	Diesel	0.000588	0.000712	0.000847	0.003559	0.005974	0.521377	0.000368
300	Diesel	0.001231	0.00149	0.001773	0.006047	0.013089	1.898308	0.00076
50	Diesel	0.000107	0.00013	0.000154	0.000357	0.000299	0.030808	3.52E-05
75	Diesel	0.000388	0.00047	0.000559	0.001692	0.003033	0.224186	0.000264
100	Diesel	0.001155	0.001397	0.001663	0.006201	0.008708	0.894343	0.000749
175	Diesel	0.002477	0.002997	0.003567	0.021698	0.023734	3.387616	0.001371
300	Diesel	0.002712	0.003282	0.003906	0.012509	0.026992	4.129726	0.001549
25	Diesel	7.01E-07	8.49E-07	1.01E-06	1.75E-06	1.34E-06	0.000109	1.45E-07
50	Diesel	0.003505	0.004242	0.005048	0.029601	0.026112	3.924038	0.001279
75	Diesel	0.00143	0.00173	0.002059	0.01864	0.017611	3.11554	0.000529
100	Diesel	0.001536	0.001858	0.002211	0.015057	0.013995	2.37663	0.00111
175	Diesel	0.007095	0.008585	0.010217	0.083219	0.063177	13.46986	0.003183
300	Diesel	0.007121	0.008616	0.010254	0.033411	0.067868	14.27474	0.003225
50	Diesel	4.28E-05	5.18E-05	6.16E-05	0.00013	0.000106	0.010378	1.36E-05
75	Diesel	8.31E-05	0.000101	0.00012	0.000272	0.000602	0.031691	5.89E-05
100	Diesel	0.000205	0.000248	0.000295	0.000712	0.001496	0.0839	0.000145
175	Diesel	0.002199	0.002661	0.003166	0.010302	0.021451	1.373436	0.001393
300	Diesel	0.002489	0.003011	0.003584	0.012295	0.027377	5.092827	0.001322
25	Diesel	2.21E-05	2.66E-05	3.17E-05	9.06E-05	0.000168	0.000243	5.64E-06
25	Diesel	6.56E-06	7.89E-06	9.43E-06	2.65E-05	4.92E-05	7.14E-05	1.79E-06
25	Diesel	4.36E-06	5.25E-06	6.27E-06	1.79E-05	3.31E-05	4.79E-05	1.11E-06
50	Diesel	1.43E-05	1.71E-05	2.07E-05	0.000128	0.000117	0.016496	5.28E-06
25	Diesel	3.14E-06	3.78E-06	4.51E-06	1.29E-05	2.39E-05	3.45E-05	8.09E-07
25	Diesel	2.25E-05	2.71E-05	3.24E-05	9.24E-05	0.000171	0.000247	5.76E-06
25	Diesel	1.17E-05	1.41E-05	1.68E-05	4.8E-05	8.88E-05	0.000128	2.99E-06
25	Diesel	5.92E-06	7.12E-06	8.51E-06	2.43E-05	4.5E-05	6.5E-05	1.54E-06
25	Diesel	1.01E-05	1.21E-05	1.44E-05	4.13E-05	7.64E-05	0.00011	2.57E-06

25	Diesel	7.06E-05	8.49E-05	0.000101	0.00029	0.000537	0.000776	1.8E-05
25	Diesel	3.77E-06	4.54E-06	5.42E-06	1.55E-05	2.87E-05	4.14E-05	9.64E-07
50	Diesel	6.28E-06	7.47E-06	9.04E-06	5.55E-05	5.07E-05	0.007406	2.27E-06
25	Diesel	0.001183	0.001423	0.001701	0.004831	0.008971	0.01296	0.000312
25	Diesel	0.000107	0.000129	0.000154	0.000441	0.000816	0.00118	2.75E-05
25	Diesel	0.000104	0.000126	0.00015	0.000428	0.000793	0.001147	2.67E-05
50	Diesel	0.001673	0.002024	0.002409	0.007103	0.005766	0.619924	0.000511
75	Diesel	0.000678	0.00082	0.000976	0.003781	0.00496	0.540629	0.000387
100	Diesel	0.000576	0.000697	0.00083	0.003747	0.004344	0.538	0.000366
175	Diesel	0.001592	0.001926	0.002292	0.019249	0.012946	2.958015	0.000712
300	Diesel	0.000908	0.001099	0.001308	0.00377	0.008537	1.292288	0.000467
50	Diesel	5.09E-05	6.15E-05	7.32E-05	0.00029	0.000246	0.027673	1.83E-05
75	Diesel	3.86E-05	4.67E-05	5.56E-05	0.0002	0.000317	0.027651	2.59E-05
100	Diesel	1.81E-05	2.19E-05	2.61E-05	0.000101	0.000118	0.014229	8.38E-06
175	Diesel	0.000633	0.000766	0.000912	0.004962	0.005382	0.73497	0.000348
300	Diesel	0.001548	0.001874	0.00223	0.00599	0.014899	1.668236	0.000894
50	Diesel	0.000174	0.000211	0.000251	0.000632	0.000521	0.057663	5.03E-05
75	Diesel	0.00031	0.000376	0.000447	0.001971	0.002518	0.299058	0.000166
100	Diesel	0.000307	0.000371	0.000442	0.002191	0.002467	0.32636	0.000192
175	Diesel	0.000738	0.000893	0.001063	0.006852	0.006491	1.103332	0.000342
300	Diesel	0.000559	0.000676	0.000804	0.00289	0.00532	1.34928	0.000235
50	Diesel	0.000175	0.000211	0.000252	0.001178	0.001052	0.154038	5.75E-05
75	Diesel	9.89E-05	0.00012	0.000142	0.000725	0.000857	0.111995	4.94E-05
100	Diesel	0.00017	0.000206	0.000245	0.001169	0.001394	0.174025	0.000112
175	Diesel	0.000608	0.000736	0.000876	0.007611	0.005372	1.233526	0.000279
300	Diesel	0.000277	0.000335	0.000398	0.001288	0.002761	0.549785	0.000132
50	Diesel	0.002551	0.003086	0.003673	0.01262	0.011119	1.444812	0.000801
75	Diesel	0.000475	0.000575	0.000684	0.003716	0.004543	0.591279	0.000264
100	Diesel	0.00099	0.001198	0.001426	0.005987	0.007764	0.877945	0.000651
175	Diesel	0.003042	0.00368	0.00438	0.032644	0.027374	5.285929	0.001415
300	Diesel	0.00038	0.000459	0.000547	0.001523	0.00407	0.432588	0.000231
50	Diesel	4.61E-05	5.57E-05	6.63E-05	0.00033	0.000311	0.048245	1.66E-05
75	Diesel	0.000655	0.000793	0.000944	0.010958	0.010367	1.924171	0.000219
100	Diesel	0.000921	0.001114	0.001326	0.007934	0.008443	1.27303	0.000623
175	Diesel	0.003725	0.004508	0.005364	0.050753	0.036455	8.54713	0.00167
300	Diesel	4.21E-05	5.09E-05	6.06E-05	0.000207	0.000431	0.067024	2.45E-05
50	Diesel	3.48E-05	4.21E-05	5.01E-05	0.000103	8.28E-05	0.007939	9.61E-06
75	Diesel	4.33E-05	5.24E-05	6.24E-05	0.000192	0.000326	0.025905	2.79E-05
100	Diesel	8.18E-05	9.9E-05	0.000118	0.000421	0.000601	0.06028	5.94E-05
175	Diesel	0.000187	0.000226	0.000269	0.001312	0.001765	0.196255	0.000106
300	Diesel	0.000199	0.00024	0.000286	0.000924	0.001822	0.240409	0.000121
50	Diesel	0.000222	0.000268	0.000319	0.000906	0.000732	0.084848	6.99E-05
75	Diesel	0.000631	0.000763	0.000908	0.004486	0.00545	0.68589	0.000343
100	Diesel	0.001143	0.001383	0.001645	0.007535	0.008825	1.102513	0.000732
175	Diesel	0.006894	0.008342	0.009927	0.056687	0.06197	8.591049	0.003663
300	Diesel	0.008498	0.010283	0.012237	0.040203	0.078419	16.3387	0.003954
50	Diesel	9.77E-06	1.18E-05	1.41E-05	2.51E-05	2.05E-05	0.001803	2.63E-06

75	Diesel	3.38E-05	4.1E-05	4.87E-05	0.00017	0.000266	0.025356	2.09E-05
100	Diesel	3.22E-05	3.89E-05	4.63E-05	0.000202	0.000269	0.029945	2.05E-05
175	Diesel	0.00044	0.000532	0.000633	0.002079	0.004262	0.238703	0.000301
300	Diesel	0.004113	0.004976	0.005922	0.016386	0.043677	3.679817	0.002676
50	Diesel	0.002484	0.003006	0.003577	0.012384	0.010703	1.423552	0.000748
75	Diesel	0.005384	0.006515	0.007753	0.063152	0.062028	10.52799	0.002083
100	Diesel	0.003151	0.003812	0.004537	0.033447	0.030447	5.303959	0.002143
175	Diesel	0.000432	0.000522	0.000622	0.009201	0.003962	1.58539	0.000138
300	Diesel	6.7E-05	8.1E-05	9.65E-05	0.000329	0.000597	0.127465	3.25E-05
50	Diesel	4.42E-05	5.35E-05	6.37E-05	0.000162	0.000132	0.013921	1.3E-05
75	Diesel	2.29E-05	2.77E-05	3.29E-05	0.000165	0.000206	0.024988	1.3E-05
100	Diesel	3.61E-05	4.37E-05	5.2E-05	0.000213	0.000276	0.030451	2.8E-05
175	Diesel	0.000108	0.00013	0.000155	0.000904	0.00096	0.139009	5.78E-05
300	Diesel	0.00013	0.000158	0.000188	0.000496	0.00127	0.159185	7.19E-05
25	Diesel	2.91E-07	3.52E-07	4.18E-07	2.95E-06	2.51E-06	0.000358	1.76E-07
50	Diesel	0.003785	0.00458	0.00545	0.014816	0.012297	1.399568	0.001139
75	Diesel	0.006027	0.007293	0.00868	0.043114	0.052794	6.683775	0.003177
100	Diesel	0.014363	0.017379	0.020683	0.103913	0.113948	15.66578	0.008886
175	Diesel	0.008944	0.010822	0.012879	0.104943	0.080469	16.97238	0.00412
300	Diesel	0.003497	0.004232	0.005036	0.017224	0.032926	7.164706	0.001643
50	Diesel	0.000806	0.000976	0.001161	0.003852	0.003506	0.447738	0.000255
75	Diesel	0.000196	0.000238	0.000283	0.000977	0.001561	0.139566	0.000127
100	Diesel	0.000275	0.000332	0.000395	0.001171	0.001881	0.160883	0.000167
175	Diesel	0.000273	0.000331	0.000393	0.001824	0.002542	0.269018	0.000153
300	Diesel	0.000161	0.000195	0.000232	0.000611	0.001766	0.162596	9.96E-05
Aggregate	Gasoline	0.079443	0.080238	0.087342	3.995532	0.039761	8.439336	0.000466

25	Diesel	0.001662	0.002011	0.002393	0.009594	0.008547	1.22251	0.000423

PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hp	Total_Populati	Horsepowe
0.00073	1.36E-05	1.23E-05	48887.81345	32698.66079	127.5920636	1747420
0.025654	0.000329	0.000297	1180576.648	139224.7142	1539.670713	42197900
0.029051	0.000369	0.000332	1319478.226	149488.1973	1161.338007	47162723
0.049842	0.000906	0.000812	3229647.647	151129.2007	1676.624548	1.15E+08
0.024912	0.000771	0.000691	2747571.127	195786.2124	997.7197069	1.09E+08
0.012031	0.000613	0.00055	2184597.818	126141.9017	318.8449156	86808493
0.000389	1.11E-05	1E-05	39764.30185	41926.92077	113.3408055	1705577
0.000756	2.42E-05	2.18E-05	86513.31388	38057.0516	160.109964	3710743
2.18E-05	1.38E-06	1.23E-06	4903.194996	4116.967064	2.361045051	233803.6
0.000668	1.67E-05	1.5E-05	59699.98944	28609.17169	17.21697774	2277384
7.2E-05	2.48E-06	2.23E-06	8846.20936	10288.62689	2.221675572	337457.6
2.99E-05	6.32E-07	5.67E-07	2254.621323	1997.213963	1.291756103	77364.46
0.000284	8.36E-06	7.49E-06	29789.78279	2892.173673	11.08622201	1280502
0.000526	1.8E-05	1.61E-05	64134.15549	14887.83662	11.89692496	2756781
3.8E-05	7.18E-07	6.47E-07	2572.120262	4683.221105	2.578910357	110323.8
0.000206	4.35E-06	3.9E-06	15505.77217	15092.0939	12.91386893	665076
0.001127	1.77E-05	1.59E-05	63192.02502	28670.73011	41.1921021	2710442
0.00231	6.78E-05	6.08E-05	241600.537	36728.8851	155.6537611	11520461
0.000428	1.22E-05	1.09E-05	43471.86723	20370.39058	10.88278705	2072909
0.000536	9.75E-06	8.79E-06	34922.32158	41126.53719	47.24117134	1497894
0.002799	5.88E-05	5.27E-05	209601.6346	76890.56288	165.6121388	8990266
0.001103	2.01E-05	1.8E-05	71671.47238	51324.38712	44.81932803	3074144
0.000176	5.18E-06	4.65E-06	18472.83317	11799.99112	8.944482207	880857.1
1.15E-05	2.43E-07	2.18E-07	865.3994917	7984.734072	0.590261257	35351.29
0.000167	4.8E-06	4.3E-06	17103.26186	12302.89239	7.173749637	776714.9
0.000282	9.73E-06	8.72E-06	34650.16123	9724.640857	8.972694354	1573577
0.000116	2.78E-06	2.51E-06	9965.608933	1993.092222	24.56508792	385321
0.000665	1.09E-05	9.8E-06	38948.65694	27905.16158	44.7241682	1505953
0.000469	9.85E-06	8.84E-06	35133.74321	17311.03103	22.01608125	1358449
0.004871	7.71E-05	6.92E-05	275209.844	82344.86506	141.9945072	10641009
0.001789	4.82E-05	4.32E-05	171688.4318	67614.04497	70.67624618	7379959
0.001185	3.2E-05	2.87E-05	114154.231	18845.91503	22.87833235	4906874
0.000394	8.33E-06	7.47E-06	29699.85402	20410.28648	19.16474863	1148347
0.002153	3.72E-05	3.34E-05	132631.7247	55400.07422	65.3556772	5128215
0.001772	4.86E-05	4.36E-05	173398.4912	60585.61918	69.58165166	7453465
0.00062	2.13E-05	1.91E-05	75888.82369	13492.5161	13.84447766	3262051

4E-06	9.55E-08	8.6E-08	341.9956797	5509.994251	1.027883567	13970.41
0.000247	4.64E-06	4.18E-06	16596.11205	28443.40945	21.86567601	677945.8
0.008767	0.000137	0.000123	487718.9682	36284.64837	438.640391	19923161
0.000457	7.99E-06	7.17E-06	28483.34513	10124.23819	15.90252357	1163535
0.001204	3.35E-05	3E-05	119252.4209	59084.07554	45.76916959	5415641
0.00107	3E-05	2.69E-05	106998.4631	42193.40729	23.68819587	4859149
0.000176	3.34E-06	3E-06	11941.59575	2892.173673	11.0862221	426834
0.00022	4.65E-06	4.17E-06	16591.12828	6303.609133	11.5178153	593024.4
0.000987	1.81E-05	1.63E-05	64694.37345	18272.50698	28.70864985	2312401
0.000192	4.95E-06	4.44E-06	17641.67161	13853.23296	5.789646311	701020.1
0.000386	1.32E-05	1.19E-05	47183.7166	14711.95893	9.408263959	1874921
3.57E-05	5.89E-07	0	2020.185566	1814.242165	3.800875972	36022.98
7.98E-05	2.27E-06	0	7783.606757	4360.842484	8.853259886	138793.5
0.000121	1.72E-06	0	5891.843155	2392.742567	4.681566746	105060.5
0.000513	1.23E-05	0	42363.67394	12001.35903	18.5408584	839800.5
0.000583	1.45E-05	0	49871.60336	8746.831041	14.5082217	988634.6
2.27E-07	1.76E-09	0	6.033495818	17.05690176	0.092704292	107.5864
3.34E-06	4.36E-08	0	149.6196339	229.5418413	1.205155796	2667.946
2.23E-05	1.8E-07	0	619.0018198	620.8526977	3.569115242	11037.74
5.45E-05	5.31E-07	0	1822.105762	1308.458517	6.999174046	32490.92
0.000338	4.94E-06	0	16942.23317	7966.427204	31.47310713	335856
0.000699	1.8E-05	0	61685.85937	17651.11692	70.82607909	1222836
3.24E-05	2.92E-07	0	1001.109756	1061.728895	3.986284556	17851.31
0.000243	2.12E-06	0	7284.957588	4536.697502	15.80608179	129901.9
0.000689	8.47E-06	0	29061.84072	13712.3596	39.77014127	518216.8
0.001261	3.21E-05	0	110081.1862	37494.69607	81.67248125	2182205
0.001425	3.91E-05	0	134196.1608	28163.61996	66.14451234	2660251
1.34E-07	1.03E-09	0	3.549080303	20.81759875	0.046352146	63.2855
0.001176	3.72E-05	0	127512.2947	168559.4588	346.3895871	2273738
0.000487	2.95E-05	0	101240.0263	76999.20489	143.2744833	1805264
0.001021	2.25E-05	0	77229.00371	40446.66081	75.41494154	1377111
0.002928	0.000128	0	437705.4722	155775.4436	214.285971	8676897
0.002967	0.000135	0	463860.1234	102948.4287	159.6367908	9195377
1.25E-05	9.83E-08	0	337.2439262	407.080696	1.715029402	6013.572
5.42E-05	3E-07	0	1029.793469	733.0946149	3.291002366	18362.78
0.000133	7.95E-07	0	2726.338544	1394.380284	5.701313958	48614.76
0.001282	1.3E-05	0	44630.05088	14928.33066	48.53069686	884728.2
0.001216	4.82E-05	0	165492.3064	35284.14731	90.85020616	3280653
4.26E-06	2.3E-09	1.98E-09	7.889347233	0	1.241256355	0
1.35E-06	6.77E-10	5.83E-10	2.321064716	0	0.880347044	0
8.42E-07	4.55E-10	3.92E-10	1.558518921	0	0.325946599	0
4.86E-06	2.11E-07	1.35E-07	536.55	394.2	0.68	13008.6
6.11E-07	3.27E-10	2.82E-10	1.121819733	0	0.45342602	0
4.35E-06	2.35E-09	2.02E-09	8.04778779	0	0.715385033	0
2.26E-06	1.22E-09	1.05E-09	4.177700931	0	0.934542569	0
1.16E-06	6.17E-10	5.31E-10	2.114369937	0	0.281535078	0
1.94E-06	1.05E-09	9.03E-10	3.592134684	0	0.700035494	0

1.36E-05	7.36E-09	6.34E-09	25.23221756	0	5.551117734	0
7.28E-07	3.93E-10	3.39E-10	1.348135707	0	0.169761559	0
2.09E-06	9.31E-08	6.06E-08	240.9	146	0.27	5402
0.000236	1.23E-07	1.06E-07	421.5592803	0	74.32166222	0
2.08E-05	1.12E-08	9.65E-09	38.38313598	0	5.240231512	0
2.02E-05	1.09E-08	9.37E-09	37.29226875	0	3.739835232	0
0.00047	5.87E-06	0	20144.52301	22418.91935	37.26712538	359207.5
0.000356	5.12E-06	0	17567.83802	12269.47357	20.11683136	313261.3
0.000337	5.1E-06	0	17482.40713	8455.381541	13.3030659	311737.9
0.000655	2.8E-05	0	96121.21414	30230.61393	29.43361271	1905468
0.00043	1.22E-05	0	41993.12413	8916.543413	11.49533221	832454.8
1.68E-05	2.62E-07	0	899.2394184	1500.98726	2.410311592	16034.81
2.38E-05	2.62E-07	0	898.5327539	622.409946	1.205155796	16022.21
7.71E-06	1.35E-07	0	462.3790813	253.8822973	0.417169314	8244.922
0.000321	6.96E-06	0	23882.97178	7893.075212	8.992316324	473446.4
0.000822	1.58E-05	0	54209.63038	12297.72582	17.84557621	1074630
4.63E-05	5.46E-07	0	1873.78468	2148.199781	6.164835418	33412.43
0.000153	2.83E-06	0	9717.955857	6235.044167	15.99149037	173285.9
0.000177	3.09E-06	0	10605.12078	5375.862497	12.28331869	189105.4
0.000315	1.05E-05	0	35852.95994	12092.26067	21.73915647	710734.7
0.000216	1.28E-05	0	43845.09747	9085.392383	16.08419466	869167.6
5.29E-05	1.46E-06	0	5005.489013	6726.926521	17.05758973	89255.48
4.54E-05	1.06E-06	0	3639.296318	2751.849673	6.72106117	64894.19
0.000103	1.65E-06	0	5654.963904	3245.018815	7.64810409	100836.6
0.000256	1.17E-05	0	40083.64042	16344.77811	24.70569382	794602
0.000121	5.21E-06	0	17865.37459	4211.310973	7.833512674	354156
0.000737	1.37E-05	0	46949.4053	63031.0082	173.357026	837179.3
0.000243	5.6E-06	0	19213.71519	13345.58328	35.22763096	342609.8
0.000599	8.32E-06	0	28528.96243	15607.86349	41.80963569	508714.8
0.001302	5.01E-05	0	171767.1771	67498.41016	113.2846448	3405044
0.000213	4.1E-06	0	14057.00852	3281.416459	7.509047652	278660.5
1.52E-05	4.57E-07	0	1567.733791	1581.484066	5.747666104	27955.08
0.000202	1.82E-05	0	62526.26031	39611.82654	117.4099858	1114938
0.000574	1.21E-05	0	41367.31783	21415.42158	67.2106117	737642.2
0.001536	8.1E-05	0	277740.4733	113743.4969	235.8397188	5505816
2.26E-05	6.35E-07	0	2177.958602	515.9520276	1.436916526	43174.98
8.84E-06	7.52E-08	0	257.9650458	295.9517107	0.834338628	4599.909
2.56E-05	2.45E-07	0	841.8034123	608.6814878	1.39056438	15010.64
5.47E-05	5.71E-07	0	1958.800035	1007.280288	2.3176073	34928.38
9.78E-05	1.86E-06	0	6377.348158	2214.210545	3.847228118	126422
0.000111	2.28E-06	0	7812.129982	1698.33239	3.105593782	154864.5
6.43E-05	8.04E-07	0	2757.137066	3464.939423	7.138230484	49163.95
0.000316	6.5E-06	0	22288.12662	16618.079	31.8439243	397431.2
0.000674	1.04E-05	0	35826.34282	20554.61539	38.65768976	638838.2
0.00337	8.14E-05	0	279167.6366	104283.3722	144.3869348	5534107
0.003637	0.000155	0	530928.9701	129698.1717	182.7665117	10524923
2.42E-06	1.71E-08	0	58.58445737	52.53311473	0.23176073	1044.65

1.92E-05	2.4E-07	0	823.9408913	471.952203	1.807733694	14692.12
1.89E-05	2.84E-07	0	973.0629861	438.3842751	1.436916526	17351.19
0.000277	2.26E-06	0	7756.693081	2142.346313	8.714203448	153765.6
0.002462	3.49E-05	0	119576.2911	20650.95982	68.69388037	2370432
0.000688	1.35E-05	0	46258.559	53109.04437	136.3680135	824860.5
0.001916	9.97E-05	0	342108.9492	245968.9222	531.2882975	6100323
0.001971	5.02E-05	0	172353.0856	99142.17381	207.3331491	3073318
0.000127	1.5E-05	0	51517.50852	24644.99296	35.92291315	1021262
2.99E-05	1.21E-06	0	4141.982182	1066.266689	1.946790132	82108.99
1.19E-05	1.32E-07	0	452.35223	731.1402711	1.575972964	8066.128
1.19E-05	2.37E-07	0	811.9829351	754.8580848	1.529620818	14478.89
2.57E-05	2.88E-07	0	989.5032696	680.795341	1.436916526	17644.35
5.32E-05	1.32E-06	0	4517.131338	2245.950578	3.47641095	89545.8
6.62E-05	1.51E-06	0	5172.730804	1433.859577	2.642072322	102542.1
1.62E-07	3.39E-09	0	11.6450521	24.40058659	0.092704292	207.649
0.001048	1.33E-05	0	45479.21403	58643.08178	149.7174316	810963.6
0.002922	6.33E-05	0	217190.44	158184.1412	353.6205218	3872836
0.008175	0.000148	0	509062.176	280376.6255	587.0962812	9077353
0.003791	0.000161	0	551520.5465	233622.5509	348.290025	10933122
0.001512	6.79E-05	0	232818.3585	56920.33367	95.85623793	4615298
0.000234	4.24E-06	0	14549.33777	12438.87353	40.23366273	259436.8
0.000117	1.32E-06	0	4535.218822	2614.044457	8.80690774	80869.85
0.000154	1.52E-06	0	5227.930431	2131.386328	7.230934776	93221.95
0.00014	2.55E-06	0	8741.779537	2784.940523	7.230934776	173293.5
9.16E-05	1.54E-06	0	5283.5996	935.1177924	2.78112876	104740
0.000352	0.000143	0.000197	559286.0401	0	6288.038301	0

0.000389	1.11E-05	1E-05	39764.30185	41926.92077	113.3408055	1705577

Table 23-1: Conversions

Days/YR	lbs / ton	grams / lbs
365	2000	453.59237

r_Hours_hhpy	HC_g_hp-hr	TOG_g_hp-hr	NH3_g_hp-hr	ROG_g_hp-hr	CO_g_hp-hr
	0.893367164	1.286448716	0.002330495	1.08097427	3.209161503
	0.827377979	1.191424289	0.002330495	1.001127356	3.108978608
	0.41371033	0.595742876	0.002330495	0.5005895	2.048801695
	0.248593037	0.357973974	0.002330495	0.300797576	1.797272087
	0.165737741	0.238662347	0.002096303	0.200542667	1.542845331
	0.10912337	0.157137653	0.002096303	0.132039277	0.626831648
	0.322674118	0.464650731	0.001942079	0.390435683	1.862571004
	0.238390802	0.343282756	0.001942079	0.288452871	1.67800968
	0.075477948	0.108688245	0.00174692	0.091328317	1.17276972
	0.204804405	0.294918342	0.002183649	0.24781333	1.659441035
	0.155148367	0.223413649	0.002183649	0.187729524	0.812964748
	0.283385923	0.408075729	0.002427599	0.342896969	1.881678038
	0.164232718	0.236495114	0.001937903	0.19872159	1.430007245
	0.139900839	0.201457208	0.001937903	0.169280015	0.712336423
	0.490033875	0.705648784	0.001942079	0.592940991	2.128550003
	0.226708747	0.326460596	0.001942079	0.274317584	1.505342433
	0.239931984	0.345502056	0.001942079	0.2903177	1.550320742
	0.146347003	0.210739683	0.00174692	0.177079873	1.245435498
	0.145202819	0.209092058	0.00174692	0.175695411	0.691563509
	0.489270318	0.704549256	0.001942079	0.592017083	2.142625009
	0.226663867	0.326395968	0.001942079	0.274263279	1.504989893
	0.216296385	0.311466795	0.001942079	0.261718626	1.512366334
	0.148203899	0.213413615	0.00174692	0.179326717	1.291826454
	0.238044187	0.342783628	0.002039183	0.288033468	1.580609563
	0.157179536	0.226338533	0.001834266	0.190187239	1.383901152
	0.130324629	0.187667465	0.001834266	0.157692801	0.682890389
	0.543607075	0.782794191	0.002154398	0.65776456	2.361255001
	0.605484496	0.871897672	0.002154398	0.732636239	2.545515589
	0.250663289	0.360955137	0.002154398	0.303302581	1.675594881
	0.26404644	0.380226873	0.002154398	0.319496192	1.725353512
	0.173682098	0.250102221	0.001937903	0.210155339	1.452744744
	0.169563646	0.24417165	0.001937903	0.205172011	0.810710335
	0.251493837	0.362151124	0.002154398	0.304307541	1.669914991
	0.249612234	0.359441617	0.002154398	0.302030803	1.693809217
	0.171597094	0.247099816	0.001937903	0.207632484	1.447484327
	0.138770712	0.199829826	0.001937903	0.167912561	0.717003314

0.514535547	0.74093119	0.002039183	0.622588011	2.234977491
0.514438196	0.740791002	0.002039183	0.622470218	2.239508391
0.280217933	0.403513823	0.002039183	0.339063699	1.675299159
0.234533769	0.337728626	0.002039183	0.283785861	1.599581919
0.161215827	0.232150791	0.001834266	0.195071151	1.36757642
0.155346505	0.223698968	0.001834266	0.187969271	0.75293951
0.588040546	0.846778388	0.002330495	0.711529056	2.554259826
0.27197366	0.391642068	0.002330495	0.32908813	1.808391343
0.2572802	0.370483487	0.002330495	0.311309042	1.816000081
0.193033058	0.277967604	0.002096303	0.23357	1.584345586
0.150649779	0.216935683	0.002096303	0.182286233	0.774766191
1.028741903	1.48138834	0	1.244777702	5.509562938
0.389028392	0.560200884	0	0.470724354	3.616308504
0.611844286	0.881055771	0	0.740331586	3.939577466
0.429098687	0.617902109	0	0.519209411	3.29226833
0.40182192	0.578623564	0	0.486204523	1.497298819
4.226702418	6.086451482	0	5.114309926	10.31192712
1.440304686	2.074038747	0	1.74276867	5.261940858
1.034464586	1.489629004	0	1.251702149	4.262257173
0.851843099	1.226654063	0	1.03073015	4.121880223
0.579930733	0.835100255	0	0.701716187	3.508519164
0.333382288	0.480070495	0	0.403392569	1.637474789
1.987557139	2.86208228	0	2.404944138	6.618199985
0.989230459	1.42449186	0	1.196968855	4.313123925
0.737733213	1.062335827	0	0.892657188	3.962482911
0.375817805	0.54117764	0	0.454739545	3.292367872
0.337592073	0.486132585	0	0.408486408	1.557051803
3.669962342	5.284745772	0	4.440654434	9.139906214
0.510489643	0.735105085	0	0.617692468	4.310702723
0.262245203	0.377633093	0	0.317316696	3.418952974
0.369234394	0.531697527	0	0.446773616	3.620379721
0.270762495	0.389897993	0	0.327622619	3.175738221
0.256418421	0.369242527	0	0.31026629	1.203117102
2.35723705	3.394421353	0	2.852256831	7.132114609
1.49838676	2.157676935	0	1.81304798	4.900338028
1.397359422	2.012197568	0	1.690804901	4.848291304
0.822976735	1.185086498	0	0.995801849	3.855539392
0.251182079	0.361702194	0	0.303930316	1.240931803
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.365224636	0.525923475	0.003435774	0.4346475	3.270019071
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.384999313	0.55439901	0.00371473	0.458181	3.402225145
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
1.542266963	2.220864427	0	1.866143025	6.547417698
0.716602647	1.031907812	0	0.867089203	3.996829223
0.611928213	0.881176627	0	0.740433138	3.980345789
0.276642785	0.39836561	0	0.33473777	3.344953594
0.361336286	0.520324252	0	0.437216906	1.499653587
1.050180802	1.512260355	0	1.27071877	5.987899965
0.798334588	1.149601807	0	0.965984851	4.129079742
0.727600727	1.047745047	0	0.88039688	4.048066823
0.443027163	0.637959115	0	0.536062867	3.470644371
0.477123218	0.687057434	0	0.577319094	1.845702773
1.728557654	2.489123022	0	2.091554762	6.264284212
0.593067134	0.854016673	0	0.717611232	3.766848372
0.536946658	0.773203187	0	0.649705456	3.837047301
0.343778199	0.495040606	0	0.415971621	3.1920855
0.212819074	0.306459467	0	0.25751108	1.101085817
0.648199096	0.933406698	0	0.784320906	4.371470154
0.504644594	0.726688215	0	0.610619958	3.698957688
0.559525775	0.805717116	0	0.677026187	3.839937952
0.253452308	0.364971323	0	0.306677292	3.171711907
0.258609329	0.372397434	0	0.312917288	1.204384308
1.008858602	1.452756387	0	1.220718909	4.991317744
0.459342547	0.661453267	0	0.555804481	3.591834888
0.64442328	0.927969523	0	0.779752169	3.896936257
0.295778736	0.42592138	0	0.357892271	3.174461932
0.451074304	0.649546997	0	0.545799907	1.809531055
0.545496954	0.785515614	0	0.660051315	3.904915176
0.194591488	0.280211743	0	0.2354557	3.254254352
0.41337258	0.595256515	0	0.500180822	3.561458145
0.224043092	0.322622053	0	0.271092142	3.05232952
0.322701348	0.464689941	0	0.390468631	1.587175993
2.506590227	3.609489927	0	3.032974175	7.414381942
0.955294276	1.375623758	0	1.155906074	4.235470967
0.775420431	1.11660542	0	0.938258721	3.993689685
0.489093433	0.704294543	0	0.591803054	3.435137679
0.424607678	0.611435056	0	0.51377529	1.975225007
1.492676512	2.149454178	0	1.80613858	6.099743198
0.525338819	0.7564879	0	0.635659971	3.737413339
0.592221962	0.852799625	0	0.716588574	3.905756703
0.412490254	0.593985965	0	0.499113207	3.391748788
0.267354749	0.384990838	0	0.323499246	1.264815975
3.097457856	4.460339313	0	3.747924006	7.959544447

0.762804009	1.098437772	0	0.92299285	3.837846719
0.61376662	0.883823933	0	0.74265761	3.852507878
0.94662858	1.363145156	0	1.145420582	4.47773627
0.574504937	0.827287109	0	0.695150974	2.288873902
0.997207367	1.435978609	0	1.206620914	4.971399544
0.292256931	0.42084998	0	0.353630886	3.427862393
0.339443468	0.488798593	0	0.410726596	3.603611711
0.139944789	0.201520496	0	0.169333194	2.983146148
0.270123289	0.388977537	0	0.32684918	1.326417953
1.814856134	2.613392833	0	2.195975923	6.669063733
0.522822714	0.752864708	0	0.632615484	3.762441085
0.678282544	0.976726864	0	0.820721879	3.988563513
0.397841522	0.572891791	0	0.481388241	3.341414504
0.420962578	0.606186113	0	0.50936472	1.601658368
0.463370245	0.667253153	0	0.560677997	4.703182161
1.545381889	2.22534992	0	1.869912085	6.049494783
0.515343186	0.742094188	0	0.623565255	3.686197255
0.523933251	0.754463881	0	0.633959233	3.790519536
0.270870817	0.390053976	0	0.327753689	3.178316062
0.250905245	0.361303553	0	0.303595347	1.235754524
1.029061964	1.481849228	0	1.245164976	4.916675084
0.803884329	1.157593434	0	0.972700038	4.000683819
0.975095074	1.404136906	0	1.179865039	4.159549051
0.521932594	0.751582935	0	0.631538438	3.484572152
0.510364028	0.734924201	0	0.617540474	1.93100628
47.03376129	51.71067894	0.116901848	47.50443696	2365.534205
13.84018916	19.9298724	0.083299976	16.74662886	79.88968916

NOx_g_hp-hr	PM10_g_hp-hr	PM2.5_g_hp-hr	CO2_g_hp-hr	gal/hp-hr
2.348093446	0.150280409	0.138257977	284.8072283	0.027977
2.482436335	0.21881277	0.201307749	284.8072269	0.027977
3.393950487	0.221697286	0.203961503	284.8072272	0.027977
2.225138102	0.155399096	0.142967169	284.8072271	0.027977
1.791174286	0.082123707	0.07555381	256.1869073	0.025166
1.120506957	0.049879731	0.045889353	256.1869072	0.025166
1.659303661	0.082085585	0.075518738	237.3393561	0.023314
1.53096195	0.07336418	0.067495045	237.3393562	0.023314
0.882945758	0.033576601	0.030890473	213.4890895	0.020971
2.217639047	0.105535942	0.097093067	266.8613627	0.026214
1.68703764	0.076824677	0.070678703	266.8613626	0.026214
2.539605314	0.139089455	0.127962299	296.6741959	0.029143
1.768348393	0.079700357	0.073324328	236.8289212	0.023264
1.474679098	0.068607475	0.063118876	236.8289216	0.023264
1.725201816	0.123999845	0.114079857	237.3393581	0.023314
2.031684299	0.111271569	0.102369842	237.3393563	0.023314
2.076158392	0.149686882	0.137711931	237.3393575	0.023314
1.708417381	0.072155678	0.066383224	213.4890863	0.020971
1.628201123	0.074395279	0.068443657	213.4890885	0.020971
1.795875948	0.128810084	0.118505278	237.3393555	0.023314
2.030666634	0.112060844	0.103095977	237.3393568	0.023314
1.839602652	0.129127089	0.118796922	237.3393554	0.023314
1.590922317	0.072014848	0.06625366	213.4890916	0.020971
2.133268548	0.11683515	0.107488338	249.206321	0.02448
1.638942721	0.077306257	0.071121756	224.1635426	0.02202
1.417111642	0.064532729	0.059370111	224.1635453	0.02202
1.992091625	0.108767402	0.10006601	263.2866325	0.025863
2.045312301	0.159050422	0.146326388	263.2866317	0.025863
2.245411343	0.124349372	0.114401423	263.2866341	0.025863
2.242875398	0.164758071	0.151577425	263.2866332	0.025863
1.876989712	0.087239312	0.080260167	236.8289205	0.023264
1.803359777	0.086915277	0.079962055	236.8289193	0.023264
2.253799536	0.12343641	0.113561498	263.2866347	0.025863
2.113229505	0.151128756	0.139038455	263.2866334	0.025863
1.853841916	0.085586096	0.078739209	236.8289213	0.023264
1.486170615	0.068388576	0.06291749	236.8289221	0.023264

1.885556587	0.102950629	0.094714579	249.2063237	0.02448
1.822812241	0.131007816	0.12052719	249.2063243	0.02448
2.395136904	0.158376887	0.145706736	249.2063216	0.02448
1.984867473	0.141441881	0.130126531	249.2063231	0.02448
1.739497818	0.080031253	0.073628753	224.1635437	0.02202
1.657458858	0.079240537	0.072901294	224.1635443	0.02202
2.070242114	0.148799792	0.136895809	284.8072269	0.027977
2.43677431	0.133783982	0.123081263	284.8072291	0.027977
2.178324865	0.153645258	0.141353637	284.8072265	0.027977
2.08814007	0.098463393	0.090586321	256.1869058	0.025166
1.606106465	0.074160346	0.068227519	256.1869092	0.025166
4.708717442	0.356993929	0.328434415	571.4540783	0.05608
3.8631891	0.207050709	0.190486652	571.4540783	0.05608
4.729167765	0.415760304	0.38249948	571.4540783	0.05608
3.851714144	0.220071453	0.202465737	514.0285459	0.050445
4.034553364	0.212288106	0.195305058	514.0285459	0.050445
6.999928172	0.759992202	0.699192825	571.4540783	0.05608
5.119084034	0.451035612	0.414952763	571.4540783	0.05608
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7.025757159	0.603210059	0.554953254	571.4540783	0.05608
5.889886387	0.36264332	0.333631854	514.0285459	0.050445
3.544295858	0.205673739	0.18921984	514.0285459	0.050445
5.539383392	0.653792836	0.601489409	571.4540783	0.05608
7.73112422	0.673881699	0.619971163	571.4540783	0.05608
5.564079245	0.478779864	0.440477475	571.4540783	0.05608
3.601268608	0.208018013	0.191376572	514.0285459	0.050445
3.359664839	0.192858735	0.177430037	514.0285459	0.050445
6.999928172	0.759992202	0.699192825	571.4540783	0.05608
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3.365174116	0.266780043	0.24543764	571.4540783	0.05608
2.410911941	0.121465671	0.111748418	514.0285459	0.050445
2.443917879	0.116133236	0.106842577	514.0285459	0.050445
5.829211269	0.75068903	0.690633907	571.4540783	0.05608
10.84770395	1.061385256	0.976474435	571.4540783	0.05608
10.18817475	0.984326395	0.905580283	571.4540783	0.05608
8.028404988	0.521503089	0.479782842	514.0285459	0.050445
2.763241997	0.1334259	0.122751828	514.0285459	0.050445
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3.395841698	0.185767667	0.170906254	514.0285459	0.050445
5.076911739	0.377219807	0.347042222	571.4540783	0.05608
6.55855304	0.534483503	0.491724823	571.4540783	0.05608
4.745358849	0.336492795	0.309573372	571.4540783	0.05608
3.764429292	0.243659746	0.224166966	514.0285459	0.050445
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2.581218335	0.123128879	0.113278569	514.0285459	0.050445
4.397949383	0.316775212	0.291433195	571.4540783	0.05608
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7.185637216	0.614970469	0.565772831	571.4540783	0.05608
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4.540376532	0.285904633	0.263032263	571.4540783	0.05608
4.573997039	0.379519467	0.34915791	571.4540783	0.05608
3.707870451	0.219173039	0.201639196	514.0285459	0.050445
2.467136103	0.124385054	0.114434249	514.0285459	0.050445
6.48966253	0.832439751	0.765844571	571.4540783	0.05608

5.985232821	0.470874607	0.433204639	571.4540783	0.05608
5.129159874	0.391979817	0.360621432	571.4540783	0.05608
9.177393341	0.647280557	0.595498112	514.0285459	0.050445
6.101141564	0.373870696	0.343961041	514.0285459	0.050445
4.296364702	0.300217721	0.276200303	571.4540783	0.05608
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4.70435365	0.296873056	0.273123211	571.4540783	0.05608
5.183951813	0.524804606	0.482820238	571.4540783	0.05608
3.548282998	0.213728015	0.196629774	514.0285459	0.050445
4.099656814	0.232319822	0.213734237	514.0285459	0.050445
3.999772598	0.280008011	0.25760737	571.4540783	0.05608
5.020801048	0.464916145	0.427722854	571.4540783	0.05608
4.513799074	0.271593379	0.249865908	571.4540783	0.05608
4.156583998	0.324146362	0.298214653	571.4540783	0.05608
2.437101824	0.124783631	0.11480094	514.0285459	0.050445
2.362240073	0.11790601	0.108473529	514.0285459	0.050445
4.475377064	0.32502383	0.299021923	571.4540783	0.05608
6.390528915	0.519439064	0.477883938	571.4540783	0.05608
6.682986971	0.593558898	0.546074186	571.4540783	0.05608
4.856798605	0.291426274	0.268112172	514.0285459	0.050445
5.581585041	0.314869837	0.28968025	514.0285459	0.050445
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Sheet 9: On-Road Vehicle Operational Fuel Efficiency
EMFAC2021 San Joaquin Valley Fuel Efficiency Estimates for 2021

Table 9-1: 2021 San Joaquin Valley Average Vehicle Fuel Efficiency (Gasoline)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	3.63	65.46	22.58	2.90
LDA	249,898.69	9,778,546.00	352,851.20	27.71
LDT1	23,308.28	739,633.69	31,986.75	23.12
LDT2	94,763.35	3,632,206.82	164,952.66	22.02
LHDT1	10,285.19	342,935.13	38,358.53	8.94
LHDT2	1,215.05	41,289.19	5,096.94	8.10
MCY	12,209.48	65,618.60	1,657.62	39.59
MDV	96,879.25	3,295,870.53	183,463.62	17.96
MH	1,698.57	14,496.65	3,288.20	4.41
MHDT	606.60	26,887.13	5,951.69	4.52
OBUS	198.27	8,881.63	1,929.55	4.60
SBUS	123.83	6,576.42	652.69	10.08
UBUS	48.14	3,627.08	772.00	4.70
TOTAL	491,238.35	17,956,634.31	790,984.04	22.70

Table 9-2: 2021 San Joaquin Valley Average Vehicle Fuel Efficiency (Diesel)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	8,006.8	1,153,664.27	199,122.12	5.79
LDA	782.81	25,941.32	618.15	41.97
LDT1	7.89	93.79	3.83	24.47
LDT2	226.36	9,565.78	309.72	30.89
LHDT1	9,240.06	323,200.86	20,506.52	15.76
LHDT2	3,131.25	115,626.09	8,957.09	12.91
MCY	0.00	0.00	0.00	0.00
MDV	1,358.73	54,194.48	2,304.27	23.52
MH	651.32	5,727.79	608.66	9.41
MHDT	5,563.72	262,958.26	30,850.40	8.52
OBUS	81.53	5,807.60	835.41	6.95
SBUS	484.04	11,109.63	1,367.95	8.12
UBUS	80.77	5,598.19	638.24	8.77
TOTAL	29,615.28	1,973,488.07	266122.37	7.42

Table 9-3: 2021 San Joaquin Valley Average Vehicle Fuel Efficiency (Electricity)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Energy Consumption (kWh/day)	Miles Per kWh
HHDT	0.00	0.00	0.00	0.00
LDA	8,906.58	288,476.46	103,071.65	2.80
LDT1	15.47	410.02	150.60	2.72
LDT2	334.09	9,252.95	3,004.14	3.08
LHDT1	0.00	0.00	0.00	0.00
LHDT2	0.00	0.00	0.00	0.00
MCY	0.00	0.00	0.00	0.00
MDV	383.22	9,614.14	3,148.04	3.05
MH	0.00	0.00	0.00	0.00
MHDT	0.00	0.00	0.00	0.00
OBUS	0.00	0.00	0.00	0.00
SBUS	0.00	0.00	0.00	0.00
UBUS	17.16	766.36	1,335.95	0.57
TOTAL	9,656.52	308,519.93	110,710.38	2.79

Sheet 10: EMFAC Output

Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissi

Region	Calendar Ye	Vehicle Cat	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT
San Joaquin	2021	HHDT	Aggregate	Aggregate	Gasoline	3.629012	65.46353	65.46353	0
San Joaquin	2021	HHDT	Aggregate	Aggregate	Diesel	8006.805	1153664	1153664	0
San Joaquin	2021	HHDT	Aggregate	Aggregate	Natural Ga	189.6409	12867.14	12867.14	0
San Joaquin	2021	LDA	Aggregate	Aggregate	Gasoline	245564	9665835	9665835	0
San Joaquin	2021	LDA	Aggregate	Aggregate	Diesel	782.8122	25941.32	25941.32	0
San Joaquin	2021	LDA	Aggregate	Aggregate	Electricity	4571.887	189680.5	0	189680.5
San Joaquin	2021	LDA	Aggregate	Aggregate	Plug-in Hyb	4334.692	211506.8	112710.8	98796
San Joaquin	2021	LDT1	Aggregate	Aggregate	Gasoline	23304.88	739538.6	739538.6	0
San Joaquin	2021	LDT1	Aggregate	Aggregate	Diesel	7.892279	93.79146	93.79146	0
San Joaquin	2021	LDT1	Aggregate	Aggregate	Electricity	12.05973	318.3305	0	318.3305
San Joaquin	2021	LDT1	Aggregate	Aggregate	Plug-in Hyb	3.405929	186.7791	95.08519	91.69394
San Joaquin	2021	LDT2	Aggregate	Aggregate	Gasoline	94499.39	3624965	3624965	0
San Joaquin	2021	LDT2	Aggregate	Aggregate	Diesel	226.3608	9565.781	9565.781	0
San Joaquin	2021	LDT2	Aggregate	Aggregate	Electricity	70.12716	2492.193	0	2492.193
San Joaquin	2021	LDT2	Aggregate	Aggregate	Plug-in Hyb	263.9668	14003.05	7242.29	6760.761
San Joaquin	2021	LHDT1	Aggregate	Aggregate	Gasoline	10285.19	342935.1	342935.1	0
San Joaquin	2021	LHDT1	Aggregate	Aggregate	Diesel	9240.057	323200.9	323200.9	0
San Joaquin	2021	LHDT2	Aggregate	Aggregate	Gasoline	1215.051	41289.19	41289.19	0
San Joaquin	2021	LHDT2	Aggregate	Aggregate	Diesel	3131.247	115626.1	115626.1	0
San Joaquin	2021	MCY	Aggregate	Aggregate	Gasoline	12209.48	65618.6	65618.6	0
San Joaquin	2021	MDV	Aggregate	Aggregate	Gasoline	96578.51	3288181	3288181	0
San Joaquin	2021	MDV	Aggregate	Aggregate	Diesel	1358.732	54194.48	54194.48	0
San Joaquin	2021	MDV	Aggregate	Aggregate	Electricity	82.48314	2906.343	0	2906.343
San Joaquin	2021	MDV	Aggregate	Aggregate	Plug-in Hyb	300.7369	14397.09	7689.295	6707.792
San Joaquin	2021	MH	Aggregate	Aggregate	Gasoline	1698.568	14496.65	14496.65	0
San Joaquin	2021	MH	Aggregate	Aggregate	Diesel	651.3176	5727.792	5727.792	0
San Joaquin	2021	MHDT	Aggregate	Aggregate	Gasoline	606.5982	26887.13	26887.13	0
San Joaquin	2021	MHDT	Aggregate	Aggregate	Diesel	5563.717	262958.3	262958.3	0
San Joaquin	2021	MHDT	Aggregate	Aggregate	Natural Ga	43.75257	2558.492	2558.492	0
San Joaquin	2021	OBUS	Aggregate	Aggregate	Gasoline	198.2741	8881.631	8881.631	0
San Joaquin	2021	OBUS	Aggregate	Aggregate	Diesel	81.52575	5807.602	5807.602	0
San Joaquin	2021	OBUS	Aggregate	Aggregate	Natural Ga	1.54806	93.15252	93.15252	0
San Joaquin	2021	SBUS	Aggregate	Aggregate	Gasoline	123.829	6576.42	6576.42	0
San Joaquin	2021	SBUS	Aggregate	Aggregate	Diesel	484.0434	11109.63	11109.63	0
San Joaquin	2021	SBUS	Aggregate	Aggregate	Natural Ga	83.44888	2126.842	2126.842	0
San Joaquin	2021	UBUS	Aggregate	Aggregate	Gasoline	48.14238	3627.078	3627.078	0

San Joaqui	2021	UBUS	Aggregate	Aggregate	Diesel	80.77485	5598.186	5598.186	0
San Joaqui	2021	UBUS	Aggregate	Aggregate	Electricity	17.15976	766.3601	0	766.3601
San Joaqui	2021	UBUS	Aggregate	Aggregate	Natural Ga	56.05856	3591.376	3591.376	0

ions, 1000 gallons/day for Fuel Consumption

Trips	Energy Cor	NOx_RUNE	NOx_IDLEX	NOx_STRE	NOx_TOTE	PM2.5_RU	PM2.5_IDL	PM2.5_STF	PM2.5_TO
72.60926	0	0.001684	0	0.000172	0.001856	8.12E-07	0	2.14E-07	1.03E-06
131025.8	0	3.233385	0.726473	0.342925	4.302783	0.049316	0.000627	0	0.049942
1542.566	0	0.024769	0.002525	0	0.027295	5.11E-05	4.41E-06	0	5.55E-05
1136573	0	0.658826	0	0.390154	1.04898	0.015542	0	0.002732	0.018274
3397.115	0	0.008984	0	0	0.008984	0.000547	0	0	0.000547
23125.13	73232.31	0	0	0	0	0	0	0	0
17923.95	29839.34	0.000881	0	0.002255	0.003136	0.000204	0	4.77E-05	0.000251
100706.7	0	0.182524	0	0.063352	0.245875	0.002078	0	0.000422	0.002499
24.03617	0	0.000156	0	0	0.000156	2.47E-05	0	0	2.47E-05
52.44858	122.9018	0	0	0	0	0	0	0	0
14.08351	27.6943	7.43E-07	0	1.77E-06	2.51E-06	1.14E-07	0	2.55E-08	1.39E-07
437156.8	0	0.466336	0	0.23116	0.697496	0.006126	0	0.001056	0.007182
1070.117	0	0.000861	0	0	0.000861	0.000119	0	0	0.000119
362.9604	962.192	0	0	0	0	0	0	0	0
1091.503	2041.951	5.66E-05	0	0.000137	0.000194	1.15E-05	0	2.61E-06	1.41E-05
153234.1	0	0.111534	0.000457	0.121298	0.233288	0.000697	0	6.97E-05	0.000767
116228.3	0	0.935227	0.024077	0	0.959304	0.018667	0.000274	0	0.018941
18102.45	0	0.011781	5.34E-05	0.013934	0.025769	7.57E-05	0	6.81E-06	8.25E-05
39387.15	0	0.245612	0.007937	0	0.253549	0.005338	9.14E-05	0	0.00543
24418.96	0	0.050518	0	0.004826	0.055344	0.000133	0	8.89E-05	0.000222
437715.8	0	0.660639	0	0.322459	0.983097	0.005732	0	0.001163	0.006895
6450.732	0	0.00704	0	0	0.00704	0.000486	0	0	0.000486
425.6838	1122.088	0	0	0	0	0	0	0	0
1243.547	2025.953	6.01E-05	0	0.000156	0.000217	1.58E-05	0	3.84E-06	1.96E-05
169.9248	0	0.008156	0	7.54E-05	0.008232	2.79E-05	0	7.95E-08	2.79E-05
65.13176	0	0.033318	0	0	0.033318	0.000862	0	0	0.000862
12136.82	0	0.032282	5.82E-05	0.006392	0.038733	5.11E-05	0	1.02E-05	6.13E-05
67380.74	0	0.584401	0.102208	0.098799	0.785408	0.007931	0.000354	0	0.008285
383.8559	0	0.000259	0.000316	0	0.000575	3.96E-06	1.01E-06	0	4.97E-06
3967.068	0	0.008832	1.41E-05	0.00197	0.010816	8.54E-06	0	1.19E-06	9.73E-06
968.5953	0	0.019261	0.001542	0.001424	0.022227	0.000407	3.55E-06	0	0.000411
13.77773	0	6.01E-06	2.5E-06	0	8.51E-06	1.74E-07	9.49E-09	0	1.83E-07
495.316	0	0.001636	0.000126	0.000352	0.002115	6.79E-06	0	3.38E-07	7.13E-06
7008.948	0	0.06306	0.013217	0.003308	0.079585	0.000339	1.43E-05	0	0.000353
1208.34	0	0.001119	0.000481	0	0.0016	7.92E-06	1.14E-06	0	9.06E-06
192.5695	0	0.000815	0	0.000199	0.001013	4.71E-06	0	2.1E-07	4.92E-06

323.0994	0	0.003764	0	0	0.003764	3.92E-05	0	0	3.92E-05
68.63904	1335.953	0	0	0	0	0	0	0	0
224.2342	0	0.000314	0	0	0.000314	9.71E-07	0	0	9.71E-07

PM2.5_PM	PM2.5_PM	PM2.5_TO	PM10_RU	PM10_IDL	PM10_STR	PM10_TOT	PM10_PM	PM10_PM	PM10_TOT
3.61E-07	2.86E-06	4.25E-06	8.83E-07	0	2.33E-07	1.12E-06	1.44E-06	8.18E-06	1.07E-05
0.011255	0.034762	0.095959	0.051546	0.000655	0	0.052201	0.045018	0.099319	0.196538
0.000128	0.000656	0.000839	5.55E-05	4.8E-06	0	6.03E-05	0.000511	0.001873	0.002444
0.02131	0.032188	0.071771	0.016903	0	0.002971	0.019874	0.085238	0.091964	0.197076
5.72E-05	8.72E-05	0.000692	0.000572	0	0	0.000572	0.000229	0.000249	0.00105
0.000418	0.000319	0.000737	0	0	0	0	0.001673	0.000912	0.002585
0.000466	0.000333	0.001051	0.000221	0	5.19E-05	0.000273	0.001865	0.000952	0.00309
0.00163	0.002987	0.007117	0.002259	0	0.000458	0.002718	0.006522	0.008534	0.017774
2.07E-07	4.3E-07	2.53E-05	2.58E-05	0	0	2.58E-05	8.27E-07	1.23E-06	2.78E-05
7.02E-07	5.42E-07	1.24E-06	0	0	0	0	2.81E-06	1.55E-06	4.36E-06
4.12E-07	2.94E-07	8.45E-07	1.24E-07	0	2.77E-08	1.52E-07	1.65E-06	8.4E-07	2.64E-06
0.007992	0.014012	0.029185	0.006662	0	0.001148	0.00781	0.031967	0.040035	0.079812
2.11E-05	3.57E-05	0.000175	0.000124	0	0	0.000124	8.44E-05	0.000102	0.00031
5.49E-06	4.18E-06	9.68E-06	0	0	0	0	2.2E-05	1.19E-05	3.39E-05
3.09E-05	2.2E-05	6.7E-05	1.25E-05	0	2.84E-06	1.53E-05	0.000123	6.29E-05	0.000202
0.000756	0.01032	0.011843	0.000758	0	7.58E-05	0.000834	0.003024	0.029486	0.033344
0.001069	0.009726	0.029736	0.019511	0.000286	0	0.019798	0.004275	0.027789	0.051862
9.1E-05	0.00145	0.001623	8.23E-05	0	7.4E-06	8.97E-05	0.000364	0.004142	0.004596
0.000382	0.004059	0.009871	0.00558	9.55E-05	0	0.005675	0.001529	0.011598	0.018803
7.23E-05	0.000304	0.000598	0.000142	0	9.42E-05	0.000236	0.000289	0.000868	0.001393
0.007249	0.013184	0.027329	0.006232	0	0.001265	0.007496	0.028997	0.037669	0.074163
0.000119	0.000209	0.000814	0.000508	0	0	0.000508	0.000478	0.000596	0.001582
6.41E-06	4.88E-06	1.13E-05	0	0	0	0	2.56E-05	1.39E-05	3.96E-05
3.17E-05	2.27E-05	7.4E-05	1.72E-05	0	4.18E-06	2.13E-05	0.000127	6.48E-05	0.000213
4.79E-05	0.000252	0.000328	3.03E-05	0	8.64E-08	3.04E-05	0.000192	0.00072	0.000942
2.53E-05	9.91E-05	0.000986	0.000901	0	0	0.000901	0.000101	0.000283	0.001285
8.89E-05	0.000467	0.000617	5.55E-05	0	1.11E-05	6.66E-05	0.000356	0.001335	0.001757
0.00087	0.004573	0.013728	0.008289	0.00037	0	0.00866	0.003478	0.013066	0.025204
8.46E-06	4.51E-05	5.85E-05	4.31E-06	1.1E-06	0	5.41E-06	3.38E-05	0.000129	0.000168
2.94E-05	0.000154	0.000193	9.29E-06	0	1.29E-06	1.06E-05	0.000117	0.000439	0.000568
1.92E-05	0.000132	0.000562	0.000426	3.71E-06	0	0.000429	7.68E-05	0.000376	0.000882
3.08E-07	1.66E-06	2.15E-06	1.89E-07	1.03E-08	0	1.99E-07	1.23E-06	4.74E-06	6.17E-06
1.45E-05	0.000114	0.000136	7.39E-06	0	3.68E-07	7.75E-06	5.8E-05	0.000326	0.000391
3.67E-05	0.000193	0.000582	0.000354	1.49E-05	0	0.000369	0.000147	0.00055	0.001066
7.03E-06	3.69E-05	5.29E-05	8.61E-06	1.23E-06	0	9.85E-06	2.81E-05	0.000105	0.000143
1.2E-05	0.000154	0.000171	5.12E-06	0	2.29E-07	5.35E-06	4.8E-05	0.00044	0.000493

4.66E-05	0.000238	0.000323	4.1E-05	0	0	4.1E-05	0.000187	0.000679	0.000906
7.51E-06	1.63E-05	2.38E-05	0	0	0	0	3E-05	4.65E-05	7.65E-05
1.96E-05	0.000152	0.000173	1.01E-06	0	0	1.01E-06	7.82E-05	0.000435	0.000514

CO2_RUNE	CO2_IDLE	CO2_STRE	CO2_TOTE	CH4_RUNE	CH4_IDLE	CH4_STRE	CH4_TOTE	N2O_RUNI	N2O_IDLE
0.209872	0	0.004275	0.214148	5.38E-05	0	3.65E-09	5.38E-05	3.35E-05	0
2089.956	139.1162	0	2229.072	0.002525	0.002622	0	0.005147	0.329273	0.021918
21.44536	2.013457	0	23.45882	0.036959	0.006707	0	0.043666	0.004372	0.00041
3213.335	0	94.1584	3307.493	0.038784	0	0.10979	0.148574	0.063894	0
6.919844	0	0	6.919844	4.72E-05	0	0	4.72E-05	0.00109	0
0	0	0	0	0	0	0	0	0	0
37.35222	0	1.341475	38.6937	0.000134	0	0.000841	0.000975	0.000164	0
292.5244	0	10.78219	303.3066	0.009694	0	0.017501	0.027194	0.012283	0
0.042914	0	0	0.042914	1.48E-06	0	0	1.48E-06	6.76E-06	0
0	0	0	0	0	0	0	0	0	0
0.031562	0	0.001151	0.032713	1.14E-07	0	6.67E-07	7.81E-07	1.41E-07	0
1515.283	0	46.51002	1561.793	0.01872	0	0.051583	0.070303	0.034326	0
3.467175	0	0	3.467175	1.31E-05	0	0	1.31E-05	0.000546	0
0	0	0	0	0	0	0	0	0	0
2.403021	0	0.096689	2.499709	8.68E-06	0	5.16E-05	6.02E-05	1.07E-05	0
358.0566	1.395131	4.312958	363.7647	0.005254	0.001373	0.006491	0.013118	0.00614	3.42E-05
228.1562	1.404054	0	229.5602	0.003971	5.19E-05	0	0.004023	0.035946	0.000221
47.62391	0.189592	0.522199	48.3357	0.000477	0.000163	0.000737	0.001376	0.000667	4.09E-06
99.51296	0.757119	0	100.2701	0.001178	1.76E-05	0	0.001196	0.015678	0.000119
14.19465	0	1.52499	15.71964	0.015796	0	0.005766	0.021562	0.003266	0
1679.948	0	57.20033	1737.148	0.025623	0	0.06987	0.095493	0.043329	0
25.79514	0	0	25.79514	5.48E-05	0	0	5.48E-05	0.004064	0
0	0	0	0	0	0	0	0	0	0
2.549175	0	0.139452	2.688627	9.14E-06	0	5.83E-05	6.74E-05	1.12E-05	0
31.17694	0	0.005981	31.18292	0.000306	0	7.17E-06	0.000314	0.000473	0
6.813636	0	0	6.813636	4.22E-05	0	0	4.22E-05	0.001073	0
55.39151	0.369124	0.680871	56.44151	0.001128	0.000156	0.000744	0.002028	0.001361	4E-06
331.1512	14.20352	0	345.3547	0.000897	9.36E-05	0	0.000991	0.052173	0.002238
2.856091	0.276967	0	3.133057	0.002185	0.000795	0	0.00298	0.000582	5.65E-05
18.0669	0.085018	0.146517	18.29844	0.000244	4.12E-05	0.000177	0.000462	0.00039	1.05E-06
9.097033	0.255005	0	9.352038	4.8E-05	4.22E-06	0	5.22E-05	0.001433	4.02E-05
0.11162	0.002388	0	0.114008	8.85E-05	5.76E-06	0	9.43E-05	2.28E-05	4.87E-07
5.809165	0.350212	0.030282	6.189659	3.82E-05	0.000343	3.47E-05	0.000415	0.000118	1.27E-05
14.0729	1.240618	0	15.31352	4.53E-05	4.6E-06	0	4.99E-05	0.002217	0.000195
2.956135	0.389061	0	3.345196	0.007465	0.001356	0	0.008821	0.000603	7.93E-05
7.294964	0	0.026147	7.321111	1.57E-05	0	2.82E-05	4.39E-05	7.53E-05	0

7.144735	0	0	7.144735	2.11E-05	0	0	2.11E-05	0.001126	0
0	0	0	0	0	0	0	0	0	0
4.139572	0	0	4.139572	0.009804	0	0	0.009804	0.000844	0

N2O_STRE	N2O_TOTE	ROG_RUNI	ROG_IDLE	ROG_STRE	ROG_TOTE	ROG_DIUR	ROG_HOTS	ROG_RUNI	ROG_TOTA
3.12E-06	3.67E-05	0.000362	0	1.98E-08	0.000362	5.05E-05	1.38E-05	0.000124	0.00055
0	0.351191	0.05436	0.05645	0	0.11081	0	0	0	0.11081
0	0.004782	0.001394	0.000119	0	0.001513	0	0	0	0.001513
0.045674	0.109567	0.156301	0	0.526375	0.682676	0.475371	0.135572	0.343536	1.637155
0	0.00109	0.001016	0	0	0.001016	0	0	0	0.001016
0	0	0	0	0	0	0	0	0	0
0.00042	0.000584	0.000418	0	0.003366	0.003784	0.002487	0.00082	0.00071	0.007802
0.005256	0.017539	0.044676	0	0.097087	0.141762	0.111191	0.028735	0.087723	0.369411
0	6.76E-06	3.19E-05	0	0	3.19E-05	0	0	0	3.19E-05
0	0	0	0	0	0	0	0	0	0
3.35E-07	4.76E-07	3.53E-07	0	2.65E-06	3E-06	1.36E-06	4.22E-07	4.07E-07	5.18E-06
0.021549	0.055876	0.077889	0	0.253766	0.331654	0.191611	0.052695	0.140693	0.716654
0	0.000546	0.000282	0	0	0.000282	0	0	0	0.000282
0	0	0	0	0	0	0	0	0	0
2.59E-05	3.66E-05	2.69E-05	0	0.000205	0.000232	0.000113	3.42E-05	3.32E-05	0.000412
0.00895	0.015124	0.026884	0.005228	0.033158	0.06527	0.039043	0.010496	0.053896	0.168705
0	0.036167	0.085495	0.001118	0	0.086613	0	0	0	0.086613
0.001048	0.001719	0.002312	0.000611	0.003728	0.00665	0.004175	0.001083	0.005618	0.017527
0	0.015798	0.025368	0.000379	0	0.025747	0	0	0	0.025747
0.000277	0.003543	0.110257	0	0.044088	0.154345	0.067728	0.096926	0.102513	0.421512
0.025137	0.068466	0.116591	0	0.376012	0.492603	0.233978	0.064092	0.174612	0.965286
0	0.004064	0.00118	0	0	0.00118	0	0	0	0.00118
0	0	0	0	0	0	0	0	0	0
2.9E-05	4.02E-05	2.85E-05	0	0.000234	0.000262	0.000151	4.34E-05	4.42E-05	0.0005
7.69E-06	0.000481	0.001388	0	3.1E-05	0.001419	0.009592	0.002609	5.77E-05	0.013677
0	0.001073	0.000909	0	0	0.000909	0	0	0	0.000909
0.000397	0.001762	0.005934	0.000662	0.004492	0.011088	0.00336	0.00083	0.006974	0.022252
0	0.054411	0.019313	0.002015	0	0.021328	0	0	0	0.021328
0	0.000639	3.12E-05	1.14E-05	0	4.26E-05	0	0	0	4.26E-05
0.000135	0.000525	0.001205	0.000162	0.000974	0.002341	0.000729	0.000178	0.000763	0.004011
0	0.001473	0.001034	9.07E-05	0	0.001125	0	0	0	0.001125
0	2.32E-05	1.26E-06	8.23E-08	0	1.35E-06	0	0	0	1.35E-06
3.5E-05	0.000166	0.000178	0.001451	0.000191	0.00182	0.000142	3.88E-05	8.39E-05	0.002085
0	0.002413	0.000976	9.9E-05	0	0.001075	0	0	0	0.001075
0	0.000682	0.000107	1.94E-05	0	0.000126	0	0	0	0.000126
1.85E-05	9.37E-05	5.16E-05	0	0.000119	0.000171	2.86E-05	7.52E-06	2.02E-05	0.000227

0	0.001126	0.000454	0	0	0.000454	0	0	0	0.000454
0	0	0	0	0	0	0	0	0	0
0	0.000844	0.000143	0	0	0.000143	0	0	0	0.000143

TOG_RUNE	TOG_IDLEX	TOG_STRE	TOG_TOTE	TOG_DIUR	TOG_HOTS	TOG_RUNI	TOG_TOTA	CO_RUNEX	CO_IDLEX
0.000528	0	2.17E-08	0.000528	5.05E-05	1.38E-05	0.000124	0.000716	0.020901	0
0.061884	0.064264	0	0.126148	0	0	0	0.126148	0.224741	0.764497
0.038705	0.006872	0	0.045577	0	0	0	0.045577	0.186314	0.013699
0.227994	0	0.576311	0.804305	0.475371	0.135572	0.343536	1.758784	10.86451	0
0.001157	0	0	0.001157	0	0	0	0.001157	0.012144	0
0	0	0	0	0	0	0	0	0	0
0.00061	0	0.003686	0.004296	0.002487	0.00082	0.00071	0.008313	0.062723	0
0.065147	0	0.106297	0.171443	0.111191	0.028735	0.087723	0.399093	1.988271	0
3.63E-05	0	0	3.63E-05	0	0	0	3.63E-05	0.000181	0
0	0	0	0	0	0	0	0	0	0
5.15E-07	0	2.9E-06	3.41E-06	1.36E-06	4.22E-07	4.07E-07	5.6E-06	5.32E-05	0
0.113618	0	0.277841	0.391459	0.191611	0.052695	0.140693	0.776459	5.009673	0
0.000321	0	0	0.000321	0	0	0	0.000321	0.002092	0
0	0	0	0	0	0	0	0	0	0
3.92E-05	0	0.000224	0.000264	0.000113	3.42E-05	3.32E-05	0.000444	0.004046	0
0.039229	0.007629	0.036303	0.083161	0.039043	0.010496	0.053896	0.186596	0.586659	0.042447
0.097331	0.001273	0	0.098603	0	0	0	0.098603	0.252171	0.009266
0.003373	0.000892	0.004081	0.008346	0.004175	0.001083	0.005618	0.019222	0.056535	0.005021
0.02888	0.000431	0	0.029311	0	0	0	0.029311	0.069657	0.00314
0.129726	0	0.047905	0.177631	0.067728	0.096926	0.102513	0.444797	1.192782	0
0.167655	0	0.411663	0.579318	0.233978	0.064092	0.174612	1.052001	5.76615	0
0.001344	0	0	0.001344	0	0	0	0.001344	0.018598	0
0	0	0	0	0	0	0	0	0	0
4.16E-05	0	0.000256	0.000297	0.000151	4.34E-05	4.42E-05	0.000536	0.004284	0
0.002025	0	3.4E-05	0.002059	0.009592	0.002609	5.77E-05	0.014317	0.035046	0
0.001035	0	0	0.001035	0	0	0	0.001035	0.003143	0
0.008659	0.000966	0.004918	0.014543	0.00336	0.00083	0.006974	0.025707	0.130246	0.009934
0.021986	0.002294	0	0.02428	0	0	0	0.02428	0.059872	0.042984
0.00223	0.000811	0	0.003041	0	0	0	0.003041	0.008327	0.001972
0.001759	0.000236	0.001066	0.003061	0.000729	0.000178	0.000763	0.004731	0.027425	0.001255
0.001177	0.000103	0	0.00128	0	0	0	0.00128	0.002944	0.001195
9.04E-05	5.88E-06	0	9.62E-05	0	0	0	9.62E-05	0.000354	1.89E-05
0.000259	0.002118	0.000209	0.002586	0.000142	3.88E-05	8.39E-05	0.002851	0.004164	0.011217
0.001111	0.000113	0	0.001224	0	0	0	0.001224	0.002849	0.002071
0.007618	0.001384	0	0.009002	0	0	0	0.009002	0.024522	0.002113
7.53E-05	0	0.00013	0.000206	2.86E-05	7.52E-06	2.02E-05	0.000262	0.001072	0

0.000517	0	0	0.000517	0	0	0	0.000517	0.00052	0
0	0	0	0	0	0	0	0	0	0
0.010009	0	0	0.010009	0	0	0	0.010009	0.100357	0

CO_STREX	CO_TOTEX	SOx_RUNE	SOx_IDLEX	SOx_STREX	SOx_TOTE	NH3_RUNE	Fuel Consumption
0.000225	0.021125	2.07E-06	0	4.23E-08	2.12E-06	1.77E-06	0.022582
0	0.989238	0.019791	0.001317	0	0.021108	0.257044	199.1221
0	0.200013	0	0	0	0	0.012447	2.711482
4.958579	15.82309	0.031767	0	0.000931	0.032698	0.338118	348.771
0	0.012144	6.56E-05	0	0	6.56E-05	8.86E-05	0.618147
0	0	0	0	0	0	0	0
0.025881	0.088604	0.000369	0	1.33E-05	0.000383	0.004563	4.080202
0.913042	2.901313	0.002892	0	0.000107	0.002998	0.030247	31.9833
0	0.000181	4.07E-07	0	0	4.07E-07	3.21E-07	0.003834
0	0	0	0	0	0	0	0
2.03E-05	7.35E-05	3.12E-07	0	1.14E-08	3.23E-07	4.4E-06	0.00345
2.322703	7.332376	0.01498	0	0.00046	0.01544	0.134816	164.6891
0	0.002092	3.29E-05	0	0	3.29E-05	3.27E-05	0.309721
0	0	0	0	0	0	0	0
0.001576	0.005622	2.38E-05	0	9.56E-07	2.47E-05	0.000334	0.263591
0.488683	1.117789	0.00354	1.38E-05	4.26E-05	0.003596	0.01693	38.35853
0	0.261438	0.002162	1.33E-05	0	0.002175	0.0486	20.50652
0.060521	0.122077	0.000471	1.87E-06	5.16E-06	0.000478	0.002046	5.096939
0	0.072797	0.000943	7.17E-06	0	0.00095	0.020381	8.957087
0.228488	1.42127	0.00014	0	1.51E-05	0.000155	0.000611	1.657617
2.662213	8.428363	0.016608	0	0.000565	0.017173	0.118563	183.1801
0	0.018598	0.000244	0	0	0.000244	0.000185	2.30427
0	0	0	0	0	0	0	0
0.001796	0.00608	2.52E-05	0	1.38E-06	2.66E-05	0.000356	0.283512
0.000685	0.035731	0.000308	0	5.91E-08	0.000308	0.000713	3.2882
0	0.003143	6.46E-05	0	0	6.46E-05	0.000727	0.608659
0.102529	0.242709	0.000548	3.65E-06	6.73E-06	0.000558	0.001326	5.951686
0	0.102856	0.003136	0.000134	0	0.00327	0.054012	30.8504
0	0.010298	0	0	0	0	0.002989	0.362134
0.020632	0.049312	0.000179	8.4E-07	1.45E-06	0.000181	0.00044	1.929547
0	0.004139	8.61E-05	2.41E-06	0	8.86E-05	0.001179	0.835414
0	0.000373	0	0	0	0	0.000109	0.013178
0.004963	0.020344	5.74E-05	3.46E-06	2.99E-07	6.12E-05	0.000326	0.652692
0	0.00492	0.000133	1.17E-05	0	0.000145	0.001447	1.367951
0	0.026635	0	0	0	0	0.002485	0.386654
0.002206	0.003278	7.21E-05	0	2.58E-07	7.24E-05	0.00018	0.772002

0	0.00052	6.77E-05	0	0	6.77E-05	0.001151	0.638236
0	0	0	0	0	0	0	0
0	0.100357	0	0	0	0	0.00384	0.478471

Carnegie SVRA RMA EIR

Operational Air Quality Emission Estimates and Transportation Energy Calculations
Prepared by: MIG, Inc.
November 2024

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Sheet 1: Emissions Summary

Table 1-1: 2022 Conditions: Annual Exhaust Emission Totals

Construction Phase / Source	AQ Emissions (short tons)					GHG Emissions (Metric tons)			
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O	CO2e
Heavy-Duty Off-Road Equipment	0.1	0.1	0.0	0.0	0.0	20.7	0.0	0.0	20.7
Parks-Owned On- and Off-Road Vehicles	0.0	0.2	0.1	0.0	0.0	83.9	0.0	0.0	85.8
Small, Utility Off-Road Equipment	0.1	0.2	0.0	0.0	0.0	2.4	0.0	0.0	2.4
Worker and Vendor Trips	0.3	0.3	0.3	0.3	0.3	8.5	0.2	0.2	79.9
Total	0.4	0.8	0.4	0.3	0.3	115.5	0.2	0.3	188.9

Table 1-2: 2022 Conditions: Average Daily Exhaust Emission Totals

Construction Phase / Source	Emissions (pounds)				
	ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)
Heavy-Duty Off-Road Equipment	0.7	1.1	0.0	0.0	0.0
Parks-Owned On- and Off-Road Vehicles	0.2	1.2	0.8	0.0	0.0
Small, Utility Off-Road Equipment	0.5	1.8	0.1	0.0	0.0
Worker and Vendor Trips	2.1	2.1	2.2	2.1	2.1
Total	3.4	6.3	3.2	2.1	2.1

Sheet 2: Off-Road Heavy-Duty Equipment Emissions

Table 2-1: Existing Heavy-Duty Equipment Emissions

Equipment	Annual Runtime	Horsepower	Load Factor	Emission Factor (g/hp-hr)								Annual Emissions (short tons)							
				NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O	NOx	CO	ROG	PM10	PM2.5	CO2	CH4	N2O
7130 TRACTOR	3	130	0.70	2.32	3.7	0.09	0.112	0.112	256.187	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
672G GRADER	68	255	0.41	1.29	2.6	0.06	0.009	0.009	514.029	0.021	0.004	0.01	0.02	0.00	0.00	0.00	4.03	0.00	0.00
430E BACKHOE	149	95	0.37	2.74	3.7	0.09	0.112	0.112	571.454	0.021	0.004	0.02	0.02	0.00	0.00	0.00	3.30	0.00	0.00
480 TRAIL DOZER	7	91	0.43	2.74	3.7	0.09	0.112	0.112	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
750J DOZER	8	157	0.43	2.32	3.7	0.09	0.112	0.112	514.029	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00
544K LOADER	167	163	0.36	2.15	3.7	0.08	0.009	0.009	571.454	0.021	0.004	0.02	0.04	0.00	0.00	0.00	6.17	0.00	0.00
E18B MINI EX	7	15	0.38	4.55	4.1	0.09	0.128	0.128	571.454	0.024	0.005	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
T190 SKID STEER	50	61	0.37	2.74	3.7	0.09	0.192	0.192	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00
500 TRAIL DOZER	0	80	0.43	2.74	3.7	0.09	0.192	0.192	571.454	0.021	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SK140SR-7 EX	200	106	0.37	2.15	3.7	0.08	0.009	0.009	514.029	0.021	0.004	0.02	0.03	0.00	0.00	0.00	4.44	0.00	0.00
415F2 BACKHOE / LOADER	225	68	0.37	2.74	3.7	0.09	0.112	0.112	571.454	0.021	0.004	0.02	0.02	0.00	0.00	0.00	3.57	0.00	0.00
											Total	0.09	0.15	0.00	0.00	0.00	22.80	0.00	0.00

Sheet 3: Off-Road Heavy-Duty Equipment Emission Factors

Table 3-1: Equipment Category and Emissions Assignment (Default; No Runtime Hour Adjustment)

Equipment	Horsepower	Engine Tier	OFFROAD Category	HP_Bin	Load Factor	Default Emission Factors							
						ROG g_hp-hr	CO g_hp-hr	NOx g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	CO2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	130	3	Agricultural - Agricultural Tractors	175	0.70	0.090	3.700	2.320	0.112	0.112	256.1869073	0.021	0.004
672G GRADER	255	4	Construction and Mining - Graders	300	0.41	0.060	2.600	1.290	0.009	0.009	514.03	0.021	0.004
430E BACKHOE	95	3	Construction and Mining - Tractors/Loaders/Ba	100	0.37	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
480 TRAIL DOZER	91	3	Construction and Mining - Crawler Tractors	100	0.43	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004
750J DOZER	157	3	Construction and Mining - Crawler Tractors	175	0.43	0.090	3.700	2.320	0.112	0.112	514.0285459	0.021	0.004
544K LOADER	163	4	Construction and Mining - Rubber Tired Loaders	175	0.36	0.080	3.700	2.150	0.009	0.009	571.4540783	0.021	0.004
E18B MINI EX	15	4	Construction and Mining - Excavators	50	0.38	0.090	4.100	4.550	0.128	0.128	571.4540783	0.024	0.005
T190 SKID STEER	61	3	Construction and Mining - Skid Steer Loaders	75	0.37	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
500 TRAIL DOZER	80	3	Construction and Mining - Crawler Tractors	75	0.43	0.090	3.700	2.740	0.192	0.192	571.4540783	0.021	0.004
SK140SR-7 EX	106	4	Construction and Mining - Tractors/Loaders/Ba	175	0.37	0.080	3.700	2.150	0.009	0.009	514.03	0.021	0.004
415F2 BACKHOE / LOADER	68	4	Construction and Mining - Tractors/Loaders/Ba	75	0.37	0.090	3.700	2.740	0.112	0.112	571.4540783	0.021	0.004

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

Table 3-2: Equipment Category and Emissions Assignment (Runtime Hour Adjustment)

Equipment	Existing Runtime Hours on Equipment	Adjusted Emission Factors							
		ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
7130 TRACTOR	459.3	0.099	3.700	2.332	0.112	0.112	256.19	0.021	0.004
672G GRADER	1941.5	0.093	2.600	1.323	0.010	0.010	514.03	0.021	0.004
430E BACKHOE	2658.9	0.151	3.700	2.836	0.133	0.133	571.45	0.021	0.004
480 TRAIL DOZER	346.7	0.098	3.700	2.752	0.115	0.115	571.45	0.021	0.004
750J DOZER	4230.4	0.175	3.700	2.434	0.114	0.114	514.03	0.021	0.004
544K LOADER	1672.1	0.113	3.700	2.195	0.010	0.010	571.45	0.021	0.004
E18B MINI EX	2200	0.169	4.100	4.759	0.149	0.149	571.45	0.024	0.005
T190 SKID STEER	2140.9	0.139	3.700	2.817	0.222	0.222	571.45	0.021	0.004
500 TRAIL DOZER	1.4	0.090	3.700	2.740	0.192	0.192	571.45	0.021	0.004
SK140SR-7 EX	4230.4	0.175	3.700	2.264	0.011	0.011	514.03	0.021	0.004
415F2 BACKHOE / LOADER	4230.4	0.177	3.700	2.892	0.146	0.146	571.45	0.021	0.004

Sheet 4: U.S. EPA Tier III and Tier IV Emission Factors

Table 4-1: U.S. EPA Tier III Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	--	--	--	--	--
50≤hp<75	75	0.09	3.7	2.74	0.192	0.192
75≤hp<100	100	0.09	3.7	2.74	0.112	0.112
100≤hp<175	175	0.09	3.7	2.32	0.112	0.112
175≤hp<300	300	0.09	2.6	2.32	0.088	0.088
300≤hp<600	600	0.09	2.6	2.32	0.088	0.088

CARB 2017 Table D-9 (pg. 235); and CalEEMod v2022.4.0 for CO.

Table 4-2: U.S EPA Tier III Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	--	--	--
50≤hp<75	75	0.000023	0.000036	0.0000141
75≤hp<100	100	0.000023	0.000036	0.0000080
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000023	0.000030	0.0000046
300≤hp<600	600	0.000023	0.000030	0.0000044

Table 4-3: U.S. EPA Tier IV (Interim) Emission Standards

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)				
		ROG	CO	NOx	PM10	PM2.5
25≤hp<50	50	0.09	4.1	4.55	0.128	0.128
50≤hp<75	75	0.09	3.7	2.74	0.112	0.112
75≤hp<100	100	0.08	3.7	2.15	0.009	0.009
100≤hp<175	175	0.08	3.7	2.15	0.009	0.009
175≤hp<300	300	0.06	2.6	1.29	0.009	0.009
300≤hp<600	600	0.06	2.6	1.29	0.009	0.009

CARB 2017 Table D-9 (pg. 235); EFs for Tier IV (Phase-In or Alt. NOx) Used Where Option Exists and CalEEMod v2022.4.0 for CO.

Table 4-4: U.S. EPA Tier IV (Interim) Controlled Off-Road Diesel Engine Deterioration Rates

Maximum Horsepower	Assigned HP Bin	Emission Factors (g/hp-hr)		
		ROG	NOx	PM
25≤hp<50	50	0.000036	0.000095	0.0000096
50≤hp<75	75	0.000023	0.000036	0.0000080
75≤hp<100	100	0.000021	0.000027	0.0000009
100≤hp<175	175	0.000020	0.000027	0.0000004
175≤hp<300	300	0.000017	0.000017	0.0000003
300≤hp<600	600	0.000017	0.000017	0.0000003

Sheet 5: On-Site, On-Road Vehicles Emission Factors and Emissions

Table 5-1: On-road Existing Ops Vehicle Emission Factor Assignment

Make	Model	Gross Vehicle Weight Rating (lbs)	Vehicle Class	Fuel	Emission Factors (tons / mi)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 (OPERATOR)	16,500	MHDT	Diesel	6.46465E-08	3.44627E-07	2.67641E-06	2.39099E-08	2.28755E-08	0.001308896	3.00266E-09	2.06217E-07
INTERNATIONAL	TRANSPORT 9300	50,000	HHDT	Diesel	7.87795E-08	8.13187E-07	3.35767E-06	3.34223E-08	3.19765E-08	0.001914801	3.6591E-09	3.01678E-07
FORD	F350 (RESOURCES)	10,100 to 14,000	LHDT2	Diesel	2.17205E-07	6.13485E-07	2.06693E-06	4.79805E-08	4.59049E-08	0.000863134	1.00888E-08	1.35987E-07
CHEVROLET	1500 (ELIZ)	6,700 to 7,300	MDV	Gasoline	2.7744E-07	2.33631E-06	2.64955E-07	2.19366E-09	2.01717E-09	0.000518934	2.64533E-08	1.91202E-08
FORD	F350 r FLATBED	10,100 to 14,000	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
RAM	2500 (DAVID)	10000	LHDT1	Gasoline	4.59773E-07	3.06919E-06	6.31151E-07	2.28501E-09	2.10099E-09	0.001042112	3.5141E-08	4.15939E-08
INTERNATIONAL	WATER TRUCK	52000	HHDT	Diesel	7.87795E-08	8.13187E-07	3.35767E-06	3.34223E-08	3.19765E-08	0.001914801	3.6591E-09	3.01678E-07
FORD	F350 (JOHN M)	10,100 to 14,000	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
FORD	F250 (ROBERT)	10,000 to 11,400	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
FORD	F250 (JESSE/MIKE)	10,000 to 11,400	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
INTERNATIONAL	DUMPTRUCK		HHDT	Diesel	7.87795E-08	8.13187E-07	3.35767E-06	3.34223E-08	3.19765E-08	0.001914801	3.6591E-09	3.01678E-07
FORD	F250 (KEITH)	10,000 to 11,400	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
FORD	F250 (GARY)	10,000 to 11,400	LHDT2	Gasoline	4.01812E-07	2.82053E-06	5.8761E-07	2.05811E-09	1.89235E-09	0.001154801	3.11234E-08	3.97274E-08
FORD	F350 FLATBED	10,100 to 14,000	LHDT2	Diesel	2.17205E-07	6.13485E-07	2.06693E-06	4.79805E-08	4.59049E-08	0.000863134	1.00888E-08	1.35987E-07

Table 5-2: On-road Existing Ops Vehicle Emission Calculations

Make	Model	Annual VMT	Vehicle Class	Fuel	Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
RAM	4500 (OPERATOR)	8898	MHDT	Diesel	0.000575224	0.003066493	0.023814677	0.00021275	0.000203546	11.64655964	2.67177E-05	0.00183492
INTERNATIONAL	TRANSPORT 9300	764	HHDT	Diesel	6.01876E-05	0.000621275	0.002565258	2.55347E-05	2.443E-05	1.462908049	2.79556E-06	0.000230482
FORD	F350 (RESOURCES)	5472	LHDT2	Diesel	0.001188548	0.003356992	0.011310221	0.00026255	0.000251192	4.723069247	5.52058E-05	0.000744121
CHEVROLET	1500 (ELIZ)	4957	MDV	Gasoline	0.00137527	0.011581096	0.001313382	1.0874E-05	9.9991E-06	2.572357768	0.000131129	9.47787E-05
FORD	F350 r FLATBED	3061	LHDT2	Gasoline	0.001229946	0.008633641	0.001798674	6.29986E-06	5.79249E-06	3.53484674	9.52688E-05	0.000121606
RAM	2500 (DAVID)	7041	LHDT1	Gasoline	0.003237258	0.021610189	0.004443932	1.60888E-05	1.4793E-05	7.33751234	0.000247428	0.000292863
INTERNATIONAL	WATER TRUCK	3183	HHDT	Diesel	0.000250755	0.002588373	0.010687456	0.000106383	0.000101781	6.094811935	1.16469E-05	0.00096024
FORD	F350 (JOHN M)	10072	LHDT2	Gasoline	0.004047047	0.028408375	0.005918407	2.07292E-05	1.90598E-05	11.63115857	0.000313475	0.000400135
FORD	F250 (ROBERT)	4091	LHDT2	Gasoline	0.001643812	0.011538787	0.002403912	8.41971E-06	7.74161E-06	4.724292066	0.000127326	0.000162525
FORD	F250 (JESSE/MIKE)	9028	LHDT2	Gasoline	0.003627556	0.025463742	0.005304942	1.85806E-05	1.70842E-05	10.42554602	0.000280982	0.000358659
INTERNATIONAL	DUMPTRUCK	833	HHDT	Diesel	6.56233E-05	0.000677384	0.002796937	2.78408E-05	2.66364E-05	1.595029325	3.04803E-06	0.000251298
FORD	F250 (KEITH)	6891	LHDT2	Gasoline	0.002768884	0.01943627	0.00404922	1.41824E-05	1.30402E-05	7.957735671	0.000214472	0.000273762
FORD	F250 (GARY)	6037	LHDT2	Gasoline	0.002425737	0.017027538	0.003547401	1.24248E-05	1.14241E-05	6.971535371	0.000187892	0.000239835
FORD	F350 FLATBED	13643	LHDT2	Diesel	0.002963333	0.008369781	0.028199076	0.000654599	0.000626281	11.77573716	0.000137641	0.001855272
				Total	0.025459181	0.162379936	0.108153499	0.001397256	0.001332801	92.45309991	0.001835028	0.007820495

Sheet 6: On-Site Small Equipment Emission Factors and Emissions

Table 6-1: On-site Small Equipment Category and Emission Factor Assignment

Make	Model	Horsepower	Fuel	OFFROAD Category	HP_Bin	Load Factor	Emission Factors							
							ROG g_hp-hr	CO g_hp-hr	Nox g_hp-hr	PM10 g_hp-hr	PM2_5 g_hp-hr	Co2_g_hp-hr	CH4_g_hp-hr	N2O_g_hp-hr
GATOR 1	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	0.40	1.055	3.183	2.325	0.147	0.135	284.807	0.021	0.004
GATOR 2	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	0.40	1.055	3.183	2.325	0.147	0.135	284.807	0.021	0.004
Gator 855	XUV 855D	24.6	Diesel	Agricultural - ATVs	25	0.40	1.055	3.183	2.325	0.147	0.135	284.807	0.021	0.004
Canycom 1	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.742	4.365	3.837	0.199	0.183	571.454	0.018	0.004
Canycom 2	SC75	22.1	Gasoline	Construction and Mining - Paving Equipme	50	0.36	0.742	4.365	3.837	0.199	0.183	571.454	0.018	0.004
Jumping Jack	MTX-70	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Jumping Jack	MTR-40	2.8	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
Vibroplate	WP 1550	4.15	Gasoline	N/A; CalEEMod - Plate Compactor	25	0.55	994.174	229.329	4.855	2.346	1.773	429.441	0.018	0.004
John Deere Mower	727A	23	Gasoline	Lawn and Garden - Misc - Rear Engine Rid	Aggregate	1.00	45.406	2369.218	22.840	0.238	0.179	4997.779	0.238	0.179

Note: CH4 and N2O emission rates for standard OFFROAD2021 equipment profiles taken from CalEEMod. Load factors from CalEEMod / Carl Moyer.

* - Emission factors for John Deere Mower (727A) are based on emissions per gallon of gasoline consumed.

Table 6-2: Small Equipment Annual Emissions Estimates

Make	Model	Annual Runtime	Horsepower	Load Factor	Annual Emissions (tons)							
					ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
GATOR 1	XUV 855D	286	24.6	0.40	0.003272027	0.009873127	0.007211052	0.000454839	0.000418452	0.883520751	6.51456E-05	1.24087E-05
GATOR 2	XUV 855D	227	24.6	0.40	0.002597029	0.007836363	0.005723457	0.000361009	0.000332128	0.70125598	5.17065E-05	9.84885E-06
Gator 855	XUV 855D	0	24.6	0.40	0	0	0	0	0	0	0	0
Canycom 1	SC75	77	22.1	0.36	0.000501297	0.002947655	0.002591389	0.000134606	0.000123838	0.385897046	1.21552E-05	2.70116E-06
Canycom 2	SC75	47.1	22.1	0.36	0.000306638	0.001803046	0.001585122	8.23371E-05	7.57502E-05	0.236048713	7.4352E-06	1.65227E-06
Jumping Jack	MTX-70	9	2.8	0.55	0.015189037	0.003503699	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Jumping Jack	MTR-40	9	2.8	0.55	0.015189037	0.003503699	7.41749E-05	3.58423E-05	2.7088E-05	0.00656102	2.75005E-07	6.11122E-08
Vibroplate	WP 1550	9	4.15	0.55	0.022512323	0.005192983	0.000109938	5.31234E-05	4.01483E-05	0.009724369	4.07596E-07	9.0577E-08
John Deere Mower*	727A	78.0	23	1.00	0.003904024	0.20370617	0.001963805	2.04554E-05	1.5428E-05	0.429710801	2.04554E-05	1.5428E-05
				Total	0.063471412	0.238366743	0.019333114	0.001178055	0.001059921	2.659279699	0.000157855	4.22518E-05

Note: * - Assumes mower consumes one gallon of gas per hour runtime.

Sheet 7: Off-site Worker and Vendor Emission Factors

Table 7-1: Worker and Vendor Trips: Emissions Assignment

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emission Factors (tons / mi)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	1.511E-07	1.511E-07	1.511E-07	1.511E-07	1.511E-07	1.511E-07	1.511E-07	1.511E-07
					LDT1	Agg	0.25	4.622E-07	4.622E-07	4.622E-07	4.622E-07	4.622E-07	4.622E-07	4.622E-07	4.622E-07
					LDT2	Agg	0.25	1.81E-07	1.81E-07	1.81E-07	1.81E-07	1.81E-07	1.81E-07	1.81E-07	1.81E-07
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	38	20	760	HHDT	Diesel	1.0	7.878E-08	8.132E-07	3.358E-06	3.342E-08	3.198E-08	0.0019148	3.659E-09	3.017E-07
Harkrader and Sons Trucking	Sand	12	20	240	HHDT	Diesel	1.0	7.878E-08	8.132E-07	3.358E-06	3.342E-08	3.198E-08	0.0019148	3.659E-09	3.017E-07
Denair Lumber Co., Inc.	2x4x8 Cedar Split Rail	2	49	98	HHDT	Diesel	1.0	7.878E-08	8.132E-07	3.358E-06	3.342E-08	3.198E-08	0.0019148	3.659E-09	3.017E-07
Pacific Source Seed	Hydroseed / Seed Mix	20	15	300	HHDT	Diesel	1.0	7.878E-08	8.132E-07	3.358E-06	3.342E-08	3.198E-08	0.0019148	3.659E-09	3.017E-07

Table 7-2: Worker and Vendor Trips: Emissions Calculations

Trip Source	Reason	Number of Trips	Trip Distance	Total VMT	Vehicle Class	Fuel Type	Percent of Workers by Vehcile Class	Emissions (tons)							
								ROG	CO	NOx	PM10 (Exh)	PM2.5 (Exh)	CO2	CH4	N2O
Worker Trips															
General Workers	N/A	50	19.4	336590	LDA	Agg	0.5	0.0508424	0.0508424	0.0508424	0.0508424	0.0508424	0.0508424	0.0508424	0.0508424
					LDT1	Agg	0.25	0.1555584	0.1555584	0.1555584	0.1555584	0.1555584	0.1555584	0.1555584	0.1555584
					LDT2	Agg	0.25	0.0609067	0.0609067	0.0609067	0.0609067	0.0609067	0.0609067	0.0609067	0.0609067
							Worker Sub-Total	**0.2673075**	**0.2673075**	**0.2673075**	**0.2673075**	**0.2673075**	**0.2673075**	**0.2673075**	**0.2673075**
Vendor Trips															
Harkrader and Sons Trucking	3/4 in Road Base	38	95	3610	HHDT	Diesel	1.0	0.0002844	0.0029356	0.0121212	0.0001207	0.0001154	6.912432	1.321E-05	0.0010891
Harkrader and Sons Trucking	Sand	12	95	1140	HHDT	Diesel	1.0	8.981E-05	0.000927	0.0038277	3.81E-05	3.645E-05	2.1828733	4.171E-06	0.0003439
Denair Lumber Co., Inc.	2x4x8 Cedar Split Rail	2	49	98	HHDT	Diesel	1.0	7.72E-06	7.969E-05	0.0003291	3.275E-06	3.134E-06	0.1876505	3.586E-07	2.956E-05
Pacific Source Seed	Hydroseed / Seed Mix	20	15	300	HHDT	Diesel	1.0	2.363E-05	0.000244	0.0010073	1.003E-05	9.593E-06	0.5744403	1.098E-06	9.05E-05
							Vendor Sub-Total	**0.0003742**	**0.0038626**	**0.0159489**	**0.0001588**	**0.0001519**	**9.0953053**	**1.738E-05**	**0.001433**

							Total	**0.2676817**	**0.2711702**	**0.2832564**	**0.2674663**	**0.2674594**	**9.3626128**	**0.2673249**	**0.2687405**

Sheet 8: OFFROAD Output

Model Output: OFFROAD2021 (v1.0.7) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2022
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horse

Region	Calendar Year	Vehicle Category	Model Year
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - Agricultural Tractors	Aggregate
San Joaquin	2022	Agricultural - ATVs	Aggregate
San Joaquin	2022	Agricultural - ATVs	Aggregate
San Joaquin	2022	Agricultural - ATVs	Aggregate
San Joaquin	2022	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2022	Agricultural - Bale Wagons (Self Propelled)	Aggregate
San Joaquin	2022	Agricultural - Balers (Self Propelled)	Aggregate
San Joaquin	2022	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2022	Agricultural - Combine Harvesters	Aggregate
San Joaquin	2022	Agricultural - Construction Equipment	Aggregate
San Joaquin	2022	Agricultural - Construction Equipment	Aggregate
San Joaquin	2022	Agricultural - Construction Equipment	Aggregate
San Joaquin	2022	Agricultural - Construction Equipment	Aggregate
San Joaquin	2022	Agricultural - Construction Equipment	Aggregate
San Joaquin	2022	Agricultural - Forklifts	Aggregate
San Joaquin	2022	Agricultural - Forklifts	Aggregate
San Joaquin	2022	Agricultural - Forklifts	Aggregate
San Joaquin	2022	Agricultural - Forklifts	Aggregate
San Joaquin	2022	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2022	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2022	Agricultural - Hay Squeeze/Stack Retriever	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Nut Harvester	Aggregate
San Joaquin	2022	Agricultural - Other Harvesters	Aggregate
San Joaquin	2022	Agricultural - Other Harvesters	Aggregate
San Joaquin	2022	Agricultural - Other Harvesters	Aggregate
San Joaquin	2022	Agricultural - Other Harvesters	Aggregate

San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Sprayers/Spray Rigs	Aggregate
San Joaquin	2022	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2022	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2022	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2022	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2022	Agricultural - Swathers/Windrowers/Hay Conditioners	Aggregate
San Joaquin	2022	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Cranes	Aggregate
San Joaquin	2022	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Crawler Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Graders	Aggregate
San Joaquin	2022	Construction and Mining - Graders	Aggregate
San Joaquin	2022	Construction and Mining - Graders	Aggregate
San Joaquin	2022	Construction and Mining - Graders	Aggregate
San Joaquin	2022	Construction and Mining - Graders	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Bore/Drill Rigs	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Cement And Mortar Mixers	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Dumpers/Tenders	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Excavators	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Other	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Paving Equipment	Aggregate

San Joaquin	2022	Construction and Mining - Misc - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Signal Boards	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Misc - Trenchers	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Tractors	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2022	Construction and Mining - Off-Highway Trucks	Aggregate
San Joaquin	2022	Construction and Mining - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Pavers	Aggregate
San Joaquin	2022	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Paving Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Rollers	Aggregate
San Joaquin	2022	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2022	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2022	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2022	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2022	Construction and Mining - Rough Terrain Forklifts	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Dozers	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Rubber Tired Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Scrapers	Aggregate

San Joaquin	2022	Construction and Mining - Scrapers	Aggregate
San Joaquin	2022	Construction and Mining - Scrapers	Aggregate
San Joaquin	2022	Construction and Mining - Scrapers	Aggregate
San Joaquin	2022	Construction and Mining - Scrapers	Aggregate
San Joaquin	2022	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Skid Steer Loaders	Aggregate
San Joaquin	2022	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Surfacing Equipment	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Tractors/Loaders/Backhoes	Aggregate
San Joaquin	2022	Construction and Mining - Trenchers	Aggregate
San Joaquin	2022	Construction and Mining - Trenchers	Aggregate
San Joaquin	2022	Construction and Mining - Trenchers	Aggregate
San Joaquin	2022	Construction and Mining - Trenchers	Aggregate
San Joaquin	2022	Construction and Mining - Trenchers	Aggregate
San Joaquin	2022	Lawn and Garden - Misc - Rear Engine Riding Mowers	Aggregate

:power-hours

Horsepowe	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd
25	Diesel	0.00456	0.005517	0.006566	0.016649	0.01216	1.489844	0.000767
50	Diesel	0.101433	0.122734	0.146063	0.388823	0.307828	35.94026	0.026718
75	Diesel	0.056905	0.068856	0.081944	0.28786	0.468629	40.24798	0.030347
100	Diesel	0.081499	0.098613	0.117358	0.61844	0.730052	98.55385	0.051358
175	Diesel	0.051573	0.062404	0.074266	0.502427	0.546098	83.714	0.025169
300	Diesel	0.02671	0.03232	0.038463	0.158449	0.26264	66.37828	0.011748
25	Diesel	0.00157	0.0019	0.002262	0.009449	0.008407	1.215165	0.000405
50	Diesel	0.002502	0.003027	0.003603	0.018554	0.016664	2.648234	0.000759
175	Diesel	4.96E-05	6E-05	7.14E-05	0.00082	0.00056	0.14923	2.15E-05
175	Diesel	0.001336	0.001617	0.001924	0.011161	0.014224	1.802746	0.00068
300	Diesel	0.000149	0.000181	0.000215	0.000792	0.001606	0.268287	7.29E-05
75	Diesel	6.29E-05	7.61E-05	9.06E-05	0.000429	0.000566	0.067989	3.04E-05
175	Diesel	0.000602	0.000728	0.000866	0.00539	0.006331	0.898319	0.000287
300	Diesel	0.001101	0.001333	0.001586	0.0057	0.011354	1.941458	0.00053
50	Diesel	0.000159	0.000192	0.000229	0.000704	0.000566	0.079125	3.94E-05
75	Diesel	0.000434	0.000525	0.000624	0.002955	0.003903	0.468747	0.00021
100	Diesel	0.001846	0.002233	0.002658	0.012476	0.016046	1.920213	0.001164
175	Diesel	0.004693	0.005678	0.006758	0.042462	0.054547	7.31272	0.002307
300	Diesel	0.00087	0.001052	0.001252	0.004202	0.009581	1.331852	0.00044
50	Diesel	0.002102	0.002543	0.003027	0.009456	0.007856	1.058905	0.000547
75	Diesel	0.005881	0.007116	0.008469	0.040148	0.052968	6.370295	0.002865
100	Diesel	0.001895	0.002293	0.002729	0.013748	0.015955	2.170508	0.00113
175	Diesel	0.000378	0.000457	0.000544	0.003388	0.003962	0.56346	0.00018
75	Diesel	2.44E-05	2.95E-05	3.51E-05	0.000166	0.000219	0.026336	1.18E-05
175	Diesel	0.000351	0.000424	0.000505	0.003194	0.003573	0.519917	0.00017
300	Diesel	0.000584	0.000707	0.000841	0.003095	0.006273	1.048077	0.000285
25	Diesel	0.000616	0.000745	0.000887	0.00273	0.002302	0.306861	0.000124
50	Diesel	0.002664	0.003224	0.003836	0.011467	0.009129	1.196814	0.000692
75	Diesel	0.000987	0.001195	0.001422	0.006786	0.008895	1.07289	0.000482
100	Diesel	0.008136	0.009844	0.011715	0.055058	0.068773	8.443117	0.005089
175	Diesel	0.003732	0.004516	0.005374	0.032156	0.039556	5.269695	0.001849
300	Diesel	0.002397	0.002901	0.003452	0.011588	0.025083	3.469622	0.001214
75	Diesel	0.000838	0.001014	0.001207	0.005711	0.007543	0.9059	0.000405
100	Diesel	0.003694	0.004469	0.005319	0.025919	0.030954	4.051254	0.002233
175	Diesel	0.003677	0.00445	0.005295	0.031947	0.038942	5.255206	0.001808
300	Diesel	0.001295	0.001567	0.001865	0.006784	0.013635	2.303808	0.000628

25	Diesel	2.09E-05	2.53E-05	3.01E-05	9.27E-05	7.81E-05	0.010415	4.2E-06
50	Diesel	0.001017	0.00123	0.001464	0.004519	0.003647	0.507221	0.000254
75	Diesel	0.016104	0.019486	0.023189	0.099148	0.138444	14.80929	0.009001
100	Diesel	0.000789	0.000955	0.001136	0.005563	0.006604	0.871491	0.000475
175	Diesel	0.002532	0.003064	0.003646	0.022117	0.026764	3.645799	0.001238
300	Diesel	0.002175	0.002632	0.003132	0.01066	0.022846	3.256821	0.001095
50	Diesel	0.000723	0.000875	0.001041	0.003204	0.002574	0.360102	0.000179
75	Diesel	0.000462	0.000559	0.000666	0.003155	0.00416	0.499895	0.000224
100	Diesel	0.001703	0.002061	0.002452	0.012443	0.014234	1.963015	0.001013
175	Diesel	0.000387	0.000469	0.000558	0.003277	0.004116	0.532428	0.000195
300	Diesel	0.000809	0.000979	0.001165	0.004223	0.008469	1.434075	0.000392
50	Diesel	0.000104	0.000126	0.00015	0.00059	0.000498	0.062028	3.62E-05
75	Diesel	0.000156	0.000189	0.000225	0.00151	0.001572	0.238736	7.96E-05
100	Diesel	0.000179	0.000217	0.000258	0.001237	0.001395	0.181122	0.000123
175	Diesel	0.000986	0.001193	0.001419	0.008313	0.008648	1.30802	0.000496
300	Diesel	0.001111	0.001344	0.0016	0.004351	0.010754	1.54239	0.000571
25	Diesel	1.36E-06	1.64E-06	1.96E-06	3.31E-06	2.22E-06	0.000182	2.41E-07
50	Diesel	1.07E-05	1.3E-05	1.55E-05	4.12E-05	3.98E-05	0.004615	3.35E-06
75	Diesel	3.26E-05	3.95E-05	4.7E-05	0.000141	0.000269	0.019211	2.28E-05
100	Diesel	7.78E-05	9.42E-05	0.000112	0.000401	0.000643	0.05657	5.55E-05
175	Diesel	0.000541	0.000654	0.000778	0.003537	0.005434	0.527825	0.000337
300	Diesel	0.001139	0.001378	0.00164	0.005832	0.011728	1.911508	0.000686
50	Diesel	0.0001	0.000121	0.000144	0.000347	0.00029	0.031104	3.27E-05
75	Diesel	0.000364	0.00044	0.000524	0.001673	0.002897	0.225775	0.000245
100	Diesel	0.001057	0.001278	0.001521	0.006137	0.008039	0.898815	0.000696
175	Diesel	0.00231	0.002795	0.003326	0.021598	0.021587	3.390189	0.001257
300	Diesel	0.002529	0.00306	0.003642	0.012156	0.024183	4.155027	0.001402
25	Diesel	6.89E-07	8.33E-07	9.92E-07	1.72E-06	1.31E-06	0.000107	1.43E-07
50	Diesel	0.003404	0.004118	0.004901	0.029703	0.02568	3.889991	0.001219
75	Diesel	0.001425	0.001724	0.002052	0.018596	0.017339	3.087883	0.000498
100	Diesel	0.001414	0.001712	0.002037	0.014965	0.012978	2.367003	0.001032
175	Diesel	0.006705	0.008112	0.009654	0.083144	0.057014	13.41135	0.00289
300	Diesel	0.006734	0.008148	0.009696	0.03301	0.060579	14.25715	0.002907
50	Diesel	3.96E-05	4.79E-05	5.71E-05	0.000125	0.000102	0.010572	1.25E-05
75	Diesel	7.59E-05	9.19E-05	0.000109	0.000267	0.000563	0.032559	5.35E-05
100	Diesel	0.000187	0.000226	0.000269	0.000702	0.001372	0.086086	0.000133
175	Diesel	0.001998	0.002418	0.002877	0.010203	0.019386	1.401325	0.001268
300	Diesel	0.002358	0.002853	0.003395	0.012154	0.024595	5.091674	0.001209
25	Diesel	2.23E-05	2.68E-05	3.2E-05	9.14E-05	0.000169	0.000245	5.69E-06
25	Diesel	6.58E-06	7.92E-06	9.46E-06	2.67E-05	4.96E-05	7.18E-05	1.77E-06
25	Diesel	4.43E-06	5.33E-06	6.37E-06	1.82E-05	3.37E-05	4.87E-05	1.13E-06
50	Diesel	1.33E-05	1.58E-05	1.92E-05	0.000129	0.000114	0.016832	4.61E-06
25	Diesel	3.19E-06	3.83E-06	4.58E-06	1.31E-05	2.42E-05	3.5E-05	8.17E-07
25	Diesel	2.28E-05	2.74E-05	3.28E-05	9.36E-05	0.000173	0.000251	5.83E-06
25	Diesel	1.19E-05	1.43E-05	1.7E-05	4.87E-05	9.01E-05	0.00013	3.03E-06
25	Diesel	6.01E-06	7.22E-06	8.63E-06	2.47E-05	4.57E-05	6.6E-05	1.55E-06
25	Diesel	1.02E-05	1.23E-05	1.47E-05	4.19E-05	7.75E-05	0.000112	2.61E-06

25	Diesel	7.15E-05	8.6E-05	0.000103	0.000294	0.000543	0.000786	1.83E-05
25	Diesel	3.91E-06	4.7E-06	5.62E-06	1.6E-05	2.97E-05	4.29E-05	9.99E-07
50	Diesel	5.84E-06	6.95E-06	8.41E-06	5.56E-05	4.99E-05	0.007406	1.99E-06
25	Diesel	0.001192	0.001433	0.001713	0.004874	0.009049	0.013065	0.000312
25	Diesel	0.000109	0.000131	0.000157	0.000447	0.000828	0.001197	2.78E-05
25	Diesel	0.000106	0.000127	0.000152	0.000434	0.000803	0.001161	2.7E-05
50	Diesel	0.001515	0.001833	0.002181	0.006834	0.005545	0.621158	0.000465
75	Diesel	0.000625	0.000756	0.000899	0.003737	0.004711	0.541597	0.000348
100	Diesel	0.000532	0.000644	0.000767	0.003707	0.004044	0.536909	0.000341
175	Diesel	0.00151	0.001827	0.002174	0.019165	0.011699	2.945224	0.000645
300	Diesel	0.000835	0.001011	0.001203	0.00365	0.007514	1.30155	0.000413
50	Diesel	4.74E-05	5.74E-05	6.83E-05	0.000283	0.000239	0.027526	1.71E-05
75	Diesel	3.61E-05	4.37E-05	5.2E-05	0.000198	0.000301	0.027694	2.34E-05
100	Diesel	1.62E-05	1.97E-05	2.34E-05	9.92E-05	0.000108	0.014286	7.8E-06
175	Diesel	0.00057	0.00069	0.000821	0.004901	0.004739	0.740402	0.000307
300	Diesel	0.001391	0.001683	0.002003	0.005699	0.012943	1.703875	0.00078
50	Diesel	0.000159	0.000193	0.000229	0.000609	0.000501	0.057961	4.58E-05
75	Diesel	0.000291	0.000352	0.000418	0.001956	0.00242	0.298954	0.000153
100	Diesel	0.000285	0.000345	0.000411	0.002172	0.002306	0.32563	0.000182
175	Diesel	0.000676	0.000817	0.000973	0.006828	0.005786	1.103517	0.000306
300	Diesel	0.000535	0.000648	0.000771	0.002869	0.004773	1.345214	0.000213
50	Diesel	0.000164	0.000199	0.000237	0.00117	0.001028	0.15312	5.34E-05
75	Diesel	9.35E-05	0.000113	0.000135	0.000719	0.000832	0.11161	4.59E-05
100	Diesel	0.000157	0.00019	0.000226	0.001158	0.001289	0.174161	0.000104
175	Diesel	0.000573	0.000693	0.000825	0.007582	0.004819	1.228912	0.000252
300	Diesel	0.000262	0.000317	0.000377	0.001274	0.00246	0.549504	0.000119
50	Diesel	0.002354	0.002848	0.00339	0.01236	0.010778	1.442396	0.000735
75	Diesel	0.000448	0.000542	0.000645	0.003693	0.004386	0.590036	0.000241
100	Diesel	0.000908	0.001098	0.001307	0.005932	0.007169	0.881689	0.000605
175	Diesel	0.00281	0.0034	0.004046	0.032523	0.024317	5.281176	0.001266
300	Diesel	0.000352	0.000427	0.000508	0.001485	0.003651	0.435147	0.000211
50	Diesel	4.35E-05	5.27E-05	6.27E-05	0.000326	0.000303	0.047948	1.53E-05
75	Diesel	0.000654	0.000791	0.000941	0.010908	0.010233	1.907209	0.000205
100	Diesel	0.00085	0.001029	0.001224	0.007883	0.007811	1.272111	0.000585
175	Diesel	0.003524	0.004264	0.005075	0.050614	0.032793	8.514083	0.001519
300	Diesel	3.69E-05	4.46E-05	5.31E-05	0.000195	0.000364	0.069062	2.04E-05
50	Diesel	3.03E-05	3.67E-05	4.37E-05	9.58E-05	7.72E-05	0.008085	8.33E-06
75	Diesel	3.83E-05	4.63E-05	5.51E-05	0.000189	0.000301	0.026356	2.41E-05
100	Diesel	7.48E-05	9.05E-05	0.000108	0.000416	0.000554	0.060539	5.49E-05
175	Diesel	0.000171	0.000207	0.000247	0.001307	0.001587	0.197297	9.62E-05
300	Diesel	0.000183	0.000222	0.000264	0.000883	0.001631	0.243378	0.000108
50	Diesel	0.0002	0.000242	0.000288	0.000874	0.000704	0.085175	6.27E-05
75	Diesel	0.000595	0.00072	0.000857	0.004453	0.005258	0.683625	0.000315
100	Diesel	0.001038	0.001256	0.001494	0.007453	0.008098	1.105054	0.000676
175	Diesel	0.006369	0.007707	0.009172	0.056362	0.05574	8.600896	0.003309
300	Diesel	0.008008	0.009689	0.011531	0.039599	0.069739	16.32233	0.003554
50	Diesel	9.03E-06	1.09E-05	1.3E-05	2.4E-05	1.95E-05	0.00182	2.42E-06

75	Diesel	3.19E-05	3.86E-05	4.59E-05	0.000169	0.000256	0.025338	1.97E-05
100	Diesel	2.92E-05	3.53E-05	4.2E-05	0.0002	0.000246	0.030181	1.89E-05
175	Diesel	0.0004	0.000484	0.000576	0.002058	0.003849	0.248673	0.000272
300	Diesel	0.003792	0.004588	0.005461	0.015709	0.039306	3.73405	0.002437
50	Diesel	0.002273	0.00275	0.003273	0.012096	0.01037	1.420287	0.000681
75	Diesel	0.005262	0.006367	0.007577	0.062907	0.060808	10.44495	0.001937
100	Diesel	0.002991	0.003619	0.004307	0.033265	0.028774	5.269708	0.002061
175	Diesel	0.000433	0.000524	0.000624	0.009222	0.003662	1.570094	0.000129
300	Diesel	6.43E-05	7.78E-05	9.26E-05	0.000323	0.000545	0.126823	2.99E-05
50	Diesel	3.88E-05	4.7E-05	5.59E-05	0.000154	0.000126	0.014019	1.14E-05
75	Diesel	2.13E-05	2.57E-05	3.06E-05	0.000164	0.000196	0.025053	1.16E-05
100	Diesel	3.22E-05	3.9E-05	4.64E-05	0.00021	0.000249	0.030658	2.52E-05
175	Diesel	9.98E-05	0.000121	0.000144	0.000896	0.000868	0.138913	5.26E-05
300	Diesel	0.000122	0.000148	0.000176	0.000483	0.001147	0.159926	6.57E-05
25	Diesel	3.01E-07	3.64E-07	4.33E-07	3E-06	2.48E-06	0.000354	1.74E-07
50	Diesel	0.003459	0.004185	0.004981	0.014339	0.011863	1.403505	0.00104
75	Diesel	0.005662	0.006851	0.008154	0.042792	0.050859	6.669007	0.002895
100	Diesel	0.013118	0.015872	0.01889	0.102961	0.105022	15.66724	0.008243
175	Diesel	0.008459	0.010236	0.012181	0.104763	0.07284	16.90314	0.00375
300	Diesel	0.003322	0.004019	0.004783	0.016986	0.029521	7.148165	0.00149
50	Diesel	0.000739	0.000895	0.001065	0.003755	0.003386	0.447976	0.000232
75	Diesel	0.000185	0.000224	0.000266	0.000967	0.001501	0.1397	0.000118
100	Diesel	0.000247	0.000299	0.000356	0.001161	0.001703	0.164221	0.000152
175	Diesel	0.000247	0.000298	0.000355	0.001822	0.002255	0.274563	0.000136
300	Diesel	0.000145	0.000176	0.000209	0.00058	0.001548	0.166448	8.76E-05
Aggregate	Gasoline	0.075959	0.076651	0.083525	3.999541	0.038557	8.436886	0.000402

PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hp	Total_Populati	Horsepowe
0.000706	1.35E-05	1.22E-05	48459.79786	33041.75604	126.5571857	1732121
0.02458	0.000326	0.000294	1169020.656	140601.1405	1525.18801	41784848
0.027919	0.000366	0.000329	1309136.912	151004.5777	1152.352551	46793089
0.04725	0.000899	0.000806	3205638.472	152010.3696	1663.755249	1.15E+08
0.023156	0.000764	0.000685	2722946.189	196639.1218	989.1777405	1.08E+08
0.010809	0.000606	0.000543	2159071.079	126616.0094	315.137017	85794147
0.000373	1.11E-05	9.94E-06	39525.40315	41867.84923	112.660388	1695330
0.000698	2.41E-05	2.17E-05	86138.49413	38323.83515	159.4262904	3694666
1.98E-05	1.36E-06	1.22E-06	4853.970188	4183.731569	2.33713027	231456.3
0.000626	1.64E-05	1.48E-05	58637.50609	28567.57986	16.91064559	2236853
6.71E-05	2.45E-06	2.2E-06	8726.525633	10330.67469	2.191798215	332892
2.8E-05	6.2E-07	5.56E-07	2211.454325	2005.376206	1.267024172	75883.24
0.000264	8.2E-06	7.35E-06	29219.42807	2903.993488	10.87396554	1255986
0.000488	1.77E-05	1.59E-05	63149.37116	14966.11267	11.71454487	2714451
3.63E-05	7.19E-07	6.47E-07	2573.674504	4702.360498	2.580468712	110390.5
0.000193	4.27E-06	3.84E-06	15246.8213	15153.77286	12.69726291	653969.1
0.00107	1.75E-05	1.57E-05	62458.31621	28396.06919	40.71976791	2678972
0.002122	6.67E-05	5.98E-05	237859.1564	36719.14555	153.2955767	11342058
0.000405	1.22E-05	1.09E-05	43320.83897	20434.87885	10.84183494	2065708
0.000503	9.62E-06	8.66E-06	34442.77194	41227.13383	46.60851981	1477325
0.002635	5.81E-05	5.21E-05	207205.119	76862.20214	163.7129916	8887475
0.001039	1.98E-05	1.78E-05	70599.62502	51693.53057	44.16316901	3028170
0.000166	5.14E-06	4.61E-06	18327.53721	11887.51121	8.876410721	873928.9
1.08E-05	2.4E-07	2.16E-07	856.6339735	8017.366478	0.584282563	34993.22
0.000156	4.75E-06	4.25E-06	16911.2253	12376.37425	7.093982595	767993.9
0.000262	9.57E-06	8.58E-06	34090.54905	9764.383909	8.829977107	1548163
0.000114	2.79E-06	2.51E-06	9981.210737	2001.237737	24.60354513	385924.2
0.000637	1.09E-05	9.79E-06	38928.5038	27778.13518	44.70333849	1505173
0.000444	9.78E-06	8.78E-06	34897.65232	17437.43699	21.8855542	1349320
0.004682	7.7E-05	6.91E-05	274627.3281	82265.8755	141.7195259	10618486
0.001701	4.81E-05	4.31E-05	171406.1767	67576.66489	70.56258934	7367826
0.001116	3.17E-05	2.84E-05	112855.6014	18910.90345	22.61807838	4851053
0.000373	8.26E-06	7.41E-06	29466.0077	20493.70006	19.01387932	1139305
0.002054	3.69E-05	3.32E-05	131774.1982	55304.49646	64.93588733	5095059
0.001664	4.8E-05	4.3E-05	170934.8956	60489.29852	68.59624509	7347569
0.000577	2.1E-05	1.89E-05	74935.43347	13565.09	13.67476202	3221070

3.86E-06	9.46E-08	8.52E-08	338.7773749	5532.512947	1.018073476	13838.95
0.000234	4.61E-06	4.15E-06	16498.2546	28498.80524	21.73448816	673948.3
0.008281	0.000135	0.000121	481698.2499	36271.02569	433.2430979	19677216
0.000437	7.95E-06	7.13E-06	28346.79175	10129.82921	15.81582279	1157957
0.001139	3.33E-05	2.98E-05	118586.0762	59019.11177	45.52131808	5385380
0.001008	2.97E-05	2.66E-05	105933.862	42058.84081	23.45492117	4810802
0.000165	3.27E-06	2.95E-06	11712.9617	2903.993315	10.87396564	418661.8
0.000206	4.56E-06	4.09E-06	16259.96003	6368.666354	11.28857676	581187.3
0.000932	1.79E-05	1.61E-05	63850.54852	18364.61605	28.3356226	2282240
0.000179	4.86E-06	4.36E-06	17318.16956	13918.4479	5.684558751	688165.2
0.00036	1.31E-05	1.17E-05	46645.84022	14722.74759	9.30125019	1853547
3.33E-05	5.88E-07	0	2015.61578	1810.044938	3.800875972	35941.5
7.32E-05	2.26E-06	0	7757.780736	4346.7708	8.853259886	138333
0.000113	1.72E-06	0	5885.599075	2390.239308	4.681566746	104949.2
0.000456	1.24E-05	0	42504.32315	12041.32452	18.5408584	842588.6
0.000525	1.46E-05	0	50120.23064	8790.405326	14.5082217	993563.3
2.22E-07	1.72E-09	0	5.899536453	16.67819399	0.092704292	105.1977
3.08E-06	4.37E-08	0	149.9609354	230.0967086	1.205155796	2674.032
2.1E-05	1.82E-07	0	624.2683032	626.0362956	3.569115242	11131.65
5.1E-05	5.36E-07	0	1838.248759	1320.238697	6.999174046	32778.77
0.00031	5E-06	0	17151.78126	8065.24489	31.47310713	340010
0.000631	1.81E-05	0	62114.77935	17777.40697	70.82607909	1231338
3.01E-05	2.95E-07	0	1010.721819	1071.253115	3.986284556	18022.71
0.000225	2.14E-06	0	7336.612173	4568.932299	15.80608179	130823
0.00064	8.51E-06	0	29207.16216	13780.98914	39.77014127	520808.1
0.001156	3.21E-05	0	110164.7707	37522.89987	81.67248125	2183862
0.00129	3.94E-05	0	135018.3386	28338.14798	66.14451234	2676549
1.31E-07	1.02E-09	0	3.484579553	20.4392611	0.046352146	62.13535
0.001121	3.68E-05	0	126405.937	167097.9587	346.3895871	2254010
0.000458	2.93E-05	0	100341.3127	76315.40016	143.2744833	1789238
0.000949	2.24E-05	0	76916.17354	40282.49145	75.41494154	1371532
0.002659	0.000127	0	435803.9977	155106.9957	214.285971	8639203
0.002675	0.000135	0	463288.6475	102824.4571	159.6367908	9184048
1.15E-05	1E-07	0	343.5411031	414.4382176	1.715029402	6125.86
4.92E-05	3.08E-07	0	1057.998091	753.3581406	3.291002366	18865.72
0.000122	8.15E-07	0	2797.386645	1430.756473	5.701313958	49881.66
0.001166	1.33E-05	0	45536.29131	15231.18613	48.53069686	902693.1
0.001112	4.82E-05	0	165454.8416	35274.9421	90.85020616	3279910
4.3E-06	2.32E-09	2E-09	7.955031109	0	1.251590603	0
1.34E-06	6.81E-10	5.87E-10	2.334756989	0	0.891259558	0
8.56E-07	4.62E-10	3.98E-10	1.584615828	0	0.331404476	0
4.24E-06	2.14E-07	1.38E-07	547.5	397.85	0.69	13129.05
6.18E-07	3.32E-10	2.86E-10	1.139271899	0	0.460486885	0
4.4E-06	2.38E-09	2.05E-09	8.148787867	0	0.724363152	0
2.29E-06	1.24E-09	1.06E-09	4.236691554	0	0.947738649	0
1.17E-06	6.26E-10	5.39E-10	2.14633986	0	0.285813436	0
1.97E-06	1.06E-09	9.16E-10	3.644490781	0	0.710238652	0

1.38E-05	7.46E-09	6.42E-09	25.55189191	0	5.621446458	0
7.55E-07	4.07E-10	3.51E-10	1.396470494	0	0.175848029	0
1.83E-06	9.44E-08	6.06E-08	240.9	138.7	0.27	5131.9
0.000236	1.24E-07	1.07E-07	424.9549524	0	75.0960674	0
2.1E-05	1.14E-08	9.79E-09	38.9341337	0	5.315456149	0
2.04E-05	1.1E-08	9.49E-09	37.74825342	0	3.785563487	0
0.000427	5.88E-06	0	20184.64122	22458.40243	37.26712538	359922.9
0.00032	5.13E-06	0	17599.28624	12286.97384	20.11683136	313822
0.000314	5.09E-06	0	17446.94188	8436.476968	13.3030659	311105.5
0.000594	2.79E-05	0	95705.56929	30094.07873	29.43361271	1897229
0.00038	1.23E-05	0	42294.08517	8975.195378	11.49533221	838421
1.57E-05	2.61E-07	0	894.4579595	1492.974092	2.410311592	15949.55
2.15E-05	2.62E-07	0	899.9242112	623.289339	1.205155796	16047.02
7.18E-06	1.35E-07	0	464.2419902	254.9595915	0.417169314	8278.141
0.000282	7.01E-06	0	24059.50794	7952.061949	8.992316324	476946
0.000717	1.61E-05	0	55367.71065	12563.78284	17.84557621	1097587
4.21E-05	5.49E-07	0	1883.438989	2159.739083	6.164835418	33584.58
0.00014	2.83E-06	0	9714.56993	6232.887415	15.99149037	173225.6
0.000167	3.08E-06	0	10581.39496	5363.716475	12.28331869	188682.4
0.000281	1.05E-05	0	35858.96348	12094.9646	21.73915647	710853.7
0.000196	1.27E-05	0	43712.95655	9057.575284	16.08419466	866548.1
4.91E-05	1.45E-06	0	4975.658581	6687.007941	17.05758973	88723.56
4.22E-05	1.06E-06	0	3626.786914	2742.550589	6.72106117	64671.13
9.6E-05	1.65E-06	0	5659.402981	3247.543183	7.64810409	100915.8
0.000232	1.16E-05	0	39933.70885	16283.75151	24.70569382	791629.8
0.00011	5.21E-06	0	17856.23626	4209.116476	7.833512674	353974.9
0.000676	1.37E-05	0	46870.90484	62926.16402	173.357026	835779.5
0.000221	5.59E-06	0	19173.3179	13320.10497	35.22763096	341889.4
0.000556	8.35E-06	0	28650.65358	15674.49199	41.80963569	510884.7
0.001165	5E-05	0	171612.7397	67439.53351	113.2846448	3401982
0.000194	4.12E-06	0	14140.18523	3300.741232	7.509047652	280309.4
1.4E-05	4.54E-07	0	1558.088181	1572.051147	5.747666104	27783.08
0.000189	1.81E-05	0	61975.10444	39262.76173	117.4099858	1105110
0.000538	1.21E-05	0	41337.46459	21399.49487	67.2106117	737109.9
0.001398	8.07E-05	0	276666.597	113307.4263	235.8397188	5484527
1.88E-05	6.54E-07	0	2244.179256	531.9724512	1.436916526	44487.71
7.67E-06	7.66E-08	0	262.7340287	301.2125827	0.834338628	4684.947
2.21E-05	2.5E-07	0	856.4284495	619.0080637	1.39056438	15271.42
5.05E-05	5.73E-07	0	1967.241154	1011.638541	2.3176073	35078.9
8.85E-05	1.87E-06	0	6411.212804	2226.072669	3.847228118	127093.3
9.96E-05	2.31E-06	0	7908.614333	1720.174755	3.105593782	156777.2
5.77E-05	8.07E-07	0	2767.787796	3478.386215	7.138230484	49353.87
0.000289	6.48E-06	0	22214.52547	16563.37668	31.8439243	396118.8
0.000622	1.05E-05	0	35908.91753	20601.7735	38.65768976	640310.6
0.003044	8.15E-05	0	279487.6109	104405.0433	144.3869348	5540450
0.00327	0.000155	0	530397.0898	129568.7457	182.7665117	10514379
2.22E-06	1.72E-08	0	59.13745911	53.02071767	0.23176073	1054.511

1.81E-05	2.4E-07	0	823.3502916	471.645714	1.807733694	14681.59
1.74E-05	2.86E-07	0	980.7433847	441.8341522	1.436916526	17488.15
0.00025	2.36E-06	0	8080.674468	2232.35414	8.714203448	160188
0.002242	3.54E-05	0	121338.6092	20958.82524	68.69388037	2405368
0.000627	1.35E-05	0	46152.47807	52985.34786	136.3680135	822968.9
0.001782	9.89E-05	0	339410.3804	244029.3649	531.2882975	6052203
0.001896	4.99E-05	0	171240.0677	98501.99736	207.3331491	3053471
0.000119	1.49E-05	0	51020.48056	24407.25535	35.92291315	1011410
2.75E-05	1.2E-06	0	4121.12005	1061.021021	1.946790132	81695.43
1.05E-05	1.33E-07	0	455.5633898	736.2309805	1.575972964	8123.388
1.07E-05	2.37E-07	0	814.093133	756.865985	1.529620818	14516.52
2.32E-05	2.9E-07	0	996.2372444	685.4482242	1.436916526	17764.43
4.84E-05	1.32E-06	0	4514.010433	2244.178367	3.47641095	89483.93
6.04E-05	1.51E-06	0	5196.813686	1440.496962	2.642072322	103019.5
1.6E-07	3.36E-09	0	11.509718	24.11701281	0.092704292	205.2358
0.000957	1.33E-05	0	45607.13073	58806.50751	149.7174316	813244.5
0.002663	6.32E-05	0	216710.5545	157848.5639	353.6205218	3864279
0.007583	0.000148	0	509109.7992	280403.0469	587.0962812	9078202
0.00345	0.00016	0	549270.4641	232670.9249	348.290025	10888517
0.001371	6.77E-05	0	232280.8681	56789.42343	95.85623793	4604643
0.000213	4.24E-06	0	14557.04609	12448.36464	40.23366273	259574.3
0.000109	1.32E-06	0	4539.58306	2616.625855	8.80690774	80947.67
0.00014	1.56E-06	0	5336.39956	2175.246548	7.230934776	95156.12
0.000125	2.6E-06	0	8921.972933	2840.183666	7.230934776	176865.6
8.06E-05	1.58E-06	0	5408.74179	958.4134575	2.78112876	107220.7
0.000303	0.000144	0.000198	558976.7607	0	6278.306011	0

Table 23-1: Conversions

Days/YR	lbs / ton	grams / lbs
365	2000	453.59237

:r_Hours_hhpy	HC_g_hp-hr	TOG_g_hp-hr	NH3_g_hp-hr	ROG_g_hp-hr	CO_g_hp-hr
	0.871697455	1.255244338	0.002330495	1.054753921	3.182650681
	0.803799982	1.157471974	0.002330495	0.972597978	3.08121629
	0.402680233	0.579859536	0.002330495	0.487243081	2.036989124
	0.235520074	0.339148907	0.002330495	0.28497929	1.787206818
	0.157827873	0.227272138	0.002096303	0.190971727	1.537558405
	0.103088574	0.148447547	0.002096303	0.124737175	0.611535367
	0.306740568	0.441706417	0.001942079	0.371156088	1.845486982
	0.224221035	0.322878289	0.001942079	0.271307451	1.662799885
	0.070942121	0.102156654	0.00174692	0.085839967	1.17350736
	0.197764173	0.284780408	0.002183649	0.23929465	1.652099831
	0.148691505	0.214115767	0.002183649	0.179916721	0.788086357
	0.274465347	0.3952301	0.002427599	0.332103068	1.870278539
	0.158603219	0.228388635	0.001937903	0.191909896	1.420974235
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	0.219572274	0.316184071	0.001942079	0.265682452	1.496222838
	0.228127602	0.328503747	0.001942079	0.276034398	1.542012659
	0.137006758	0.197289733	0.00174692	0.165778178	1.23964869
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	0.471096379	0.678378783	0.001942079	0.570026619	2.119522822
	0.219112459	0.315521941	0.001942079	0.265126075	1.495789815
	0.207246791	0.298435378	0.001942079	0.250768617	1.503271253
	0.143061965	0.206009231	0.00174692	0.173104977	1.283745039
	0.230550879	0.331993264	0.002039183	0.278966564	1.571033975
	0.15114214	0.217644681	0.001834266	0.18288199	1.37709347
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	0.528621461	0.761214895	0.002154399	0.639631965	2.342254528
	0.586072731	0.843944732	0.002154398	0.709148004	2.522692236
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	0.243577175	0.350751134	0.002154398	0.294728383	1.659798384
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	0.165723252	0.238641483	0.001937903	0.200525134	1.439713433
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0.270990336	0.390226086	0.002039183	0.327898305	1.668426193
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0.745207881	1.073099349	0	0.901701536	4.084521013
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0.755948747	1.088566196	0	0.914697984	3.957076668
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0.461692665	0.664837437	0	0.558648124	3.411822036
0.448307281	0.645562484	0	0.54245181	1.79003672
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NOx_g_hp-hr	PM10_g_hp-hr	PM2.5_g_hp-hr	CO2_g_hp-hr	gal/hp-hr
2.32451784	0.146619708	0.134890131	284.8072263	0.027977
2.43937289	0.211723853	0.194785944	284.8072279	0.027977
3.316162877	0.214745934	0.197566259	284.8072272	0.027977
2.109752191	0.14841809	0.136544643	284.8072278	0.027977
1.671205188	0.077024731	0.070862752	256.1869073	0.025166
1.013660533	0.045342991	0.041715552	256.1869073	0.025166
1.642075145	0.079182028	0.072847466	237.3393568	0.023314
1.493457413	0.068000239	0.062560219	237.339356	0.023314
0.800981371	0.030746758	0.028287017	213.4890891	0.020971
2.105594181	0.100679052	0.092624728	266.861361	0.026214
1.597280617	0.072499282	0.066699339	266.8613632	0.026214
2.470336376	0.132670179	0.122056564	296.6741937	0.029143
1.668967586	0.075685368	0.069630538	236.8289201	0.023264
1.384960684	0.064704523	0.059528161	236.8289208	0.023264
1.696703116	0.11829928	0.108835337	237.3393556	0.023314
1.976269057	0.106136141	0.09764525	237.3393564	0.023314
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1.592455274	0.067347287	0.061959504	213.4890881	0.020971
1.535855479	0.070509245	0.064868505	213.4890899	0.020971
1.760858385	0.122520942	0.112719267	237.3393556	0.023314
1.973440659	0.106723831	0.098185924	237.3393548	0.023314
1.744687198	0.123547119	0.11366335	237.3393563	0.023314
1.501059231	0.068359231	0.062890492	213.4890884	0.020971
2.075082482	0.111442945	0.10252751	249.206323	0.02448
1.540525179	0.073155092	0.067302685	224.1635446	0.02202
1.34171565	0.060899393	0.056027442	224.1635448	0.02202
1.975520269	0.106094928	0.097607334	263.2866362	0.025863
2.008309764	0.152291111	0.140107823	263.2866331	0.025863
2.182944744	0.118314201	0.108849065	263.2866322	0.025863
2.144590452	0.158683215	0.145988558	263.2866329	0.025863
1.777708076	0.083077846	0.076431618	236.8289213	0.023264
1.712141965	0.082833765	0.076207063	236.8289226	0.023264
2.192326059	0.117739555	0.10832039	263.2866317	0.025863
2.011655101	0.145096831	0.133489085	263.2866332	0.025863
1.75492749	0.081486567	0.074967642	236.8289221	0.023264
1.401636444	0.064517973	0.059356535	236.8289215	0.023264

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1.888520245	0.13575543	0.124894996	249.2063242	0.02448
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2.036043586	0.141959115	0.130602385	284.8072273	0.027977
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2.065168134	0.147040855	0.135277586	284.8072269	0.027977
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4.400041556	0.387945216	0.356909599	571.4540783	0.05608
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6.999928172	0.759992202	0.699192825	571.4540783	0.05608
4.922448147	0.414908741	0.381716042	571.4540783	0.05608
8.013128746	0.67804491	0.623801317	571.4540783	0.05608
6.498046434	0.560513636	0.515672545	571.4540783	0.05608
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7.333347238	0.620372003	0.570742242	571.4540783	0.05608
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3.133169298	0.24916021	0.229227393	571.4540783	0.05608
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2.184137645	0.104825751	0.096439691	514.0285459	0.050445
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4.303885772	0.362734371	0.333715621	571.4540783	0.05608
2.041754014	0.112645297	0.103633674	514.0285459	0.050445
2.967664994	0.162980783	0.14994232	514.0285459	0.050445
4.95671468	0.354736255	0.326357354	571.4540783	0.05608
6.206053808	0.481906256	0.443353756	571.4540783	0.05608
4.328228336	0.31209793	0.287130096	571.4540783	0.05608
3.290253605	0.213008766	0.195968065	514.0285459	0.050445
3.904697826	0.235167806	0.216354382	514.0285459	0.050445
4.940574077	0.451580801	0.415454337	571.4540783	0.05608
4.62540362	0.29165547	0.268323033	571.4540783	0.05608
4.047236398	0.318627739	0.29313752	571.4540783	0.05608
2.695071581	0.142502541	0.131102338	514.0285459	0.050445
1.823760775	0.081292847	0.07478942	514.0285459	0.050445
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2.015611678	0.105255148	0.096834736	514.0285459	0.050445
2.30147633	0.111527351	0.102605163	514.0285459	0.050445
4.270248458	0.291050309	0.267766284	571.4540783	0.05608
4.248181345	0.233020781	0.214379118	571.4540783	0.05608
4.646628753	0.391872142	0.360522371	571.4540783	0.05608
2.366811957	0.123211031	0.113354148	514.0285459	0.050445
4.313337572	0.249500514	0.229540473	514.0285459	0.050445
3.615911557	0.181928462	0.167374185	571.4540783	0.05608
3.066159143	0.061498228	0.05657837	571.4540783	0.05608
3.509009763	0.262763744	0.241742645	571.4540783	0.05608
1.979835874	0.091731059	0.084392575	514.0285459	0.050445
2.70632134	0.151752189	0.139612014	514.0285459	0.050445
5.45582706	0.588892888	0.541781457	571.4540783	0.05608
6.525811387	0.521530906	0.479808433	571.4540783	0.05608
5.232910288	0.518583973	0.477097255	571.4540783	0.05608
4.135804567	0.250558868	0.230514159	514.0285459	0.050445
3.444265185	0.228728794	0.210430491	514.0285459	0.050445
4.724234348	0.420843821	0.387176315	571.4540783	0.05608
4.395318366	0.262903795	0.241871491	571.4540783	0.05608
4.187454647	0.349357649	0.321409037	571.4540783	0.05608
3.33125299	0.197768592	0.181947105	514.0285459	0.050445
2.196255985	0.111937608	0.102982599	514.0285459	0.050445
6.125059788	0.758337022	0.69767006	571.4540783	0.05608

5.771545586	0.443361426	0.407892512	571.4540783	0.05608
4.666471536	0.357520948	0.328919272	571.4540783	0.05608
7.956446343	0.562215389	0.517238158	514.0285459	0.050445
5.410787246	0.335529557	0.308687192	514.0285459	0.050445
4.172233281	0.274091751	0.252164411	571.4540783	0.05608
3.326884335	0.105970972	0.097493294	571.4540783	0.05608
3.120327516	0.223514988	0.205633789	571.4540783	0.05608
1.198926073	0.04234169	0.038954355	514.0285459	0.050445
2.207012692	0.121192602	0.111497194	514.0285459	0.050445
5.131139514	0.465005973	0.427805495	571.4540783	0.05608
4.474262986	0.264069484	0.242943926	571.4540783	0.05608
4.642738523	0.469449647	0.431893676	571.4540783	0.05608
3.213754457	0.194622501	0.179052701	514.0285459	0.050445
3.685338987	0.211055583	0.194171137	514.0285459	0.050445
4.000884767	0.280270748	0.257849088	571.4540783	0.05608
4.830214231	0.423419474	0.389545916	571.4540783	0.05608
4.357970034	0.24805147	0.228207353	571.4540783	0.05608
3.830621903	0.300655506	0.276603066	571.4540783	0.05608
2.215079041	0.114053219	0.104928961	514.0285459	0.050445
2.122860369	0.107153121	0.098580871	514.0285459	0.050445
4.319610219	0.295847605	0.272179796	571.4540783	0.05608
6.14071895	0.483744797	0.445045213	571.4540783	0.05608
5.927639013	0.527656524	0.485444002	571.4540783	0.05608
4.222398703	0.253986901	0.233667949	514.0285459	0.050445
4.780900398	0.27041394	0.248780825	514.0285459	0.050445
22.84016358	0.237907673	0.179436603	4997.779018	

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Sheet 9: On-Road Vehicle Operational Fuel Efficiency
EMFAC2021 San Joaquin Valley Fuel Efficiency Estimates for 2022

Table 9-1: 2022 San Joaquin Valley Average Vehicle Fuel Efficiency (Gasoline)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	2.65	57.25	18.57	3.08
LDA	250,840.66	9,972,327.18	354,344.06	28.14
LDT1	22,635.03	734,810.70	31,294.97	23.48
LDT2	97,566.18	3,835,154.52	169,841.54	22.58
LHDT1	10,032.89	343,680.35	37,766.84	9.10
LHDT2	1,192.96	41,208.17	5,018.02	8.21
MCY	12,156.83	65,858.41	1,654.83	39.80
MDV	95,931.34	3,318,018.22	181,402.51	18.29
MH	1,600.89	13,846.61	3,139.81	4.41
MHDT	579.49	27,135.21	5,908.82	4.59
OBUS	190.89	8,510.79	1,830.68	4.65
SBUS	125.39	6,800.30	672.13	10.12
UBUS	48.77	3,674.27	782.05	4.70
TOTAL	492,903.96	18,371,081.96	793,674.82	23.15

Table 9-2: 2022 San Joaquin Valley Average Vehicle Fuel Efficiency (Diesel)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Gallons Per Day	Miles Per Gallon
HHDT	8,309.0	1,176,546.19	201,246.37	5.85
LDA	747.60	24,646.14	583.58	42.23
LDT1	7.05	82.55	3.37	24.47
LDT2	248.86	10,706.82	339.93	31.50
LHDT1	9,047.42	317,992.09	20,147.70	15.78
LHDT2	3,132.38	115,997.92	8,943.84	12.97
MCY	0.00	0.00	0.00	0.00
MDV	1,375.55	54,411.92	2,295.40	23.70
MH	647.06	5,702.87	606.22	9.41
MHDT	5,611.05	266,972.39	31,215.26	8.55
OBUS	81.55	5,850.55	842.18	6.95
SBUS	485.98	11,054.11	1,356.91	8.15
UBUS	81.19	5,625.26	641.01	8.78
TOTAL	29,774.64	1,995,588.79	268221.77	7.44

Table 9-3: 2022 San Joaquin Valley Average Vehicle Fuel Efficiency (Electricity)

Vehicle Class	Population	Vehicle Miles Travelled Per Day	Energy Consumption (kWh/day)	Miles Per kWh
HHDT	0.00	0.00	0.00	0.00
LDA	11,216.99	388,343.30	140,049.41	2.77
LDT1	23.23	728.05	261.87	2.78
LDT2	608.97	18,142.72	6,074.56	2.99
LHDT1	0.00	0.00	0.00	0.00
LHDT2	0.00	0.00	0.00	0.00
MCY	0.00	0.00	0.00	0.00
MDV	574.50	15,886.46	5,422.15	2.93
MH	0.00	0.00	0.00	0.00
MHDT	0.00	0.00	0.00	0.00
OBUS	0.00	0.00	0.00	0.00
SBUS	0.00	0.00	0.00	0.00
UBUS	17.16	766.36	1,335.95	0.57
TOTAL	12,440.85	423,866.88	153,143.94	2.77

Sheet 10: EMFAC Output

Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissi

Region	Calendar Ye	Vehicle Cat	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT
San Joaquin	2022	HHDT	Aggregate	Aggregate	Gasoline	2.652755	57.24618	57.24618	0
San Joaquin	2022	HHDT	Aggregate	Aggregate	Diesel	8308.956	1176546	1176546	0
San Joaquin	2022	HHDT	Aggregate	Aggregate	Natural Ga	205.0434	13547.93	13547.93	0
San Joaquin	2022	LDA	Aggregate	Aggregate	Gasoline	245832.5	9843786	9843786	0
San Joaquin	2022	LDA	Aggregate	Aggregate	Diesel	747.597	24646.14	24646.14	0
San Joaquin	2022	LDA	Aggregate	Aggregate	Electricity	6208.84	270760.5	0	270760.5
San Joaquin	2022	LDA	Aggregate	Aggregate	Plug-in Hyb	5008.15	246123.7	128540.8	117582.8
San Joaquin	2022	LDT1	Aggregate	Aggregate	Gasoline	22627.08	734599.7	734599.7	0
San Joaquin	2022	LDT1	Aggregate	Aggregate	Diesel	7.047783	82.54563	82.54563	0
San Joaquin	2022	LDT1	Aggregate	Aggregate	Electricity	15.27984	499.3637	0	499.3637
San Joaquin	2022	LDT1	Aggregate	Aggregate	Plug-in Hyb	7.945735	439.7289	211.0394	228.6895
San Joaquin	2022	LDT2	Aggregate	Aggregate	Gasoline	97154.08	3824225	3824225	0
San Joaquin	2022	LDT2	Aggregate	Aggregate	Diesel	248.8605	10706.82	10706.82	0
San Joaquin	2022	LDT2	Aggregate	Aggregate	Electricity	196.8674	7077.9	0	7077.9
San Joaquin	2022	LDT2	Aggregate	Aggregate	Plug-in Hyb	412.1009	21993.86	10929.04	11064.82
San Joaquin	2022	LHDT1	Aggregate	Aggregate	Gasoline	10032.89	343680.3	343680.3	0
San Joaquin	2022	LHDT1	Aggregate	Aggregate	Diesel	9047.422	317992.1	317992.1	0
San Joaquin	2022	LHDT2	Aggregate	Aggregate	Gasoline	1192.957	41208.17	41208.17	0
San Joaquin	2022	LHDT2	Aggregate	Aggregate	Diesel	3132.379	115997.9	115997.9	0
San Joaquin	2022	MCY	Aggregate	Aggregate	Gasoline	12156.83	65858.41	65858.41	0
San Joaquin	2022	MDV	Aggregate	Aggregate	Gasoline	95564.44	3308854	3308854	0
San Joaquin	2022	MDV	Aggregate	Aggregate	Diesel	1375.555	54411.92	54411.92	0
San Joaquin	2022	MDV	Aggregate	Aggregate	Electricity	207.6079	7423.518	0	7423.518
San Joaquin	2022	MDV	Aggregate	Aggregate	Plug-in Hyb	366.8941	17627.41	9164.472	8462.938
San Joaquin	2022	MH	Aggregate	Aggregate	Gasoline	1600.886	13846.61	13846.61	0
San Joaquin	2022	MH	Aggregate	Aggregate	Diesel	647.0576	5702.865	5702.865	0
San Joaquin	2022	MHDT	Aggregate	Aggregate	Gasoline	579.4901	27135.21	27135.21	0
San Joaquin	2022	MHDT	Aggregate	Aggregate	Diesel	5611.053	266972.4	266972.4	0
San Joaquin	2022	MHDT	Aggregate	Aggregate	Natural Ga	50.50235	2902.472	2902.472	0
San Joaquin	2022	OBUS	Aggregate	Aggregate	Gasoline	190.8864	8510.792	8510.792	0
San Joaquin	2022	OBUS	Aggregate	Aggregate	Diesel	81.54809	5850.547	5850.547	0
San Joaquin	2022	OBUS	Aggregate	Aggregate	Natural Ga	1.737809	106.0977	106.0977	0
San Joaquin	2022	SBUS	Aggregate	Aggregate	Gasoline	125.3894	6800.304	6800.304	0
San Joaquin	2022	SBUS	Aggregate	Aggregate	Diesel	485.9784	11054.11	11054.11	0
San Joaquin	2022	SBUS	Aggregate	Aggregate	Natural Ga	86.52134	2182.36	2182.36	0
San Joaquin	2022	UBUS	Aggregate	Aggregate	Gasoline	48.7687	3674.266	3674.266	0

San Joaquin	2022	UBUS	Aggregate	Aggregate	Diesel	81.19085	5625.256	5625.256	0
San Joaquin	2022	UBUS	Aggregate	Aggregate	Electricity	17.15976	766.3601	0	766.3601
San Joaquin	2022	UBUS	Aggregate	Aggregate	Natural Ga	57.64598	3693.83	3693.83	0

ions, 1000 gallons/day for Fuel Consumption

Trips	Energy Con	NOx_RUNE	NOx_IDLEX	NOx_STREX	NOx_TOTE	PM2.5_RUN	PM2.5_IDL	PM2.5_STR	PM2.5_TOT
53.07633	0	0.00113	0	9.34E-05	0.001223	5.98E-07	0	1.5E-07	7.48E-07
135865.8	0	2.82473	0.744065	0.381656	3.950451	0.037289	0.000333	0	0.037622
1666.956	0	0.023448	0.002658	0	0.026106	4.96E-05	4.97E-06	0	5.46E-05
1136643	0	0.588829	0	0.368739	0.957569	0.015389	0	0.002638	0.018027
3218.197	0	0.007707	0	0	0.007707	0.000489	0	0	0.000489
31332.77	104535.9	0	0	0	0	0	0	0	0
20708.7	35513.51	0.001008	0	0.002605	0.003613	0.000219	0	5.2E-05	0.000271
97756.5	0	0.162056	0	0.057974	0.22003	0.00193	0	0.000385	0.002315
21.0833	0	0.000136	0	0	0.000136	2.16E-05	0	0	2.16E-05
69.47265	192.7956	0	0	0	0	0	0	0	0
32.85561	69.07105	1.66E-06	0	4.13E-06	5.79E-06	2.29E-07	0	5.32E-08	2.82E-07
449996.7	0	0.421961	0	0.216067	0.638028	0.00621	0	0.001046	0.007256
1177.281	0	0.000853	0	0	0.000853	0.000118	0	0	0.000118
1015.886	2732.654	0	0	0	0	0	0	0	0
1704.037	3341.904	8.57E-05	0	0.000214	0.0003	1.51E-05	0	3.53E-06	1.87E-05
149475.1	0	0.09983	0.000437	0.116647	0.216914	0.00066	0	6.25E-05	0.000722
113805.2	0	0.869758	0.023105	0	0.892863	0.017862	0.000267	0	0.018129
17773.28	0	0.010704	5.13E-05	0.013459	0.024214	7.18E-05	0	6.15E-06	7.8E-05
39401.38	0	0.232022	0.007737	0	0.239759	0.005233	9.15E-05	0	0.005325
24313.66	0	0.049391	0	0.004641	0.054032	0.000135	0	8.69E-05	0.000222
432433.2	0	0.582564	0	0.294134	0.876698	0.005575	0	0.0011	0.006675
6482.028	0	0.00649	0	0	0.00649	0.000468	0	0	0.000468
1069.37	2866.091	0	0	0	0	0	0	0	0
1517.107	2556.06	7.19E-05	0	0.000191	0.000263	1.72E-05	0	4.27E-06	2.15E-05
160.1527	0	0.007167	0	7.25E-05	0.007239	2.55E-05	0	7.12E-08	2.55E-05
64.70576	0	0.032522	0	0	0.032522	0.000836	0	0	0.000836
11594.44	0	0.027144	5.58E-05	0.006032	0.033232	4.8E-05	0	8.84E-06	5.68E-05
68076.61	0	0.515361	0.094789	0.104377	0.714527	0.005824	0.000283	0	0.006107
442.9405	0	0.000277	0.000363	0	0.00064	4.56E-06	1.19E-06	0	5.75E-06
3819.255	0	0.007941	1.36E-05	0.001908	0.009863	8.41E-06	0	1.16E-06	9.57E-06
970.2818	0	0.017193	0.001357	0.001528	0.020078	0.000319	2.01E-06	0	0.000321
15.4665	0	8.93E-06	2.83E-06	0	1.18E-05	1.88E-07	1.03E-08	0	1.98E-07
501.5577	0	0.001609	0.000128	0.000363	0.0021	6.62E-06	0	3.29E-07	6.95E-06
7036.967	0	0.06007	0.013029	0.003453	0.076551	0.000318	1.31E-05	0	0.000331
1252.829	0	0.001112	0.000498	0	0.00161	8.13E-06	1.2E-06	0	9.33E-06
195.0748	0	0.000884	0	0.000209	0.001094	4.83E-06	0	2.16E-07	5.05E-06

324.7634	0	0.003773	0	0	0.003773	3.94E-05	0	0	3.94E-05
68.63904	1335.953	0	0	0	0	0	0	0	0
230.5839	0	0.000317	0	0	0.000317	1.06E-06	0	0	1.06E-06

PM2.5_PM	PM2.5_PM	PM2.5_TOT	PM10_RUN	PM10_IDLE	PM10_STR	PM10_TOT	PM10_PMT	PM10_PMB	PM10_TOT
3.16E-07	2.41E-06	3.48E-06	6.5E-07	0	1.63E-07	8.13E-07	1.26E-06	6.9E-06	8.97E-06
0.011479	0.035077	0.084178	0.038975	0.000348	0	0.039323	0.045915	0.100221	0.185458
0.000134	0.000696	0.000885	5.4E-05	5.41E-06	0	5.94E-05	0.000538	0.001987	0.002584
0.021702	0.033036	0.072765	0.016737	0	0.002869	0.019606	0.086807	0.09439	0.200803
5.43E-05	8.37E-05	0.000627	0.000511	0	0	0.000511	0.000217	0.000239	0.000967
0.000597	0.000456	0.001053	0	0	0	0	0.002388	0.001302	0.00369
0.000543	0.000389	0.001203	0.000238	0	5.66E-05	0.000295	0.00217	0.001113	0.003578
0.00162	0.00298	0.006914	0.002099	0	0.000419	0.002518	0.006478	0.008514	0.01751
1.82E-07	3.8E-07	2.21E-05	2.26E-05	0	0	2.26E-05	7.28E-07	1.09E-06	2.44E-05
1.1E-06	8.46E-07	1.95E-06	0	0	0	0	4.4E-06	2.42E-06	6.82E-06
9.69E-07	6.97E-07	1.95E-06	2.49E-07	0	5.79E-08	3.07E-07	3.88E-06	1.99E-06	6.18E-06
0.008431	0.014835	0.030522	0.006754	0	0.001137	0.007892	0.033724	0.042387	0.084002
2.36E-05	4.02E-05	0.000182	0.000123	0	0	0.000123	9.44E-05	0.000115	0.000332
1.56E-05	1.19E-05	2.75E-05	0	0	0	0	6.24E-05	3.4E-05	9.64E-05
4.85E-05	3.48E-05	0.000102	1.65E-05	0	3.84E-06	2.03E-05	0.000194	9.95E-05	0.000314
0.000758	0.010342	0.011822	0.000717	0	6.79E-05	0.000785	0.003031	0.02955	0.033366
0.001052	0.009569	0.02875	0.018669	0.000279	0	0.018948	0.004206	0.027341	0.050496
9.08E-05	0.001447	0.001616	7.81E-05	0	6.69E-06	8.48E-05	0.000363	0.004134	0.004582
0.000384	0.004073	0.009781	0.00547	9.56E-05	0	0.005566	0.001534	0.011636	0.018736
7.26E-05	0.000305	0.000599	0.000144	0	9.21E-05	0.000236	0.00029	0.000871	0.001398
0.007295	0.01335	0.027319	0.006063	0	0.001196	0.007259	0.029179	0.038142	0.07458
0.00012	0.000213	0.000802	0.000489	0	0	0.000489	0.00048	0.00061	0.001579
1.64E-05	1.25E-05	2.88E-05	0	0	0	0	6.55E-05	3.56E-05	0.000101
3.89E-05	2.79E-05	8.82E-05	1.87E-05	0	4.64E-06	2.34E-05	0.000155	7.97E-05	0.000259
4.58E-05	0.000241	0.000312	2.77E-05	0	7.74E-08	2.78E-05	0.000183	0.000688	0.000898
2.51E-05	9.87E-05	0.00096	0.000874	0	0	0.000874	0.000101	0.000282	0.001257
8.97E-05	0.000472	0.000618	5.22E-05	0	9.62E-06	6.18E-05	0.000359	0.001347	0.001768
0.000883	0.004643	0.011633	0.006088	0.000296	0	0.006383	0.003531	0.013265	0.02318
9.6E-06	5.11E-05	6.65E-05	4.96E-06	1.29E-06	0	6.25E-06	3.84E-05	0.000146	0.000191
2.81E-05	0.000147	0.000185	9.15E-06	0	1.26E-06	1.04E-05	0.000113	0.000421	0.000544
1.93E-05	0.000132	0.000472	0.000333	2.11E-06	0	0.000335	7.74E-05	0.000377	0.000789
3.51E-07	1.89E-06	2.44E-06	2.04E-07	1.12E-08	0	2.15E-07	1.4E-06	5.4E-06	7.01E-06
1.5E-05	0.000118	0.00014	7.2E-06	0	3.58E-07	7.56E-06	6E-05	0.000337	0.000404
3.66E-05	0.000192	0.000559	0.000332	1.37E-05	0	0.000346	0.000146	0.000547	0.001039
7.22E-06	3.78E-05	5.44E-05	8.84E-06	1.3E-06	0	1.01E-05	2.89E-05	0.000108	0.000147
1.22E-05	0.000156	0.000173	5.25E-06	0	2.35E-07	5.49E-06	4.86E-05	0.000446	0.0005

4.68E-05	0.000239	0.000325	4.12E-05	0	0	4.12E-05	0.000187	0.000682	0.00091
7.51E-06	1.63E-05	2.38E-05	0	0	0	0	3E-05	4.65E-05	7.65E-05
2.03E-05	0.000157	0.000178	1.11E-06	0	0	1.11E-06	8.13E-05	0.000447	0.00053

CO2_RUNE	CO2_IDLEX	CO2_STREX	CO2_TOTEX	CH4_RUNE	CH4_IDLEX	CH4_STREX	CH4_TOTEX	N2O_RUNE	N2O_IDLEX
0.172934	0	0.003184	0.176118	3.71E-05	0	4.29E-09	3.71E-05	2.36E-05	0
2109.865	142.9865	0	2252.852	0.001602	0.002703	0	0.004305	0.33241	0.022528
22.17883	2.16566	0	24.34449	0.036606	0.007027	0	0.043633	0.004521	0.000441
3223.755	0	92.35441	3316.109	0.035178	0	0.103601	0.138779	0.060081	0
6.532885	0	0	6.532885	4.31E-05	0	0	4.31E-05	0.001029	0
0	0	0	0	0	0	0	0	0	0
42.70324	0	1.531221	44.23446	0.000154	0	0.00097	0.001124	0.000187	0
286.4672	0	10.23886	296.7061	0.008635	0	0.015938	0.024573	0.011122	0
0.037756	0	0	0.037756	1.3E-06	0	0	1.3E-06	5.95E-06	0
0	0	0	0	0	0	0	0	0	0
0.070223	0	0.002624	0.072847	2.54E-07	0	1.55E-06	1.8E-06	3.1E-07	0
1560.306	0	46.56645	1606.872	0.017625	0	0.049674	0.067299	0.03249	0
3.805296	0	0	3.805296	1.39E-05	0	0	1.39E-05	0.0006	0
0	0	0	0	0	0	0	0	0	0
3.635167	0	0.147592	3.782759	1.32E-05	0	8.02E-05	9.33E-05	1.6E-05	0
352.5798	1.353049	4.220679	358.1535	0.004611	0.001326	0.00614	0.012077	0.00554	3.34E-05
224.1758	1.367607	0	225.5434	0.003805	5.08E-05	0	0.003856	0.035319	0.000215
46.89249	0.185184	0.509566	47.58724	0.000424	0.000157	0.000702	0.001283	0.000613	3.99E-06
99.36901	0.752737	0	100.1217	0.001153	1.76E-05	0	0.00117	0.015656	0.000119
14.20391	0	1.489284	15.6932	0.015451	0	0.00561	0.021061	0.003222	0
1661.674	0	55.40408	1717.078	0.022776	0	0.064754	0.08753	0.039507	0
25.69583	0	0	25.69583	5.45E-05	0	0	5.45E-05	0.004048	0
0	0	0	0	0	0	0	0	0	0
3.045601	0	0.167196	3.212797	1.1E-05	0	7.09E-05	8.18E-05	1.33E-05	0
29.77011	0	0.005603	29.77572	0.000262	0	6.69E-06	0.000268	0.000427	0
6.786338	0	0	6.786338	4.18E-05	0	0	4.18E-05	0.001069	0
55.04734	0.349687	0.637998	56.03502	0.000923	0.000153	0.000695	0.001771	0.001172	4.03E-06
335.2503	14.18893	0	349.4392	0.000716	8.58E-05	0	0.000802	0.052819	0.002235
3.21862	0.319439	0	3.538059	0.002481	0.000903	0	0.003384	0.000656	6.51E-05
17.13928	0.081464	0.140063	17.3608	0.000218	3.98E-05	0.000169	0.000427	0.000352	1.02E-06
9.174736	0.253002	0	9.427738	3.87E-05	3.94E-06	0	4.26E-05	0.001445	3.99E-05
0.126661	0.002649	0	0.12931	9.97E-05	6.65E-06	0	0.000106	2.58E-05	5.4E-07
5.989861	0.353769	0.030342	6.373973	3.38E-05	0.000349	3.46E-05	0.000417	0.000119	1.29E-05
13.94811	1.24186	0	15.18997	4.39E-05	4.52E-06	0	4.84E-05	0.002198	0.000196
3.011161	0.403543	0	3.414704	0.007561	0.001395	0	0.008956	0.000614	8.23E-05
7.389942	0	0.026504	7.416446	1.59E-05	0	2.97E-05	4.55E-05	8.02E-05	0

7.175739	0	0	7.175739	2.12E-05	0	0	2.12E-05	0.001131	0
0	0	0	0	0	0	0	0	0	0
4.246949	0	0	4.246949	0.010191	0	0	0.010191	0.000866	0

N2O_STREX	N2O_TOTE	ROG_RUNE	ROG_IDLEX	ROG_STREX	ROG_TOTE	ROG_DIUR	ROG_HOTS	ROG_RUNL	ROG_TOTA
1.71E-06	2.53E-05	0.000247	0	2.33E-08	0.000247	3.65E-05	9.98E-06	8.96E-05	0.000383
0	0.354938	0.034493	0.058195	0	0.092688	0	0	0	0.092688
0	0.004963	0.001311	0.000122	0	0.001433	0	0	0	0.001433
0.044617	0.104697	0.138583	0	0.488486	0.627069	0.465804	0.130698	0.335273	1.558844
0	0.001029	0.000928	0	0	0.000928	0	0	0	0.000928
0	0	0	0	0	0	0	0	0	0
0.000484	0.000671	0.000481	0	0.003889	0.00437	0.002794	0.000951	0.00083	0.008944
0.004952	0.016074	0.039525	0	0.087489	0.127014	0.104909	0.026623	0.08139	0.339935
0	5.95E-06	2.79E-05	0	0	2.79E-05	0	0	0	2.79E-05
0	0	0	0	0	0	0	0	0	0
7.74E-07	1.08E-06	7.89E-07	0	6.17E-06	6.96E-06	2.8E-06	9.22E-07	8.48E-07	1.15E-05
0.021108	0.053598	0.072021	0	0.240442	0.312464	0.193089	0.051779	0.140947	0.698278
0	0.0006	0.000299	0	0	0.000299	0	0	0	0.000299
0	0	0	0	0	0	0	0	0	0
4.01E-05	5.62E-05	4.09E-05	0	0.00032	0.000361	0.000162	5.12E-05	4.84E-05	0.000623
0.008721	0.014295	0.023392	0.005007	0.031153	0.059552	0.037502	0.009565	0.051396	0.158015
0	0.035534	0.081924	0.001095	0	0.083018	0	0	0	0.083018
0.001021	0.001637	0.002038	0.000588	0.003524	0.00615	0.004022	0.001025	0.005361	0.016558
0	0.015774	0.024816	0.000379	0	0.025195	0	0	0	0.025195
0.000267	0.003489	0.107024	0	0.042786	0.14981	0.068286	0.096579	0.102869	0.417544
0.023759	0.063266	0.099864	0	0.343818	0.443682	0.236436	0.062043	0.175847	0.918008
0	0.004048	0.001173	0	0	0.001173	0	0	0	0.001173
0	0	0	0	0	0	0	0	0	0
3.52E-05	4.85E-05	3.43E-05	0	0.000285	0.000319	0.000176	5.38E-05	5.31E-05	0.000603
7.49E-06	0.000435	0.001162	0	2.86E-05	0.001191	0.00887	0.002315	5.27E-05	0.012428
0	0.001069	0.000901	0	0	0.000901	0	0	0	0.000901
0.00039	0.001567	0.004805	0.000636	0.004134	0.009575	0.002977	0.000723	0.006078	0.019353
0	0.055054	0.015411	0.001848	0	0.017259	0	0	0	0.017259
0	0.000721	3.54E-05	1.29E-05	0	4.83E-05	0	0	0	4.83E-05
0.000131	0.000484	0.001079	0.000156	0.000926	0.002161	0.000745	0.000176	0.000782	0.003864
0	0.001485	0.000832	8.48E-05	0	0.000917	0	0	0	0.000917
0	2.64E-05	1.42E-06	9.5E-08	0	1.52E-06	0	0	0	1.52E-06
3.62E-05	0.000168	0.000155	0.001471	0.000189	0.001815	0.000138	3.69E-05	7.79E-05	0.002069
0	0.002393	0.000945	9.73E-05	0	0.001042	0	0	0	0.001042
0	0.000696	0.000108	1.99E-05	0	0.000128	0	0	0	0.000128
1.9E-05	9.93E-05	5.22E-05	0	0.000126	0.000178	2.86E-05	7.55E-06	2.02E-05	0.000234

0	0.001131	0.000456	0	0	0.000456	0	0	0	0.000456
0	0	0	0	0	0	0	0	0	0
0	0.000866	0.000149	0	0	0.000149	0	0	0	0.000149

TOG_RUNE	TOG_IDLEX	TOG_STREX	TOG_TOTE	TOG_DIURN	TOG_HOTS	TOG_RUNL	TOG_TOTA	CO_RUNEX	CO_IDLEX
0.000361	0	2.55E-08	0.000361	3.65E-05	9.98E-06	8.96E-05	0.000497	0.015141	0
0.039267	0.066251	0	0.105518	0	0	0	0.105518	0.139167	0.817585
0.038256	0.007196	0	0.045452	0	0	0	0.045452	0.188776	0.014959
0.202171	0	0.534828	0.736999	0.465804	0.130698	0.335273	1.668774	10.28002	0
0.001056	0	0	0.001056	0	0	0	0.001056	0.011462	0
0	0	0	0	0	0	0	0	0	0
0.000702	0	0.004258	0.00496	0.002794	0.000951	0.00083	0.009534	0.071803	0
0.057643	0	0.095789	0.153431	0.104909	0.026623	0.08139	0.366353	1.799589	0
3.18E-05	0	0	3.18E-05	0	0	0	3.18E-05	0.000158	0
0	0	0	0	0	0	0	0	0	0
1.15E-06	0	6.76E-06	7.91E-06	2.8E-06	9.22E-07	8.48E-07	1.25E-05	0.000118	0
0.105072	0	0.263253	0.368326	0.193089	0.051779	0.140947	0.75414	4.833406	0
0.000341	0	0	0.000341	0	0	0	0.000341	0.002312	0
0	0	0	0	0	0	0	0	0	0
5.97E-05	0	0.00035	0.00041	0.000162	5.12E-05	4.84E-05	0.000672	0.006128	0
0.034134	0.007306	0.034109	0.075549	0.037502	0.009565	0.051396	0.174011	0.533829	0.041451
0.093265	0.001246	0	0.094511	0	0	0	0.094511	0.240618	0.009073
0.002974	0.000858	0.003858	0.00769	0.004022	0.001025	0.005361	0.018098	0.052132	0.004935
0.028252	0.000431	0	0.028683	0	0	0	0.028683	0.068022	0.003141
0.126337	0	0.046494	0.172831	0.068286	0.096579	0.102869	0.440565	1.161449	0
0.145565	0	0.376434	0.521999	0.236436	0.062043	0.175847	0.996325	5.269539	0
0.001335	0	0	0.001335	0	0	0	0.001335	0.019101	0
0	0	0	0	0	0	0	0	0	0
5E-05	0	0.000312	0.000362	0.000176	5.38E-05	5.31E-05	0.000645	0.005125	0
0.001696	0	3.13E-05	0.001728	0.00887	0.002315	5.27E-05	0.012964	0.028346	0
0.001025	0	0	0.001025	0	0	0	0.001025	0.003106	0
0.007012	0.000928	0.004526	0.012466	0.002977	0.000723	0.006078	0.022244	0.104789	0.00953
0.017544	0.002104	0	0.019648	0	0	0	0.019648	0.048707	0.043299
0.002532	0.000922	0	0.003453	0	0	0	0.003453	0.00941	0.002331
0.001575	0.000228	0.001014	0.002816	0.000745	0.000176	0.000782	0.004519	0.024402	0.001209
0.000947	9.66E-05	0	0.001044	0	0	0	0.001044	0.002359	0.001206
0.000102	6.79E-06	0	0.000109	0	0	0	0.000109	0.0004	2.05E-05
0.000227	0.002146	0.000207	0.00258	0.000138	3.69E-05	7.79E-05	0.002833	0.003653	0.011367
0.001076	0.000111	0	0.001187	0	0	0	0.001187	0.002775	0.002128
0.007716	0.001424	0	0.00914	0	0	0	0.00914	0.024698	0.00224
7.62E-05	0	0.000138	0.000214	2.86E-05	7.55E-06	2.02E-05	0.00027	0.001131	0

0.000519	0	0	0.000519	0	0	0	0.000519	0.000522	0
0	0	0	0	0	0	0	0	0	0
0.010404	0	0	0.010404	0	0	0	0.010404	0.104657	0

CO_STREX	CO_TOTEX	SOx_RUNE	SOx_IDLEX	SOx_STREX	SOx_TOTEX	NH3_RUNE	Fuel Consumption
0.000206	0.015347	1.71E-06	0	3.15E-08	1.74E-06	1.81E-06	0.018571
0	0.956752	0.019979	0.001354	0	0.021333	0.270553	201.2464
0	0.203735	0	0	0	0	0.013043	2.813852
4.642904	14.92292	0.03187	0	0.000913	0.032783	0.353619	349.6796
0	0.011462	6.19E-05	0	0	6.19E-05	8.42E-05	0.58358
0	0	0	0	0	0	0	0
0.029902	0.101705	0.000422	0	1.51E-05	0.000437	0.005328	4.664469
0.820987	2.620577	0.002832	0	0.000101	0.002933	0.029988	31.28729
0	0.000158	3.58E-07	0	0	3.58E-07	2.82E-07	0.003373
0	0	0	0	0	0	0	0
4.74E-05	0.000166	6.94E-07	0	2.59E-08	7.2E-07	9.77E-06	0.007682
2.220176	7.053583	0.015425	0	0.00046	0.015886	0.146162	169.4427
0	0.002312	3.61E-05	0	0	3.61E-05	3.66E-05	0.339926
0	0	0	0	0	0	0	0
0.002461	0.008588	3.59E-05	0	1.46E-06	3.74E-05	0.000505	0.398887
0.479542	1.054821	0.003486	1.34E-05	4.17E-05	0.003541	0.016984	37.76684
0	0.249691	0.002124	1.3E-05	0	0.002137	0.049512	20.1477
0.059163	0.116229	0.000464	1.83E-06	5.04E-06	0.00047	0.002042	5.018015
0	0.071163	0.000942	7.13E-06	0	0.000949	0.02097	8.943836
0.226327	1.387776	0.00014	0	1.47E-05	0.000155	0.000618	1.654828
2.460974	7.730513	0.016427	0	0.000548	0.016975	0.121677	181.0637
0	0.019101	0.000243	0	0	0.000243	0.000186	2.295398
0	0	0	0	0	0	0	0
0.002191	0.007315	3.01E-05	0	1.65E-06	3.18E-05	0.000424	0.338785
0.000626	0.028972	0.000294	0	5.54E-08	0.000294	0.000683	3.139812
0	0.003106	6.43E-05	0	0	6.43E-05	0.00075	0.606221
0.093168	0.207487	0.000544	3.46E-06	6.31E-06	0.000554	0.001341	5.908823
0	0.092006	0.003175	0.000134	0	0.003309	0.056777	31.21526
0	0.011741	0	0	0	0	0.003391	0.408946
0.019588	0.045199	0.000169	8.05E-07	1.38E-06	0.000172	0.000422	1.830675
0	0.003566	8.69E-05	2.4E-06	0	8.93E-05	0.001241	0.842176
0	0.000421	0	0	0	0	0.000124	0.014946
0.004868	0.019888	5.92E-05	3.5E-06	3E-07	6.3E-05	0.000337	0.672127
0	0.004903	0.000132	1.18E-05	0	0.000144	0.001491	1.356914
0	0.026938	0	0	0	0	0.00255	0.394688
0.002234	0.003366	7.31E-05	0	2.62E-07	7.33E-05	0.000182	0.782055

0	0.000522	6.8E-05	0	0	6.8E-05	0.001158	0.641006
0	0	0	0	0	0	0	0
0	0.104657	0	0	0	0	0.00395	0.490883

California Department of Parks and Recreation
Carnegie State Vehicular Recreation Area
Resource Management Area Program EIR

Appendix E: Special-Status Species List
Carnegie SVRA 2024 General Plan Update

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Table 2-9. Special-Status Plant Species Documented in and Near the Planning Area – Species Within the Planning Area

Species	California Rare Plant Rank*	Comments
Forked hareleaf *Lagophylla dichotoma*	1.B.1	The woodland communities and grasslands provide potentially suitable habitat for this species. It was observed in the planning area in 2003, but specific locations were not recorded because the species was not listed in the CRPR system at that time. Taxonomic changes made since the surveys in 2003 indicate the species identified in the planning area may actually be *L. diabloensis*, a CRPR 1B.2 species.
Chaparral harebell *Campanula exigua*	1B.2	This species grows in rocky places in chaparral, usually in serpentinite soils. Suitable habitat may be present in rocky outcrops within the planning area. The fire-prone chaparral hillsides within the planning area provide suitable habitat for this species. It was observed within the black sage – bush mallow vegetation community during the 2016 surveys. This area had burned during the August 2015 Tesla fire.
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	1.B.2	Openings in the scrub communities and moist areas in the woodland communities provide potentially suitable habitat for this species. It has been documented at six locations in the planning area, including two locations initially identified by Ecosystems West in 2003. The species was observed at one of these locations in 2014, but there were fewer plants occupying a much smaller area than recorded in 2003. This species was found at four additional locations in 2014.
Stinkbells *Fritillaria agrestis*	4.2	The scrub and woodland communities and the grasslands provide potentially suitable habitat for this species. It has been observed in the southwestern portion of the planning area within the blue oak woodland vegetation community. This species was not found during plant surveys conducted in 2003 (Ecosystems West 2004); however, an undescribed fritillary species was found. AECOM and TRA Environmental Sciences observed fritillary plants in areas where Ecosystems West had observed the undescribed fritillary; however, all of the fritillary plants present had aborted their flower buds and could not be positively identified. This species was positively identified during surveys conducted in 2016 (MIG 2016).
Sylvan scorzonella *Microseris sylvatica*	4.2	The woodland and scrub communities and grasslands provide potentially suitable habitat for this species. It has been documented in the planning area (State Parks 2000) This species was not found during plant surveys conducted in 2003 (Ecosystems West 2004) but was found during plant surveys in 2016 (MIG 2016).
Jepson's woolly sunflower *Eriophyllum jepsonii*	4.3	The scrub and woodland communities provide potentially suitable habitat for this species, which has been observed in many locations throughout the planning area, the most recent recorded observations made during the 2016 surveys (MIG 2016).
Fritillary *Fritillaria* sp.	None	Fritillary plants that do not correspond to any known species in California were observed in two locations in 2003. These plants do not have a state or federal status, but they may be a variant of stinkbells or an undescribed species. AECOM and TRA Environmental Sciences observed fritillary plants in areas where Ecosystems West had observed the undescribed fritillary; however, all of the fritillary plants present had aborted their flower buds and could not be positively identified.

Notes:
* California Rare Plant Rank (CRPR) definitions:
1.B.1: Rare, threatened, or endangered in California and elsewhere, and seriously endangered in California
1.B.2: Rare, threatened, or endangered in California and elsewhere, and fairly endangered in California
1.B.3: Rare, threatened, or endangered in California and elsewhere, but not very endangered in California
4.2: Uncommon and fairly endangered in California
4.3: Uncommon but not very endangered in California

Table 2-10. Special-Status Plant Species Documented in and Near the Planning Area–Species Documented Within 5 Miles of the Planning Area

Species	California Rare Plant Rank*	Comments
Large-flowered fiddleneck *Amsinckia grandiflora*	1.B.1	This species is federally and state listed as endangered. The woodland communities and grassland provide potentially suitable habitat.
Big tarplant *Blepharizonia plumosa*	1.B.1	This species is also a focal species in the *East Alameda County Conservation Strategy*. The grasslands provide potentially suitable habitat for this species, which was identified at 12 locations, west of the planning area, during surveys conducted in 2003 (Ecosystems West 2004) and in 2016 (MIG 2016).
Round-leaved filaree *California macrophyllum*	1.B.1	The woodland communities and grasslands provide potentially suitable habitat for this species. It has been documented in two specific locations within the planning area (Ecosystems West 2004), and there is a record with vague location information in the vicinity of the planning area. The two specific locations where this plant was previously recorded were revisited during separate surveys by AECOM and TRA Environmental Sciences in 2014 and this species was not relocated.
Diamond-petaled California poppy *Eschscholzia rhombipetala*	1.B.1	Alkaline clay soils in the grasslands provide potentially suitable habitat for this species. This species was observed north of Tesla Road in the vicinity of the planning area (CNDDB 2022).
Loma Prieta hoita *Hoita strobilina*	1.B.1	The woodland communities in the planning area provide potentially suitable habitat for this species, which is usually found in serpentinite soils in mesic areas. Soils of the Franciscan complex in the southern portion of the planning area may contain minor serpentine inclusions. There is record of this species being within 5 miles of the planning area.
Showy golden madia *Madia radiata*	1.B.1	The woodland communities and grasslands provide potentially suitable habitat for this species.
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	1.B.1	Two records exist of this species with vague location information indicating they may be within 5 miles of the planning area, but the species is believed to have been extirpated from Alameda and San Joaquin Counties.
Alkali milk-vetch *Astragalus tener* var. *tener*	1.B.2	Potentially suitable clay soils are present in the grasslands within the planning area.
San Joaquin spearscale *Atriplex joaquinana*	1.B.2	This species is also a focal species in the *East Alameda County Conservation Strategy*. Alkaline soils in the grasslands provide potentially suitable habitat for this species.
Big-scale balsamroot *Balsamorhiza macrolepis*	1.B.2	The scrub and woodland communities and grassland provide potentially suitable habitat for this species.
Lemmon's jewelflower *Caulanthus lemmonii*	1.B.2	The California juniper woodland and grasslands provide potentially suitable habitat for this species. A record exists of this species with vague information about a location in the vicinity of the planning area.
Mt. Hamilton fountain thistle *Cirsium fontinale* var. *campylon*	1.B.2	This species is found in serpentine seeps in chaparral, cismontane woodland, and annual grasslands. No serpentine seeps are present in the planning area.

Species	California Rare Plant Rank*	Comments
Talus fritillary *Fritillaria falcata*	1.B.2	This species is found in serpentinite soils, usually talus, in chaparral, cismontane woodland, and lower montane coniferous forest. Suitable serpentine habitat may be present, as serpentine indicator species have been found in the planning area and soils of the Franciscan complex in the southern portion of the planning area may contain minor serpentine inclusions.
Diablo helianthella *Helianthella castanea*	1.B.2	This species is found in rocky soils in a variety of upland habitat types, but most often in chaparral–oak woodland interface. Woodland and grassland communities provide potentially suitable habitat.
Brewer's western flax *Hesperolinon breweri*	1.B.2	This species is found in chaparral, cismontane woodland, and annual grasslands, usually on serpentine soils. This species was found near the planning area (Alameda-Tesla property) at one location in the planning area in 2014. This find represents a range extension for this species, which was previously known only from Napa, Solano, and Contra Costa Counties.
Shining navarretia *Navarretia nigelliformis* ssp. *radians*	1.B.2	The woodland communities and grasslands provide potentially suitable habitat for this species.
Sharsmith's onion *Allium sharsmithiae*	1.B.3	This species grows in serpentinite soils in chaparral and cismontane woodland. Suitable serpentine habitat may be present, as serpentine indicator species have been found in the planning area, and soils of the Franciscan complex in the southern portion of the planning area may contain minor serpentine inclusions.
Tehama County western flax *Hesperolinon tehamense*	1.B.3	This species grows in serpentinite soils in chaparral and cismontane woodland. Suitable serpentine habitat may be present, as serpentine indicator species have been found in the planning area and soils of the Franciscan complex in the southern portion of the planning area may contain minor serpentine inclusions.
Chaparral ragwort *Senecio aphanactis*	2.2	The scrub and woodland communities provide potentially suitable habitat for this species, which has been documented in two locations in the Alameda-Tesla property, adjacent to the planning area. Seven colonies of chaparral ragwort were found in these two locations in 2003 (Ecosystems West 2004). These locations were visited in 2014 by AECOM and TRA Environmental Sciences botanists and the species was not found. A reference population outside the planning area was visited and the species was not found. It is assumed that the species did not survive to bloom in 2014 because of poor climatic conditions. Before its regional discovery in 1998, the last record of this species in Northern California was a 1933 herbarium record from Nortonville Hills near Antioch (State Parks 2000). An additional occurrence was found in Alameda County in 2003 (Coyote Hills Regional Park).
Santa Clara thorn-mint *Acanthomintha lanceolata*	4.2	The scrub and woodland communities provide potentially suitable habitat for this species, which has been documented in three locations in the vicinity of the planning area during 2016 surveys (MIG 2016).
California androsace *Androsace elongata* ssp. *acuta*	4.2	The scrub and woodland communities and the grasslands provide potentially suitable habitat for this species, which has been documented in four locations in the vicinity of the planning area (MIG 2016).

Species	California Rare Plant Rank*	Comments
Carlotta Hall's lace fern *Aspidotis carlotta-halliae*	4.2	This species grows in chaparral and cismontane woodlands, generally in serpentinite soils. Suitable serpentine habitat may be present, as serpentine indicator species have been found in the planning area and soils of the Franciscan complex in the southern portion of the planning area may contain minor serpentine inclusions. This species has not been identified during any surveys or database searches within or near the planning area. Additionally, this species is generally restricted to Marin and Santa Clara Counties.
Phlox-leave serpentine bedstraw *Galium andrewsii* ssp. *gatense*	4.2	This species grows in chaparral and cismontane woodlands, generally in rocky and serpentinite soils. This species was observed in the vicinity of the planning area during the 2016 surveys (MIG 2016).
Michael's rein orchid *Piperia michaelii*	4.2	This species grows in chaparral and cismontane woodlands and was found growing along Corral Hollow Creek, in the vicinity of the planning area during the 2016 surveys (MIG 2016).
Santa Clara red ribbons *Clarkia concinna* ssp. *automixa*	4.3	The scrub and woodland communities provide potentially suitable habitat for this species. There is record of this species being within 5 miles of the planning area.

Notes:

* California Rare Plant Rank (CRPR) definitions:
  1.B.1: Rare, threatened, or endangered in California and elsewhere, and seriously endangered in California
  1.B.2: Rare, threatened, or endangered in California and elsewhere, and fairly endangered in California
  1.B.3: Rare, threatened, or endangered in California and elsewhere, but not very endangered in California
  4.2: Uncommon and fairly endangered in California
  4.3: Uncommon but not very endangered in California

Additional CRPR species have been documented in the 12-quadrangle search area but are not known to occur within 5 miles of the planning area. Although potentially suitable habitat is present for these species in the planning area, they are considered to have low potential to occur because they have not been found in the planning area during previous floristic surveys and known occurrences are located many miles away. These species are:

- Carlotta Hall's lace fern (*Aspidotis carlotta-halliae*)
- heartscale (*Atriplex cordulata* var. *cordulata*)
- brittlescale (*Atriplex depressa*)
- lesser saltscale (*Atriplex minuscula*)
- big-scale balsamroot (*Balsamorhiza macrolepis*)
- Mt. Diablo fairy-lantern (*Calochortus pulchellus*)
- Oakland star-tulip (*Calochortus umbellatus*)
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)
- dwarf soaproot (Chlorogalum pomeridianum var. *minus*)
- hispid salty bird's-beak (*Chloropyron molle* ssp. *hispidum*)
- palmate-bracted bird's-beak (*Chloropyron palmatum*)
- Brewer's clarkia (*Clarkia breweri*)
- small-flowered morning-glory (*Convolvulus simulans*)
- Recurved larkspur (*Delphinium recurvatum*)
- bay buckwheat (*Eriogonum umbellatum* var. *bahiiforme*)
- San Joaquin spearscale (*Extriplex joaquinana*)
- Diablo helianthella (*Helianthella castanea*)
- serpentine leptosiphon (*Leptosiphon ambiguus*)
- large-flowered leptosiphon (*Leptosiphon grandiflorus*)
- Mt. Hamilton coreopsis (*Leptosyne hamiltonii*)
- spring lessingia (*Lessingia tenuis*)
- Mt. Diablo cottonweed (*Micropus amphibolus*)

Special-Status Wildlife

The determination of which special-status wildlife species have the potential to occur in the planning area is based on:

- vegetation communities present on the site,
- USFWS species lists for Alameda and San Joaquin Counties,
- observations of special-status wildlife species from park personnel and ongoing monitoring activities, and
- studies conducted in the planning area and on adjacent parcels of land with similar habitat types.

A complete list of sources used for this analysis was provided previously in the introduction to the "Biotic Resources" section.

Twenty-six special-status wildlife species have been observed or are assumed present in the planning area based on the habitats present in the planning area, the area's location relative to the species' known occurrence range, and previous surveys or assessments performed there (Table 2-11). Figure 2-16 shows the distribution of CNDDB records of special-status wildlife occurrences documented within 5 miles of the planning area. Figure 2-17 shows the detections of special-status bird, reptile, and amphibian species made during HMS surveys conducted by State Parks. (Not all observations of special-status species made in the planning area have been reported to the CNDDB and specific location information is not available for all observations. Therefore, not all special-status species reported in the planning area are reflected in the species occurrence figures.)

Table 2-11. Special-Status Wildlife Species Observed or Assumed to Be Present in the Planning Area–Invertebrates

Species	Status*	Comments
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	This species may occur in portions of the planning area where elderberry (*Sambucus* sp.) shrubs are present. Elderberry shrubs have been documented within Corral Hollow Floodplain, Franciscan Loop West, and Kiln Canyon (State Parks 2005b; 2021). Potential valley elderberry longhorn beetle exit holes were observed within numerous elderberry shrubs along Franciscan Loop West and Kiln Canyon Road.

* Status:
FT = federally listed as threatened

Table 2-12. Special-Status Wildlife Species Observed or Assumed to Be Present in the Planning Area–Reptiles and Amphibians

Species	Status*	Comments
Alameda whipsnake *Coluber lateralis euryxanthus*	FT, CT	This species is found in coastal scrub, chaparral, and grassland habitats. It is known to occur in western San Joaquin County, southern Alameda County, and northern Santa Clara County. The planning area is within designated critical habitat for the species. A whipsnake determined to be a hybrid of chaparral whipsnake and Alameda whipsnake was observed at Carnegie SVRA in 2007 (State Parks n.d.[c]). Whipsnake observations were made in 2013 and 2014, but the species could not be positively identified during either of these sightings. It is assumed that Alameda whipsnake could occur in the planning area.
California glossy snake *Arizona elegans occidentalis*	CSC	This species is found in chaparral, sage-scrub, and alluvial soils. This species was observed along Tesla Road, adjacent to the planning area (Vollmar 2023).

Species	Status*	Comments
California red-legged frog *Rana draytonii*	FT, CSC	The ponds and backwaters of drainages such as Corral Hollow Creek provide potential habitat for this species. California red-legged frogs typically require water bodies with at least 22 weeks of water for breeding. Therefore, not all water features in the planning area provide suitable habitat for the species. Surveys conducted in 2018 documented California red-legged frog within Lime Kiln Pond in the southern portion of the planning area (State Parks 2019a). The planning area is within designated critical habitat for this species.
California tiger salamander - central California DPS *Ambystoma californiense* pop. 1	FT, CT	California tiger salamanders in the planning area are considered part of the Central Valley distinct population segment. This species utilizes vernal pools and other seasonal wetlands for breeding and upland grasslands during the dry season. California tiger salamanders have been documented in Lower Juniper Pond within the planning area and several additional ponds just outside of the planning area (State Parks 2015a; 2019).
Coast horned lizard *Phrynosoma blainvillii*	CSC	This species is found throughout California west of the Sierra Nevada, with the exception of extreme northwest, in a variety of scrub and grassland habitats. California horned lizard has been incidentally observed in the planning area (State Parks 2015a).
Foothill yellow-legged frog – central coast DPS *Rana boylii* pop. 4	CE; petitioned for listing under ESA. USFWS has determined that listing may be warranted	Streams and creeks in the planning area provide potential habitat for this species. Surveys for foothill yellow-legged frogs have documented occurrences of frogs in Corral Hollow Creek in the vicinity of the planning area the in 2000 (State Parks 2000, n.d.[f]. Vollmar 2023). This species was not observed during 2018 surveys but is likely that they are still present within the planning area (State Parks 2019a).
San Joaquin whipsnake *Coluber flagellum ruddocki*	CSC	The species is found in scrubland, woodland, and grassland habitats throughout California, and this subspecies is found in California from the Sacramento Valley south to the Grapevine area. This species has been observed in the planning area (State Parks 2015a).
Silvery legless lizard *Anniella pulchra*	CSC	This subspecies is found from the central portion of California west to the coast. Its habitat is typically sandy soils in chaparral, pine-oak woodland, and riparian habitats. This species has not been documented to occur in the planning area. However, the planning area contains suitable habitat for this species.
Western pond turtle *Actinemys marmorata*	CSC petitioned for listing under ESA	Perennial ponds in and near the planning area provide potential habitat for this species. Western pond turtles have been documented to occur in Kiln Canyon Basin. This species was observed within the Tesla Stock Pond adjacent to the planning area but was not observed within the planning area. A record of this species is located north of Tesla Road near the planning area (Vollmar 2023).
Western spadefoot *Spea hammondii*	CSC; petitioned for listing under ESA. USFWS has determined that listing may be warranted	Seasonal pools in the planning area provide potential breeding habitat for this species and annual grassland habitats provide potential upland refugia in the planning area. This species was observed at Tyson's Pond during 2018 surveys. While there was no evidence of breeding at this location, Tyson's Pond is the only pond within the planning area that retains water long enough to support breeding (State Parks 2019a). There are multiple records of this species along Corral Hollow Creek floodplain within and adjacent to the planning area. The nearest CNDDB Occurrence number is #152.

Notes: ESA = federal Endangered Species Act; HMS = Habitat Monitoring System; USFWS = U.S. Fish and Wildlife Service

* Statuses:
CSC = California species of special concern (California Department of Fish and Wildlife [CDFW])
CT = state-listed as threatened
CE = state-listed as endangered
FE = federally listed as endangered
FT = federally listed as threatened

Table 2-13. Special-Status Wildlife Species Observed or Assumed to Be Present in the Planning Area–Birds

Species	Status*	Comments
Burrowing owl *Athene cunicularia*	CSC (breeding sites and some wintering sites)	Annual grassland habitats in the planning area could potentially support burrowing owls. A burrowing owl was observed adjacent to the planning area during reconnaissance surveys within the Alameda-Tesla property. Burrowing owls have also been observed on the adjacent LLNL Site 300.
California horned lark *Eremophila alpestris actia*	CSC	This species occurs in annual grassland and open woodland habitats throughout the Central Valley. Horned larks are known to occur in the planning area (State Parks 2015a).
Ferruginous hawk *Buteo regalis*	W	Ferruginous hawks winter in California. In the planning area, this species has been observed foraging in grassland areas during HMS surveys in 2006 (State Parks n.d.[b]). This species was not observed within HMS surveys conducted in 2011 through 2014 (State Parks 2015a).
Golden eagle *Aquila chrysaetos*	BE, CFT (nesting and wintering)	This species forages in open grassland habitats and nests in large trees, snags, and transmission towers. The species is relatively common in the Alameda-Tesla property adjacent to the planning area, where it is known to nest (State Parks n.d.[f]) and is frequently detected during HMS annual monitoring surveys. Golden eagle pairs have been documented foraging and nesting in the vicinity of Carnegie SVRA for several years. In 2023, a nest pair was observed incubating in an alternative nest site near the planning area, about 0.3 miles south of their typical nest within the transmission tower (Hunt 2002; Hunt and Hunt 2006, 2013).
Grasshopper sparrow *Ammodramus savannarum*	CSC (nesting)	This species is generally associated with open grassland habitats containing patches of bare ground. It nests on the ground. Grasshopper sparrow was detected in the planning area during HMS surveys in 2012, and it could nest in the planning area.
Loggerhead shrike *Lanius ludovicianus*	CSC (nesting)	This species occurs in annual grassland and open woodland habitats. Loggerhead shrikes are regularly detected on HMS survey transects throughout the planning area.
Northern harrier *Circus cyaneus*	CSC (nesting)	Annual grassland habitats in the planning area are suitable foraging and nesting habitat for this species. This species is known to occur in the vicinity of the planning area (State Parks 2005a; State Parks 2015a).
Olive-sided flycatcher *Contopus cooperi*	CSC (nesting)	This species breeds primarily in late-successional coniferous forests and forages mostly in openings or at forest edges. Olive-sided flycatcher was observed in the planning area during HMS surveys in 2011, but the planning area does not contain the species' preferred breeding habitat, so it is not expected to nest in the planning area.
Swainson's hawk *Buteo swainsoni*	CT	This species requires large, open grasslands with suitable nest trees; nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, lightly grazed pastures/crops, irrigated pastures, and grain fields. This species has been documented nesting more than 7 miles northeast of planning area (CNDDB 2022). Riparian areas where large trees exist in the planning area could provide habitat.
Tricolored blackbird *Agelaius tricolor*	CT	This species is found in freshwater marsh and other emergent wetland habitats. It forages in open grasslands and agricultural areas. Suitable nesting habitat for this species occurs along Corral Hollow Creek, and this species has been observed within the planning area, but specific location information was not recorded.

Species	Status*	Comments
White-tailed kite *Elanus leucurus*	CSC, CFT (nesting)	This species forages in open grassland habitats and nests on the edges of riparian habitats and open woodlands. This species has been documented in the planning area during HMS surveys in 2011.
Yellow warbler *Setophaga petechia*	CSC	This species occurs in riparian habitat close to water in streams or wet meadows. Yellow warbler was observed during HMS surveys in 2010, 2011, 2013, and 2014, and it could nest in riparian habitat in the planning area.

Notes: HMS = Habitat Monitoring System
* Statuses:
BE = protected by Bald Eagle and Golden Eagle Protection Act
CFT = California fully protected species
CSC = California species of special concern (California Department of Fish and Wildlife [CDFW])
CT = state-listed as threatened
W = CDFW watch list

Some of the stock ponds in the planning area support special-status species, namely western pond turtle, western spadefoot, California red-legged frog, and California tiger salamander. These species have persisted at Carnegie SVRA despite ongoing OHV activity. However, because of their status, specific management actions may be required in some areas of the planning area known to support special-status species.

Elderberry shrubs are present at the SVRA. Elderberry shrubs with branches greater than 1 inch in diameter are considered potential habitat for the valley elderberry longhorn beetle, an invertebrate that is federally listed as threatened. Surveys conducted in 2021 found potential valley elderberry longhorn beetle exit holes in elderberry shrubs in Franciscan Loop West and along Kiln Canyon Road.

HMS surveys identified various mammals including Yuma myotis, fringed myotis, and hoary bat within the Alameda-Tesla property adjacent to the planning area. While these species could be found within the planning area, they are not considered in Table 2-14 as they do not meet the requirements of “special status species” as defined in the introduction of Section 2.3.2.3

Table 2-14. Special-Status Wildlife Species Observed or Assumed to Be Present in the Vicinity of Planning Area–Mammals

Species	Status*	Comments
American badger *Taxidea taxa*	CSC	This species is found in a variety of grassland and shrubland habitats. This species has been observed in the planning area during ongoing monitoring by State Parks as part of the HMS (State Parks n.d.[c]).
Pallid bat *Antrozous pallidus*	CSC	This species occurs throughout California in a variety of desert scrub, grassland, and coniferous forest habitats. Suitable roosting habitat exists in the Tesla Coal Mine and Lime Kiln Cave in the vicinity of the planning area and possibly in rock outcroppings throughout the planning area. This species was detected at Tyson’s Pond and Lime Kiln Cave during summer 2014 and acoustic surveys conducted in 2016 (de Silva, pers. comm. 2014; MIG 2016).
San Joaquin kit fox *Vulpes macrotis mutica*	FE, CT	This species’ range extends from the southern San Joaquin Valley near Bakersfield north to Alameda County. In the planning area, it could potentially occur within grassland habitats. San Joaquin kit foxes have been documented in the planning area in 2002 (CNDDB 2022) and USFWS expects that this species is present at least periodically (USFWS 2022).

Species	Status*	Comments
San Joaquin pocket mouse *Perognathus inornatus*	BLM	This species occurs in open grassland in the Central Valley and extending into the Salinas Valley. The San Joaquin pocket mouse has been documented in the planning area during small mammal trapping as part of the HMS and studies conducted by State Parks in 2020 (State Parks n.d.[c]; 2020).
Townsend's big-eared bat *Corynorhinus townsendii*	CSC	This species occurs in a variety of habitats in California including desert scrub, riparian areas, grasslands, and coniferous forests. Bat-specific acoustic surveys conducted in 2016 did not detect this species anywhere within the planning area. Historically and recently, the Tesla Mine near the planning area provided roosting habitat for Townsend's big eared bat. It is assumed that the species can forage in the planning area at least periodically, given its distribution in California. Suitable roosting habitat exists in the Tesla Coal Mine near the planning area and Lime Kiln Cave within the planning area and possibly in rock outcroppings in the planning area. The 2008 and 2014 HMS reports mentions the species as occurring in the planning area (State Parks n.d.[d]; State Parks 2015a). This species was identified in the Tesla Coal Mine by State Parks staff members in September 2014 (de Silva, pers. comm., 2014).
Western mastiff bat *Eumops perotis californicus*	CSC	This species occurs in a variety of habitats including ponderosa pine forests, desert scrub, and oak woodlands. It roosts in rock outcrops. This species was detected at Tyson's Pond during acoustic surveys conducted in 2016. Rock outcroppings in the planning area may provide suitable roost habitat.

Notes: CESA = HMS = Habitat Monitoring System

* Statuses:

CSC = California species of special concern (California Department of Fish and Wildlife [CDFW])

CT = state-listed as threatened

FE = federally listed as endangered

FT = federally listed as threatened

California Tiger Salamander

California tiger salamander larvae were found in Tyson's Basin Pond in the planning area during the 2018 dipnet surveys. This species has also been detected in North Parcel, Mitchell Ravine, and Mobile Home Ponds (State Parks n.d.[f]) immediately to the west of the planning area. Several California tiger salamander larvae were also found in Lower Juniper Pond during HMS surveys conducted in 2011 and in Tyson's Pond during 2018 surveys (State Parks 2015a; State Parks 2019a).



California tiger salamanders have been found in ponds in the planning area during regular habitat monitoring activities.

California Red-legged Frog

California red-legged frogs are known to occur in Lime Kiln Pond within the planning area. Additionally, surveys conducted at the Carnegie SVRA in 2003 resulted in several observations of California red-