SAN BERNARDINO COUNTY
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION
ENVIRONMENTAL CHECKLIST FORM

This form and the descriptive information in the application package constitute the contents of Initial Study pursuant to County Guidelines under Ordinance 3040 and Section 15063 of the State CEQA Guidelines.

PROJECT LABEL:

APNs:	0466-021-01-0000	***USGS Quad:***	Wild Crossing (1973, photorevised 1993)
Applicant :	Lockheed Martin Aeronautics Company 1011 Lockheed Way Palmdale, CA 93599	***T, R, Section***	**T08N, R04W, Section 04**
Location	17452-Wheeler Road, Helendale, CA 92342	***Thomas Bros***	
Project No	P201900193	***Community Plan:***	None
Rep	Tetra Tech, Inc. 301 E. Vanderbilt Way, Suite 450 San Bernardino, CA 92408	***LUZD:***	Resource Conservation (RC)
Proposal	Construction of a new 19,395-square foot warehouse	***Overlays:***	None

PROJECT CONTACT INFORMATION:

Lead Agency: County of San Bernardino
Land Use Services Department
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Contact Person: Ms. Suzanne Peterson
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Project Sponsor Ms. Reenu Ko
Lockheed Martin Aeronautics Company
1011 Lockheed Way
Palmdale, CA 93599

PROJECT DESCRIPTION:

PROJECT LOCATION

The proposed warehouse project is located within Assessor Parcel Number (APN) 0466-021-01 in the southern region of the Helendale Radar Measurement Facility (HRMF), a fenced facility located at 17452-Wheeler Road, Helendale, California, 92342 in San Bernardino County. (Figure 1). The facility is located on approximately 9 square miles (5,760 acres) of land, 5 miles north of the community of Helendale and just west of the Mojave River. The entrance to the HRMF is from Wheeler Road. Based on the topographic map, the property is located at approximately 2,500 feet above mean sea level (USGS, Wild Crossing 7.5 Quadrangle, 1973, Photo revised in

1993). The regional topographic gradient in the area is toward the south. The proposed project would be constructed in an area of the property that was likely disturbed during construction of the facility in the early 1980's. Since then, no disturbance of the project area has occurred, and native desert plants have become established and matured.

PROJECT BACKGROUND

The HRMF is a Lockheed Martin Aeronautics Company facility that is used to test radar signatures of various models. The HRMF began operation in the early 1980's and is currently comprised of a main operation complex and a 7,500-foot paved test range with three in-line measurement positions identified as pits due to their location underground characteristics. The HRMF is under 24-hour active security and regular patrols around the facility are conducted. The proposed action is to construct a new19,395-square foot temperature-controlled secure warehouse which would be used to store models used for testing at the HRMF (Figure 1).

PROJECT CHARACTERISTICS

The project would consist of constructing a 19,395-square foot warehouse to be designated as Building 944 with a proposed height of 64 feet, 7 inches (Figure 2). The main purpose of the proposed project is to create additional working and storage space to support current operations. The construction activities include earthwork, grading, paving, and construction of a pre-engineered building with attached utility building, offices and bathrooms. The building would be equipped with power, compressed air, a 15-ton crane, high volume air conditioning (HVAC), electrical power distribution, building automation, access control, security alarms, fire alarms, and a fire suppression system. The building would require utility connections to data, telephone, electrical (high voltage), natural gas, domestic water, and a new septic system. Construction of the warehouse and associated pavement would result in a total of approximately 1.96 acres of permanent impacts to desert habitat. Additional temporary impacts would occur as a result of construction of the septic system, stormwater management and drainage and other associated facilities.

Construction Schedule
Construction of Building 944 is proposed to begin in January 2020 and conclude in October 2020. Construction would occur Monday through Friday, 6:00 AM to 2:30 PM but possibly during all daylight hours depending on the time of the year. No work would occur at night or on weekends. The following is an overview of construction-related activities, the estimated number of days to complete each activity and number of estimated personnel required for the activity.

Activity	Days	Number of Site Personnel
Site Preparation	6	6
Grading	1	5
Building/Structure Construction	200-225	20-30
Trenching	20-30	6-8
Paving	3	5

The following equipment would be used during construction of Building 944:

- DC dozer
- Water trucks
- Bottom dumper
- Street sweepers
- 966 loader
- 140H blade scraper
- Scissor lifts
- Fork lifts
- Boom lifts
- Skip loaders
- Back hoes
- Concrete trucks
- Roller compactor
- Rubber tire roller

A total of 16,209 cubic yards of fill would be used during construction and would be acquired from soil that was stockpiled during the excavation and construction of Pit 3 in the early 1980's (Figure 3). The soil would be excavated, loaded and transported along an existing dirt road parallel to the test range to the project site (Figure 3).

Operations and Maintenance Activities

Once construction is complete, the warehouse would be used to store large test articles and models. When required, test articles would be moved with appropriate lifts to testing locations within the range using existing paved roads. Routine maintenance at Building 944 would include crane testing and routine maintenance of hangar door and equipment within the warehouse such as the air conditioning system.

Surrounding Land Uses and Setting

The following is a summary of existing land uses and zoning district for the project and adjacent areas to the project.

Existing Land Use and Land Use Zoning Districts		
Location	**Existing Land Use**	**Land Use Zoning District**
Project Site	Industrial	RC-Resource Conservation
North	Undeveloped lands	RC-Resource Conservation
South	Rural residential	RL-Rural Living 1, du/2.5
East	Undeveloped lands	RC-Resource Conservation
West	Undeveloped lands	RC-Resource Conservation

du: Dwelling Units

ADDITIONAL APPROVAL REQUIRED BY OTHER PUBLIC AGENCIES

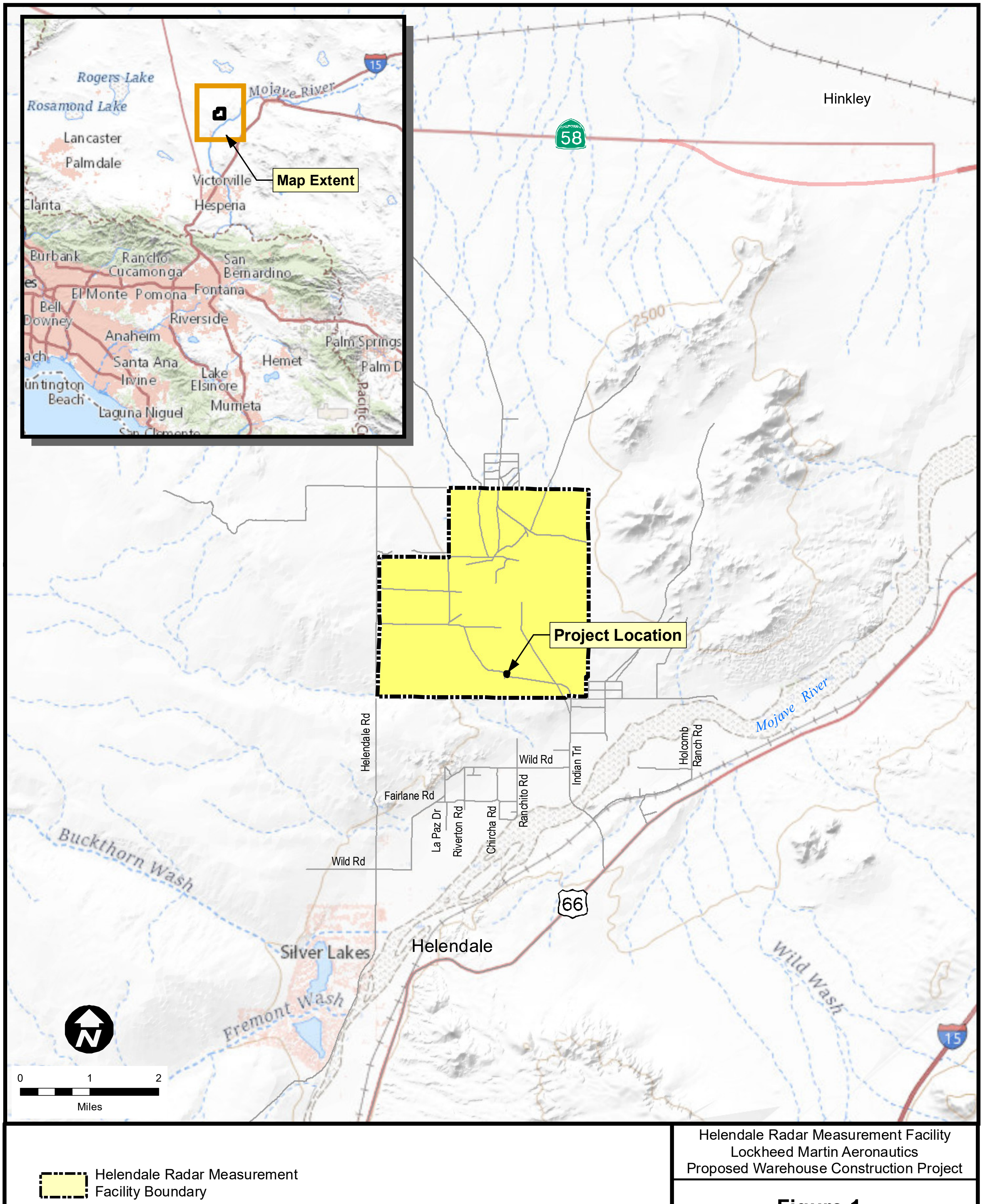
Federal: None

State of California: None

County of San Bernardino: Land Use Services Department-Building and Safety, Public Health-Environmental Health Services, Special Districts, and Public Works

Regional: Mojave Desert Air Quality Management District

Local: None

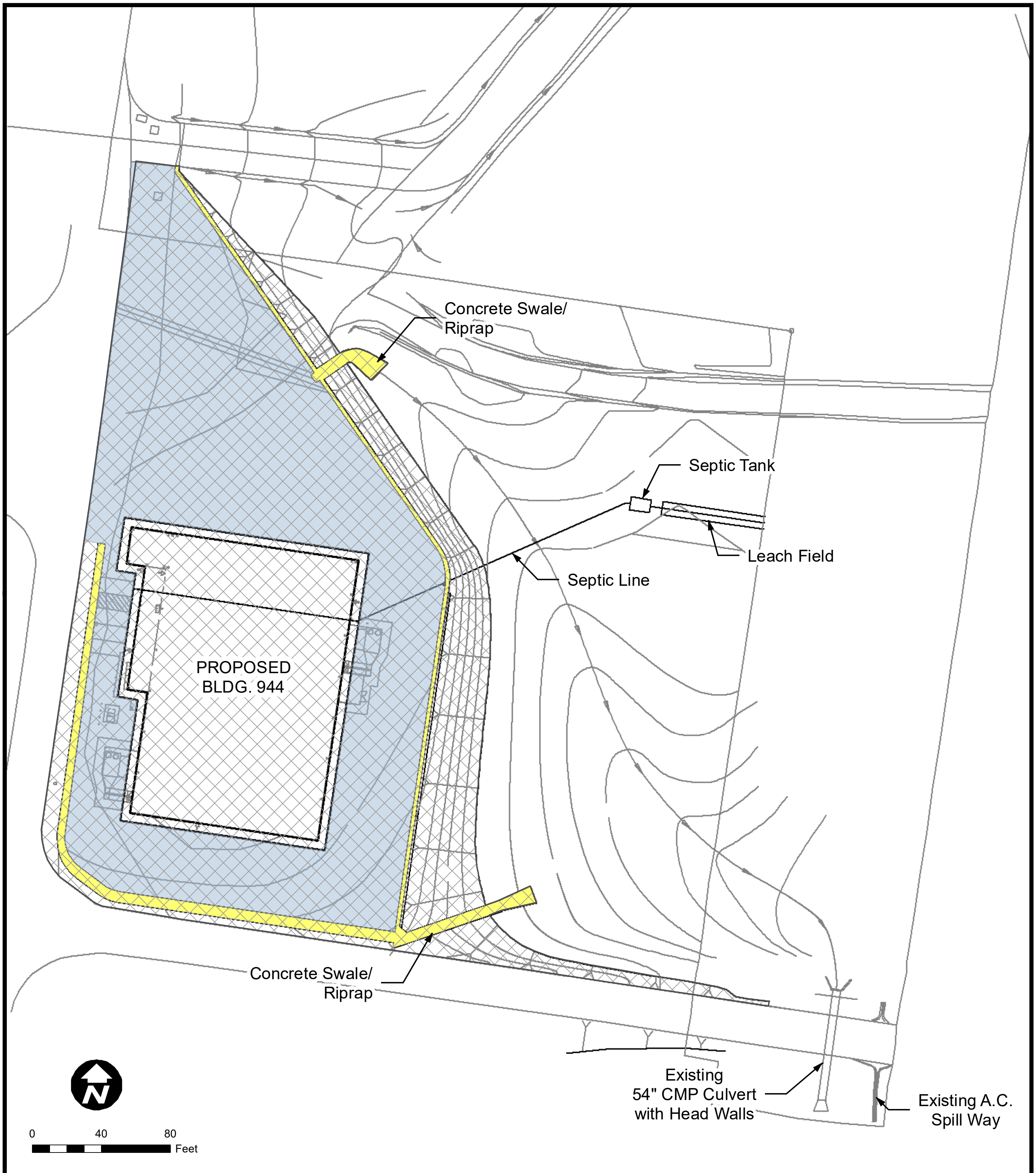


Helendale Radar Measurement Facility
Lockheed Martin Aeronautics
Proposed Warehouse Construction Project

Figure 1

Regional Setting

TETRA TECH



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Permanent Impacts (1.96 acres)

Asphalt (43,659 sq. ft./~1.0 acre)

Concrete (3,980 sq. ft./~0.09 acre)

Helendale Radar Measurement Facility
Lockheed Martin Aeronautics
Proposed Warehouse Construction Project

Figure 2

Site Plan

TETRA TECH

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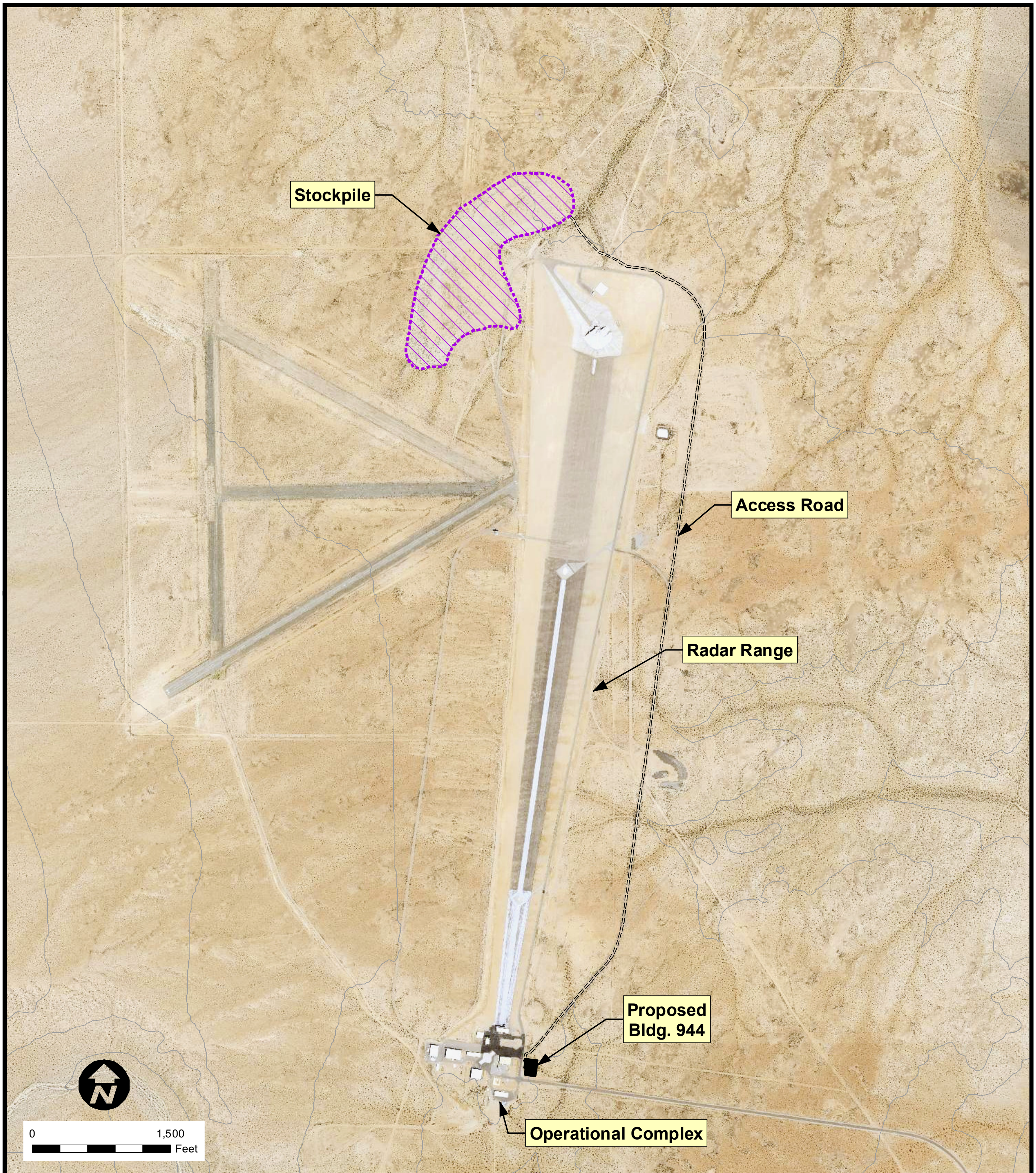

Stockpile Location

Proposed Building Location

Helendale Radar Measurement Facility
Lockheed Martin Aeronautics
Proposed Warehouse Construction Project

Figure 3

Soil Stockpile Location

TETRA TECH

Site Photographs
Proposed Warehouse Construction Project
Helendale Radar Measurement Facility

Photograph 1:

View of the project study area from the northwestern corner. View to the southeast.

Photograph 2:

View of project study area from the southwestern corner. View to the northeast.

Site Photographs
Proposed Warehouse Construction Project
Helendale Radar Measurement Facility

Photograph 3: **View of the project study area from an adjacent dirt road on the northeastern side of the study area. View to the southeast.**	

Photograph 4: **View of the project study area. View to the southeast.**	

CONSULTATION WITH CALIFORNIA NATIVE AMERICAN TRIBES

Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentially, etc.?

On September 13, 2019, the County of San Bernardino initiated Consultation with Native American tribes that have traditional and cultural affiliations with the region that includes the project area. Tribal consultation was concluded on December 9, 2019. Section XVII, Tribal Cultural Resources, provides details on the consultation process. Mitigations to reduce impact to tribal resources to a less than significant level are identified in Section V, Cultural Resources and Section XVII.

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

EVALUATION FORMAT

This Initial Study is prepared in compliance with the California Environmental Quality Act (CEQA) pursuant to Public Resources Code Section 21000, et seq. and the State CEQA Guidelines (California Code of Regulations Section 15000, et seq.). Specifically, the preparation of an Initial Study is guided by Section 15063 of the State CEQA Guidelines. This format of the study is presented as follows. The project is evaluated based on its effect on 20 major categories of environmental factors. Each factor is reviewed by responding to a series of questions regarding the impact of the project on each element of the overall factor. The Initial Study checklist provides a formatted analysis that provides a determination of the effect of the project on the factor and its elements. The effect of the project is categorized into one of the following four categories of possible determinations:

Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant	No Impact

Substantiation is then provided to justify each determination. One of the four following conclusions is then provided as a summary of the analysis for each of the major environmental factors.

1. **No Impact**: No impacts are identified or anticipated and no mitigation measures are required.
2. **Less than Significant Impact**: No significant adverse impacts are identified or anticipated and no mitigation measures are required.
3. **Less than Significant Impact with Mitigation Incorporated**: Possible significant adverse impacts have been identified or anticipated and the following mitigation measures are required as a condition of project approval to reduce these impacts to a level below significant. The required mitigation measures are: (List of mitigation measures)

4. **Potentially Significant Impact**: Significant adverse impacts have been identified or anticipated. An Environmental Impact Report (EIR) is required to evaluate these impacts, which are (List of the impacts requiring analysis within the EIR).

At the end of the analysis the required mitigation measures are restated and categorized as being either self- monitoring or as requiring a Mitigation Monitoring and Reporting Program.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below will be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture and Forestry Resources	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Energy
☐	Geology/Soils	☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials
☐	Hydrology/Water Quality	☐	Land Use/Planning	☐	Mineral Resources
☐	Noise	☐	Population/Housing	☐	Public Services
☐	Recreation	☐	Transportation	☐	Tribal Cultural Resources
☐	Utilities/Service Systems	☐	Wildfire	☐	Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation, the following finding is made:

☐	The proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION shall be prepared.
☒	Although the proposed project could have a significant effect on the environment, there shall not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION shall be prepared.
☐	The proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	The proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	Although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature: (prepared by Name , Planner) Date

Signature:(Name , Supervising Planner) Date

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
I.	***AESTHETICS*** – Except as provided in Public Resources Code Section 21099, would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b)	Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c)	In non-urbanized 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 a 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?	☐	☐	☒	☐
d)	Create a new source of substantial light or glare, which will adversely affect day or nighttime views in the area?	☐	☐	☐	☒

SUBSTANTIATION: *(Check ☐ if project is located within the view-shed of any Scenic Route listed in the General Plan):*
San Bernardino General Plan, 2007*; *Submitted Project Materials

a) **No Impact.** The project site is undeveloped previously disturbed desert habitat. There are no unique or unusual features on the project site or within adjacent industrial development. The warehouse height will be a maximum height of 64 feet, 7 inches and of similar height to existing warehouses within the facility. The closest scenic vista is found associated with Historic Route 66/National Trails Highway located more than three miles to the east. As a result of the distance and intervening topography between the proposed project area and Route 66/National Trails Highway, no impact to the traveling public view would occur. No impact would occur, and no mitigation is required.

b) **No Impact.** The proposed project would not substantially damage scenic resources including but not limited to trees, rock outcropping, and historic buildings within a state scenic highway. The closest scenic highway is Route 66/National Trails Highway is more than three miles to the east. No impact would occur, and no mitigation is required.

c) **Less than Significant.** The project may be visible to residences living on the southern border of the larger facility boundary. The new warehouse would be consistent with existing facility structures and would not a be unique design or character. The closest residence is 0.4 miles to the southwest of the project area. As a result of the distance and intervening topography between the proposed project area and the closest residence, a less than significant impact would occur.

d) **No Impact.** The proposed project would be used to store test articles. No substantial lighting would be required for the warehouse and would not cause a new source of substantial light or glare, which will adversely affect day or nighttime views in the area. No impacts would occur, and no mitigation is required.

Therefore, no significant adverse impacts to aesthetics are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
II.	**AGRICULTURE AND FORESTRY RESOURCES** - In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒

d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

SUBSTANTIATION: *(Check ☐ if project is located in the Important Farmlands Overlay):*

San Bernardino County General Plan, 2007*; *California Department of Conservation Farmland Mapping and Monitoring Program

a-e) **No Impact**. The proposed project site is not identified or designated as Prime Farmlands, Unique Farmland, or Farmland of Statewide Importance as identified California Department of Conservation (2019). There are no agricultural uses at the site or the surrounding portion of the property. The project area and adjacent facilities are not under a Williamson Act land conservation contract. The proposed project will not conflict with existing zoning or cause rezoning of forest land as the project site is not zone forest land and is not timberland as defined by Public Resources Code section 4562, or timberland zone Timberland Protection. The site will not result in the loss of forest land or the conversion of forest land to non-forest use as the proposed project site is not forest land. No impacts would occur, and no mitigation is proposed.

Therefore, no significant adverse impacts to agriculture and forestry resources are identified or anticipated and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
III.	**AIR QUALITY -** Where available, the significance criteria established by the applicable air quality management district or air pollution control district might be relied upon to make the following determinations. Would the project:				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b)	Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐

d)	Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?	☐	☐	☒	☐

SUBSTANTIATION:	*(Discuss conformity with the Mojave Desert Air Quality Management Plan, if applicable):*

San Bernardino County General Plan, 2007*; *Appendix A

a) **Less than Significant Impact.** To pursue improvement of air quality in the San Bernardino County portion of the Mojave Desert Air Quality Management District (MDAQMD), the MDAQMD has prepared a set of attainment plans, which present comprehensive pollution control strategies aimed at attaining San Bernardino County's ozone standards as required by the Clean Air Act Amendments of 1990. These strategies are developed, in part, based on regional population, housing, and employment projections reflected in local general plans. A project is consistent with local air quality plans if it is consistent with the local general plan. A proposed project would be inconsistent with a general plan if it resulted in a land use re-designation, causing a general plan amendment and an increase in population beyond what is budgeted.

The proposed project site is located in the Helendale area of the Desert Region within San Bernardino County. The land use of the proposed project site is designated as Resource Conservation (RC) in the County of San Bernardino General Plan and Title 8 of the San Bernardino County Code, which includes national parks, military bases, conservation, areas and land owned by federal and state agencies. The proposed project would not result in either a land use re-designation nor an increase in population. A maximum of 20 to 30 workers would be employed during construction of the warehouse. The main purpose of the proposed project is to create additional working and storage space to support current operations. Thus, construction and operation of the proposed project would not conflict with MDAQMD air quality plans. Since the proposed project is consistent with the County of San Bernardino's General Plan, a less than significant impact would occur. No mitigations are required.

b) **Less than Significant Impact.** CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (14 CCR Section 15355).

The intent of the proposed project is to add working space with increase to neither work force nor operation activities. The proposed project will generate temporary emissions of criteria pollutants during its construction stage but will not add significant emissions to current operations. Construction activities and emissions will be temporary and will stop once the proposed project is completed. Operation emissions would be minimal and result only from energy used (e.g., heating) and upkeep maintenance conducted (e.g., touch up architectural coating) at Building 944 and repair of paved areas.

Air emissions resulting from construction and operation activities of the proposed project were calculated based on a scenario where each equipment piece in each phase runs simultaneously. This approach assumes maximum daily operating time for all equipment assigned in each construction phase (e.g., Site Preparation, Grading, and Paving). Construction emissions were calculated using the California Emissions Estimator Model (CalEEMod). CalEEMod is widely accepted to provide a uniform platform to estimate potential emissions resulting from construction and operation activities of land use projects.

The model uses pre-programed algorithms to calculate emissions based on data entered. The algorithms are designed to take information such as project size; construction length; vehicle and equipment types; number of vehicle trips and lengths; and equipment operating hours to calculate emissions of criteria pollutants and greenhouse gases. Emission calculations provided in this document factor dust control measures such as those prescribed in MDAQMD Rule 403.2 and off-road vehicles using on average Tier 3 engines.

CalEEMod input values and calculated air emission results for the proposed project are provided as Appendix A and summarized in Tables 1 and 2.

Table 1
Project Construction Emissions of Criteria Pollutants

Project Phase	VOCs	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Construction 2021 Annual (tons)/Daily (lbs)	0.3/48.8	1.3/27.2	1.2/14.9	0.0/0.1	0.1/3.1	0.1/1.8
Threshold of Significance Annual (tons)/Daily (lbs)	25/137	25/137	100/548	25/137	15/82	15/82
Significant?	No	No	No	No	No	No

Notes:
CO carbon monoxide
lbs pounds NOx oxides of nitrogen (nitric oxide and nitrogen dioxide)
PM_{10} respirable particulate matter less than 10 microns in diameter
$PM_{2.5}$ respirable particulate matter less than 2.5 microns in diameter
SOx oxides of sulfur (sulfur dioxide and sulfur trioxide)
VOCs volatile organic compounds

Construction emissions of the proposed project do not exceed the MDAQMD established daily thresholds.

Table 2
Project Operation Emissions of Criteria Pollutants

Project Phase	VOCs	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Operation Annual (tons)/Daily (lbs)	0.1/0.6	0.0/0.2	0.0/0.1	0.0/0.0	0.0/0.0	0.0/0.0
Threshold of Significance Annual (tons)/Daily (lbs)	25/137	25/137	100/548	25/137	15/82	15/82
Significant?	No	No	No	No	No	No

Notes:
CO carbon monoxide
lbs pounds
NOx oxides of nitrogen (nitric oxide and nitrogen dioxide)
PM_{10} respirable particulate matter less than 10 microns in diameter
$PM_{2.5}$ respirable particulate matter less than 2.5 microns in diameter
SOx oxides of sulfur (sulfur dioxide and sulfur trioxide)
VOCs volatile organic compounds

Operation emissions of the proposed project do not exceed the MDAQMD established daily thresholds.

Construction and operation emissions from the proposed project will contribute to overall emissions from construction and operation of other projects in the area. However, the project contributions neither impact emissions budgeted in the General Plan nor exceed MDAQMD established thresholds. A less than significant impact would occur. No mitigations are required.

c) **Less than Significant Impact**. The proposed project is not expected to expose sensitive receptors to substantial pollutant concentration during its construction and operation. During construction, emissions from off-road vehicles will be generated but odors associated with these emissions are temporary and not anticipated to impact workers in nearby buildings. Operation of the proposed project would not create either additional operation activity, processes, and odors. A less than significant impact would occur. No mitigations are required.

d) **Less than Significant Impact.** Construction and operation of the proposed project is not anticipated to create objectionable odors, and sources of objectionable odors are not identified near the proposed project site. A less than significant impact would occur. No mitigations are required.

Therefore, no significant adverse impacts to air quality are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
IV.	**BIOLOGICAL RESOURCES -** Would the project:				
a)	Have substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☒	☐
c)	Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d)	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?	☐	☐	☐	☒

e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☐	☒

SUBSTANTIATION: *(Check if project is located in the Biological Resources Overlay or contains habitat for any species listed in the California Natural Diversity Database ☐):*

2019 Habitat Reconnaissance Survey (Appendix B), 2007 Biological Opinion for the HRMF (Appendix C)

a) **Less than Significant with Mitigations Incorporated.** The project area is undeveloped and supports relatively undisturbed native habitat that is dominated by creosote (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*) scattered across the landscape. During construction of the HRMF in the early 1980's, the study area was disturbed, likely during the construction of adjacent paved roads found on the southern and eastern borders of the study area.

In 2011, focused surveys for desert tortoise (*Gopherus agassizii*), a federal and state listed as threatened reptile, was conducted May 9 through 17, 2011 at the entire 5,760-acre HRMF property (Tetra Tech, Inc. 2011). The HRMF is located adjacent to, but outside the Fremont Kramer Desert Wildlife Management Area (DWMA). The Fremont Kramer DWMA provides habitat for threatened or endangered species such as desert tortoise. Desert tortoise have been undergoing a decline in population due to a number of factors. These include loss or destruction of habitat, killing or harming of animals in the wild, collection of individual animals, raven predation and disease. The California Department of Fish and Wildlife listed the tortoise as threatened on June 22, 1989. The tortoise was emergency listed as endangered by the United States Fish and Wildlife (USFWS) on August 4, 1989. The USFWS listing was later changed to threatened. Both listings were made on the basis of declining populations due to the factors listed above. The discovery that the tortoise was rapidly disappearing throughout its range as a result of a disease known as Upper Respiratory Disease Syndrome (URDS) was a critical part of the listing decisions.

Focused surveys for desert tortoise of the entire HRMF (which included the project area for the proposed warehouse) resulted in the documentation of 130 live tortoises and 479 active burrows. Observations of active tortoise sign were evenly distributed throughout the undeveloped area of the HRMF although slightly higher concentrations of tortoise sign were evident in regions that are a greater distance from development and regular human activity.

Focused burrowing owl surveys were conducted simultaneously with the May 2011 desert tortoise surveys. The focused surveys identified a total of 12 live burrowing owls and approximately 57 active burrows with recent burrowing owl sign (whitewash with pellets, and/or prey remains). One burrow contained an active nest of burrowing owl fledglings.

Special status plants that were incidentally observed at the HRMF included Mojave fish hook cactus (*Sclerocactus polyancistrus*), Mojave spineflower (*Chorizanthe spinosa*) and Beaver dam breadroot (*Pediomelum castoreum*). None of the special status plants observed during the survey are federal or state listed species. Special status wildlife species observed at the HRMF during the 2011 survey included loggerhead shrike (*Lanius ludovicianus*), LeConte's thrasher (*Toxostoma lecontei*), and prairie falcon (*Falco mexicanus*).
The 2011 survey concluded that based on the presence of suitable habitat, other special-status wildlife that have a potential to occur at the HRMF included the following:

- Mohave ground squirrel (*Xerospermophilus mohavensis* – State of California Threatened)

- American badger (*Taxidea taxus* – California Species of Special Concern).

The HRMF was determined to have suitable habitat for nesting by the following sensitive bird:

- Loggerhead shrike (*Lanius ludovicianus* - California Species of Special Concern)

In December 2007, a Biological Opinion (BO) related to desert tortoise (*Gopherus agassizii*) for routine operations at the HRMF was issued by the USFWS (Appendix B). This BO was issued based on a review of Air Force Flight Test Center's (AFFTC), Edwards Air Force Base, mission defense support activities and projects accomplished at the HRMF. The BO provides a description of proposed activities at the HRMF and protective measures. The following is list of activities by type that occur within the HRFM and are detailed in the 2007 BO (United States Fish and Wildlife Service 2007).

- Class I: Activities that do not result in new surface disturbance.
- Class II Activities that result in new surface disturbance during the season with typically the least desert tortoise activity (November 1 through February 28).
- Class III Activities that result in new surface disturbance during the season with typically the most desert tortoise activity (March 1 through October 31).

Class I activities are routine daily operations at the HRMF. Class II and III activities include use of heavy equipment used to perform routine maintenance repairs such as road grading, fence repairs and any new construction.

The following Protective Measures identified in the BO are used to ensure no take or injury to desert tortoise at the HRMF

1. Workers attend Instructor lead Desert Tortoise Awareness Training once a year.

2. All visitors and workers at the HRMF stay on existing roads and keep speeds under 20 miles per hour on all roads.

2. Workers at the HRMF will report tortoise sightings to HRMF Security immediately, including dead or injured tortoises.

3. Do not handle a desert tortoise unless it is in imminent danger – call your authorized biologist.
4. Visual inspection beneath all vehicles and equipment is required prior to movement.
5. Dogs and firearms are not allowed at the HRMF (except firearms used by security personnel).
6. Keep trash in closed containers to reduce raven and coyotes on the HRMF.
7. Herbicides used at the facility must be approved before use and must be wildlife-safe.
8. Killed or injured desert tortoise resulting from activities at HRMF will be reported to the USFWS within 3 days. Injured tortoise will be transported to a qualified veterinarian.
9. Provide the USFWS an annual report documenting any tortoise that have been injured or killed plus any new habitat disturbances.
10. Presurvey of area proposed for construction activities within 24 hours of activity.
11. Relocate desert tortoise within a construction area using a USFWS-approved biologist.
12. Inspection of any open trench morning, afternoon and evening. The trench will either be fenced off or ramped to prevent desert tortoise entrapment.
13. Activities, vehicles and staging areas will be restricted to pre-determined corridors, access routes and previously disturbed areas as practicable.
14. Activities will take place within the smallest practical area to minimize habitat disturbance.

A reconnaissance survey of the proposed project area was on September 30, 2019, to identify potential habitat within the study area that could support sensitive biological species (Tetra Tech 2019) (Appendix C). The project area was determined to be suitable habitat for desert tortoise, Mohave ground squirrel and burrowing owl. One active desert tortoise burrow was noted within the project area. No shrubs that may be suitable as nesting sites for loggerhead shrike, LeConte's thrasher, prairie falcon or other raptors such as ravens are present within the study area.

Based on habitat within the project area and sign of occupation by desert tortoise, the proposed project has the potential to significantly impact desert tortoise. To reduce impacts from the proposed project to a less than significant level, Mitigation Measures **BIO-1**, **BIO-2** and **BIO-3** described below will be implemented.

b) **Less than Significant Impact**. The proposed project would permanently impact 1.69 acres of creosote scrub habitat that would be reported as part of the annual reporting requirements. The project site had been disturbed as part of the initial construction of the HRMF. With the minor loss of habitat, a less than significant impact would occur and no mitigations are proposed. No other sensitive communities, such as riparian habitat, exists on the project site.

c) **No Impact.** There are no protected wetlands present within the project site or in adjacent areas to the project site. No impacts would occur, and no mitigation is proposed.

d) **No Impact.** The proposed project would not interfere with movement of any native wildlife species. The project site is located immediately adjacent to existing facilities at the HRMF and would not interfere with migratory wildlife corridors or impede the use of native wildlife nursery sites. No impacts would occur, and no mitigation is proposed.

e) **No Impacts.** The proposed project would not conflict with any County of San Bernardino policies or ordinances protecting biological resources. While creosote shrubs are listed in the County of San Bernardino Development Code, under the Plant Protection and Management chapter, only creosote shrubs rings that are 10 feet in diameter or greater are protected. No impacts would occur, and no mitigation is proposed.

f) **No Impact.** The project site and the HRMF are not within a Habitat Conservation Plan or Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan. As a result, no impacts would occur and no mitigations are proposed.

Therefore, potential significant adverse impacts to biological resources have been identified, and the following mitigation measures are required:

BIO-1 Prior to project site disturbance, a clearance survey conducted by an Authorized Biologist for the HRMF will be conducted. Once the project area has been cleared, desert tortoise fencing will be installed to ensure exclusion of tortoise from adjacent undeveloped areas.

BIO-2 A preconstruction survey of the project site and soil stockpile for burrowing owl will be completed within 14 days prior to ground disturbance according to California Department of Fish and Wildlife guidelines (California Department of Fish and Game 2012). If active burrowing owl nests are present within the construction areas, they must be avoided by establishing a non-disturbance buffer until the young fledge or the nest fails. Nesting owls that are adjacent to construction will also be avoided by establishing buffer areas. The buffer areas should be delineated and flagged to facilitate avoidance.

BIO-3 All Conservation Measures identified in the 2007 BO for the HRMF will be adhered to during the Class II/Class III activities associated with the proposed project.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
V.	**CULTURAL RESOURCES** - Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☐	☐	☒
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c)	Disturb any human remains, including those outside of formal cemeteries?	☐	☒	☐	☐

SUBSTANTIATION: (Check if the project is located in the Cultural ☐ or Paleontologic ☐ Resources overlays or cite results of cultural resource review): ***San***

2015 Cultural Resources Report for HRMF (Appendix D)

a) **No Impact.** A cultural resource assessment of portions of the HRMF that included the proposed project site was conducted May 12 and May 15, 2015 (Tetra Tech, Inc. 2015a) (Appendix D). A California Historical Resources Information System (CHRIS) records search was conducted at the South-Central Coastal Information Center (SCCIC). The record search encompassed portions of the radar testing features including the proposed project area, along with a 1-mile buffer. The CHRIS database indicates that at least seven cultural resource projects have been conducted within 1 mile of the proposed project area, including several surveys that were conducted within the current project area. The CHRIS database also indicated that 12 cultural resources had been recorded within 1 mile of the Project area, including three prehistoric archaeological sites, two historical archaeological sites, and seven isolated occurrences. None of these known cultural resources are located within the Project area. The intensive pedestrian survey of the Project area resulted in the identification and documentation of 11 cultural resources that included five archaeological sites (two prehistoric and three historical), two built-environment resources, and four isolated artifacts (three prehistoric and one historical). No historic or prehistoric resources were identified within the proposed project area. Significance evaluations indicate that none of these cultural resources were recommended as eligible for listing on the California Register of Historical Resources.

b) **Less than Significant Impact with Mitigation Incorporated.** No prehistoric resources were identified within the project area. Prehistoric resource noted during the 2015 assessment were determined to not be significant. In the unlikely event that potentially significant prehistoric resources are encountered during earthwork, Mitigation Measure **CR-1** will be implemented to reduce potentially significant impacts to a less than significant level. If encountered prehistoric resources are determined to be significant, Mitigation CR-2 will be implemented to reduce potentially significant impacts to a less than significant level.

c) **Less than Significant Impact with Mitigation Incorporated.** No formal cemeteries are located within the project area or within the HRMF and no known human remains occur in the area. No impact would occur. In the event that human remains are encountered during earthwork, Mitigation **CR-3** will be implemented to reduce potentially significant impacts to a less than significant level.

Therefore, potential significant adverse impacts to cultural resources have been identified, and the following mitigation measures are required:

CR-1 In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall ~~be hired to~~ assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CR-2 If significant pre-contact cultural resources are discovered and avoidance cannot be ensured, the archaeologist shall develop a cultural resources Monitoring and Treatment Plan (Plan), the drafts of which shall be provided to SMBMI for review and comment. The archaeologist shall monitor the remainder of the ground-disturbance portion of the project and implement the Plan accordingly

CR-3 In the unlikely event of an accidental discovery of any human remains are encountered during any earthwork activities, all work will cease in the immediate vicinity (within a 100-foot buffer of the find) until the San Bernardino County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. State law requires the Native American Heritage Commission (NAHC) be notified in the event the remains are determined to be prehistoric or of Native American origin. The NAHC shall determine and notify a Most Likely Descendant (MLD) who may inspect the site of the discovery within 48-hours of notification by the NAHC. The MLD may recommend scientific removal and non-destructive analysis of human remains and items associated with Native American burials. In addition, a Native American monitor will be present to identify the find in compliance with state law.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
VI.	**ENERGY** – Would the project:				
a)	Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b)	Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

SUBSTANTIATION: San Bernardino County General Plan, 2007

a) **Less than Significant Impact.** Construction activities would require expenditure of energy in the form of vehicle/equipment use and materials such as concrete and asphalt. Once constructed, the warehouse, where feasible, would use energy conservation features. No unnecessary or wasteful consumption of energy resources would occur, and a less than significant impact would occur. No mitigation is required.

b) **No Impact.** The proposed project would not conflict or obstruct with local or state plans for renewable energy or energy efficiency.

Therefore, no impacts are identified or anticipated to energy resources, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
VII.	**GEOLOGY AND SOILS** - Would the project:				
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?	☐	☒	☐	☐

SUBSTANTIATION: *(Check ☐ if project is located in the Geologic Hazards Overlay District):* ***San Bernardino County General Plan, 2007; Submitted Project Materials***

San Bernardino County General Plan, 2007; Geotechnical and infiltration Studies (Appendix E), Stormwater Pollution Prevention Plan (Appendix F), Paleontological Resources Assessment (Appendix G),

a) i-iv) **Less than Significant.** The proposed project will not expose people or structures to potential substantial adverse effect including the risk of loss, injury, or death involving i) rupture of a known earthquake fault, ii) strong seismic ground shaking, iii) seismic related ground failure including liquefaction or iv) landslides. The HRMF and the proposed project site are located in Southern California which is a highly seismic area. The nearest significant active faults and distance to the to the proposed project area as follows (Krazan & Associates, Inc. 2015).

Fault System	Distance from Project Site (Miles)
Helendale-South Lockhart,	2.4
Lenwood-Lockhart-Old Woman Springs	9.9
Gravel Hills-Harper Lake	18
Blackwater	20
Landers	22
San Andreas	37

A review of Hazard Overlay concluded that the HRMF and project area are not located in an area with a known fault and is not susceptible to seismic related ground failure, including liquefaction and landslides. A geotechnical analysis of soils associated with the project area was completed in 2015 and updated in 2019 (Krazan & Associates, Inc. 2015, 2019b). Based on soil conditions at the site, seismic design of the warehouse was recommended. With incorporation of the recommendations in the geotechnical study, hazards from a seismic event, a less than significant impact would occur. No mitigations are required.

b) **Less than Significant Impact** The proposed project would not result in substantial soil erosion or loss of topsoil as the HRMF has a Stormwater Pollution Prevention Plan (SWPPP) that has identified Best Management Practices (BMPs) for erosion and sediment control (Lockheed Martin Aeronautics Company 2018) (Appendix F). These BMPs will ensure no sediment will be discharged from the project area during construction. Once constructed, stormwater runoff generated by the project area would be directed into existing drainages and no project related sediment erosion would occur. A less than significant impact would occur, and no mitigation is proposed.

c) **Less than Significant Impact.** The project is not located on a geologic unit or soil that is unstable or would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. At the time of building permit review, the warehouse technical design drawings must incorporate recommendations of the approved geotechnical investigation and implement all measures to ensure stability in accordance with the latest adopted California Building Code. A less than significant impact would occur, and no mitigation is proposed.

d) **No Impact.** The project area is not located on expansive soils, as defined in Table 18.1.B of the California Building Code (1994) creating substantial risk to life or property. No impact would occur, and no mitigations are required.

e) **Less than Significant Impact.** A septic system would be required for the proposed project. An infiltration study has been completed at the project area (Krazan & Associates, Inc. 2019a). Based on the nature of soils found at the site, design parameters have been specified so that the septic tank and leach field function adequately (Appendix E). A less than significant impact would occur, and no mitigations are required.

f) **Less than Significant with Mitigation Incorporated.** Based on the literature reviewed and a County of San Bernardino museum record search for the project vicinity, the potential for encountering fossilized remains during earthwork greater than three feet below ground surface was been determined to be high (Tetra Tech, Inc. 2015b) (Appendix G). The Quaternary older alluvium deposits at the HRMF were determined to have a high paleontological resource potential because similar Pleistocene age deposits throughout San Bernardino County have been known to yield significant paleontological resources. Therefore, substantial excavations (greater than 3 feet below ground surface) within finer-grained sediments could encounter fossilized remains. Further, because the Quaternary older alluvial deposits are potentially hundreds of feet thick in the area, there would be no lower limit for monitoring, unless crystalline bedrock is encountered. Mitigation Measure **GEO-1** would reduce potentially significant impacts to a less than significant level.

Therefore, potential significant adverse impacts related to geology and soils have been identified, and the following mitigation measures are required

GEO-1 As a result of the high paleontological resource potential of the Quaternary older alluvium in the project area, further paleontological resource management, including construction monitoring by a qualified paleontologist, in previously undisturbed sediments at depths greater than 3 feet below ground surface will be required. Encountered fossils exposed during grading would be recovered and preserved. A report of findings with an itemized accession inventory would be prepared as evidence that monitoring has been successfully completed.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
VIII. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

SUBSTANTIATION:
San Bernardino County General Plan, 2007; Greenhouse Gas emissions calculations (Appendix A)

a) **Less than Significant Impacts.** Greenhouse Gas (GHG) emissions resulting from the Proposed Project were calculated using CalEEMod and are summarized in Table 3. Detailed CalEEMod input values and calculated GHG results are included as Appendix A.

The proposed project would generate GHG emissions during construction and operation activities but not in significant quantities. These emissions would contribute to the cumulative GHGs in the County. However, GHG emissions resulting from the Proposed Project are anticipated to have a less than significant impact.

Table 3
Project Construction and Operation Emissions of GHGs

Project Phase	**CO_2e Annual (MT)/Daily (lbs)**
Project Construction 2020	235/5483
Project Operation	97/204
Threshold of Significance	90,718/584,000
Significant?	No

Notes: MT CO_2e metric tons of carbon dioxide equivalent
lbs pounds

The MDAQMD has established thresholds of GHG emissions (presented in Table 3-5) which if exceeded would render a project as having a significant adverse impact. The proposed project construction and operation emissions are significantly lower than the thresholds. Thus, a less than significant impact would occur. No mitigations are proposed.

b) **Less than Significant Impact.** The proposed project would not result in an increase of either population or emissions sources beyond what has been planned for in the San Bernardino's General Plan. Therefore, the proposed project would be consistent with and would not impact the implementation of the State's Climate Change Scoping Plan. Hence, the proposed project would not conflict with applicable plans, policies or regulations of an agency adopted for the purpose of reducing the emissions of GHGs. A less significant impact would occur. No mitigation is required.

Therefore, no significant adverse impacts related to greenhouse gases are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
IX.	**HAZARDS AND HAZARDOUS MATERIALS –** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

g)	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007

a) **Less than Significant.** The proposed warehouse would be used to store test elements and hazardous materials would not be routinely transported to the warehouse. During construction, minor transport, use and disposal of hazardous materials and wastes that are typically associated with construction projects would be generated. Existing laws and regulations regarding the storage and use of these products, the disposal of wastes and procedures to prevent accidental release and cleanup would reduce any impact to a less than significant level. No mitigations are required.

b) **Less than Significant.** The proposed project is a storage warehouse that would not create a significant hazard to the public or the environment though reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Construction activities may produce hazardous waste associated with the use of construction materials. All hazardous materials are required to be utilized and transported in accordance with their labeling instructions as required by federal and state law. Existing laws and regulations governing the response to accidental release of hazardous materials is sufficient in ensuring any potential accident is not harmful to people or the environment. A less than significant impact would occur, and no mitigations are required.

c) **No Impact.** The proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-fourth mile of an existing or proposed school. The closest school, Helendale Elementary School, 27274 Peachtree Lane, Helendale, California 92342, is located more than five miles southwest of the HRMF. No impact would occur, and no mitigation is required.

d) **No Impact.** The HRMF and project site is not located on a hazardous materials site. No impact would occur, and no mitigation is required.

e) **No Impact.** The HRMF and project site are not located within the vicinity or approach/departure flight path of a public airport. The runway features located on the HRMF to the northwest of the project area as depicted in Figure 3 are the remains of the Helendale Auxiliary Army Air Field No. 2, which was constructed in 1942 as one of four satellite Army airfields serving the Victorville Army Air Field. No impact would occur, and no mitigation is required.

f) **No Impact.** The HRMF and project site are not located within the vicinity or approach/departure flight path of a private airport. The runway features located on the HRMF to the northwest of the project area as depicted in Figure 3 are the remains of the Helendale Auxiliary Army Air Field No. 2, which was constructed in 1942 as one of four satellite Army airfields serving the Victorville Army Air Field. No impact would occur, and no mitigation is required.

g) **No Impact.** The proposed project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires. The County of San Bernardino Development Code Fire Safety (FS) Overlay, Title 8, Development Code, Land Use Zoning District and Allowed Land Uses, Section 82.13.050 has a defined Fire Safety Areas within San Bernardino County as follows.

The FS Overlay corresponds to distinct geographic areas and the associated wildland fire hazard. The requirements applicable to the fire safety area are found in Section 82.13.050 (General Development Standards).

The FS Overlay includes areas within the mountains, valley foothills, and desert region designated by the applicable Fire Authority as wildfire risk areas. It includes all the land generally characterized by areas varying from relatively flat to steep sloping terrain and with moderate to heavy fuel loading contributing to high fire hazard conditions. Present and future development within the FS Overlay is exposed to the impacts of wild land fires and other natural hazards primarily due to native fuel types, topography, and prevailing weather conditions such as Santa Ana winds. These factors contribute to the potential of extreme wildland fire behavior conditions.

The County has established additional development standards for these areas. The HRMF and project area are not within any Fire Safety Areas as defined by County of San Bernardino Development Code and risk of loss, injury or death from wildlife are low given the undeveloped nature of the HRMF. No impact would occur, and no mitigation is required.

Therefore, no significant adverse impacts related to hazards or hazardous materials are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
X.	**HYDROLOGY AND WATER QUALITY -** Would the project:				
a)	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water 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 which would result in flooding on or offsite;	☐	☐	☒	☐
	iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of 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?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007; Storm Water Pollution Prevention Plan (Appendix F)

a) **Less than Significant Impact.** The BMPs for erosion and sediment control as listed in the HRMP SWPPP would be implemented during construction (Lockheed Martin Aeronautics Company 2018). These BMPs will ensure no sediment will be discharged from the project area during construction. Once constructed, stormwater runoff generated by the project area would be directed into existing drainages and no project related impacts to stormwater runoff would occur. A less than significant impact would occur, and no mitigation is proposed.

b) **Less than Significant Impact**. The proposed project is a storage warehouse that would have sanitary facilities for workers that would require a water source. The proposed project would not substantially deplete groundwater supplies or impede sustainable groundwater management of the local aquifer. During construction, water would be used for dust suppression during earthwork at the site and at the stockpiled soils. The earthwork portion of the construction effort would occur over a limited number of days that will not substantially deplete groundwater supplies or impede sustainable groundwater management of the local aquifer. No impacts would occur, and no mitigations are required.

c) **Less than Significant Impact.**

i. Stormwater generated from the project area would be directed into an existing natural drainage found to the east. Stormwater would be directed to the south through an existing culvert beneath the HRMF access road. No changes to the existing drainage would occur. A less than significant impact would occur, and no mitigations are required.

ii. Stormwater would be directed from the project area to the drainage via concrete swales. The area around the warehouse would be paved and sediments would not be generated. Stormwater entering the drainage may transport a less than significant amount of sediments. A less than significant impact would occur, and no mitigations are required.

iii. The existing culvert is adequate to manage stormwater current stormwater generated in the project area and will continue to manage stormwater generate from the project area. A less than significant impact would occur, and no mitigations are required.

iv. The proposed project would be constructed on an engineered pad and would not impede or redirect stormwater. No designated flood zones have been identified in the project area.

d) **No Impact.** The HRMF and project area are not part of a mapped flood hazard zone and is not subject to hazards from tsunami or seiche. The proposed project would not cause a release of pollutants due to flooding. No impact would occur, and no mitigations are required.

e) **No Impact.** The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Less than significant amounts of water would be used during construction. During operation, water would be used for the sanitary system within the warehouse. No impact would occur, and no mitigations are required.

Therefore, no significant adverse impacts to hydrology and water quality are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XI.	**LAND USE AND PLANNING** - Would the project:				
a)	Physically divide an established community?	☐	☐	☐	☒
b)	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?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007

a) **No Impact.** The proposed project will not physically divide an established community as it will be part of the existing HRMF. The proposed project will meet all the development standards of the County Code and meet the goals and policies of the General Plan. No impact would occur, and no mitigations are required.

b) **No Impact**. The proposed project will not conflict with County land use, policy or regulations. The proposed project will be an extension of the existing features of the HRMF. The project is consistent will all applicable land use policies and regulations of the County Code and General Plan. No impact would occur, and no mitigations are required.

Therefore, no significant adverse impacts related to land use are identified or anticipated, and no mitigation measures are required.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XII. MINERAL RESOURCES - Would the project:				
a) Result in the loss of availability of a known mineral resource that will be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

SUBSTANTIATION: *(Check ☐ if project is located within the Mineral Resource Zone Overlay):*

San Bernardino County General Plan, 2007

a) **No Impact.** The proposed project would not result in the loss of availability of a known mineral resources that would be of value. Stockpiled soils present at the HRMF will be used at the site during earthwork. No impact would occur, and no mitigations are required.

b) **No Impact.** The project would not cause the loss of availability of a locally important mineral resource recover site. No impact would occur, and no mitigations are required.

Therefore, no significant adverse impacts to mineral resources are identified or anticipated, and no mitigation measures are required.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XIII. NOISE - Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant	No Impact
b)	Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c)	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

SUBSTANTIATION: *(Check if the project is located in the Noise Hazard Overlay District ☐ or is subject to severe noise levels according to the General Plan Noise Element ☐):*

San Bernardino County General Plan, 2007

a) **Less than Significant**. During construction, noise from equipment would be generated and there would be an increase in ambient noise levels in the vicinity of the project. Workers within the closest warehouse to the project area may perceive an increase in ambient noise. Once earthwork was complete, noise levels would diminish. Work would be completed during daytime hour. The closest resident is slightly more than 0.4 miles to the southwest and with the intervening distance, is not likely to perceive the temporary increase in ambient noise at the project area. Once constructed, ambient noise levels will return to existing conditions. A less than significant impact would occur, and no mitigations are required.

b) **Less than Significant.** During compaction operations of the warehouse pad, compaction rollers may generate ground borne vibrations that may be perceived by workers in the closest warehouse. This short-term vibration activity would not result in any ground borne vibrations above the standards identified in the County Development Code. A less than significant impact would occur, and no mitigations are required.

c) **No Impact**. The proposed project is not located within a private airstrip or in an airport land use plan. No impact would occur, and no mitigation is required.

Therefore, no significant adverse noise impacts are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XIV.	**POPULATION AND HOUSING** - Would the project:				
a)	Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and	☐	☐	☐	☒

	businesses) or indirectly (for example, through extension of roads or other infrastructure)?				
b)	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007.

a) **No Impact.** During construction, as many as 20 to 30 workers would be used to build the warehouse facility. This temporary increase in workers for this project would not induce either directly or indirectly, a substantial population growth in the area. Upon completion of construction, current workers at the HRMF would use the warehouse to store test materials. No impact would occur, and no mitigations are required.

b) **No Impact.** The proposed project would not displace any people necessitating the construction of replacement housing elsewhere. The project area is vacant, undeveloped lands. No impact would occur, and no mitigations are required.

Therefore, no significant adverse impacts related to population and housing are identified or anticipated and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XV.	**PUBLIC SERVICES**				
a)	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
	Fire Protection?	☐	☐	☐	☒
	Police Protection?	☐	☐	☐	☒
	Schools?	☐	☐	☐	☒
	Parks?	☐	☐	☐	☒
	Other Public Facilities?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007; Submitted Project Materials

a) **No Impact.** The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services, including fire and police protection, schools, parks, or other public facilities. The new warehouse will be part of the HRMF that is monitored by 24-hour private security and no impacts to the local police would occur. No increase in workers would occur so no impacts to the local school district would occur. The warehouse will have a fire suppression system that will meet all County Code requirements. No impacts would occur, and no mitigations are required.

Therefore, no significant adverse impacts to public services are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XVI.	**RECREATION**				
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility will occur or be accelerated?	☐	☐	☐	☒
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007

a) **No Impact.** This project will not 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. The project is a storage warehouse and will not necessitate any new employees to move to the project area that would use existing neighborhood or regional parks. No impacts would occur, and no mitigations are required.

b) **No Impact.** This project is the construction of a storage warehouse and does not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. The County's General Plan requires new residential development to provide a local park and recreation facilities. The proposed project is not a residential development. No impacts would occur, and no mitigations are required.

Therefore, no significant adverse impacts to recreational resources are identified or anticipated, and no mitigation measures are required.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XVII.	**TRANSPORTATION** – Would the project:				
a)	Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b)	Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b)?	☐	☐	☒	☐
c)	Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d)	Result in inadequate emergency access?	☐	☐	☐	☒

SUBSTANTIATION:

San Bernardino County General Plan, 2007

a) **Less than Significant Impact.** The proposed Project would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit. During construction, there would be a temporary increase in daily traffic to and from the HRMF from crews of workers. Due to the isolated location of the HRMF, construction workers are likely to carpool to the facility. Once the warehouse is constructed, current workers at the HRMF will use the warehouse and no permanent increase in traffic to the HRMF would occur. A less than significant impact would occur, and no mitigations are required.

b) **Less than Significant Impact.** The proposed project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b). Construction crews will be encouraged to carpool to reduce vehicle trips and local congestion. Impacts would be temporary, and a less than significant impact would occur. Once the warehouse is constructed, current workers at the HRMF would use the warehouse and no increase in traffic would occur.

c) **No Impact.** No roads or changes to configuration of current roads at the HRMF are required. No impacts would occur, and no mitigations are required.

d) **No Impact.** The proposed project would not result in inadequate emergency access at the HRMF. No impacts would occur, and no mitigations are required.

Therefore, no significant adverse impacts to traffic and transportation are identified or anticipated, and no mitigation measures are required.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XVIII. TRIBAL CULTURAL RESOURCES				
a) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code 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:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii) 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

SUBSTANTIATION:

San Bernardino County General Plan, 2007; Cultural Historical Resources Information System (CHRIS), South Central Coast Information Center, California State University, Fullerton; Submitted Project Materials, Cultural Resources Assessment dated 2015

a)i) **Less than Significant with Mitigation Incorporated.** As indicated in Section V, a database review in support of a cultural resources assessment conducted at the HRMF indicated that 12 cultural resources had been recorded within 1 mile of the Project area, including three prehistoric archaeological sites, two historical archaeological sites, and seven isolated occurrences. None of these known cultural resources are located within the Project area. The intensive pedestrian survey of the Project area resulted in the identification and documentation of 11 cultural resources that included five archaeological sites (two prehistoric and three historical), two built-environment resources, and four isolated artifacts (three prehistoric and one historical). Although no historic or prehistoric resources were identified within the proposed project area, Mitigation **TRC-1** would reduce potentially significant impacts to pre-historic resources discovered during project implementation.

a)ii) **Less than Significant with Mitigation Incorporated.** On September 13, 2019, the County of San Bernardino initiated Consultation with Native American tribes that have traditional and cultural affiliations with the region that includes the project area (Appendix H). Tribal consultation was concluded on December 9, 2019. The following Native American tribes were provided an opportunity to consult with the County of San Bernardino with regards to the proposed project,

- Colorado River Indian Tribes
- Twenty-Nine Palms Band of Mission Indians
- Fort Mojave Indian Tribe
- Morongo Band of Mission Indians
- Soboba Band of Luiseño Indians
- San Manuel Band of Mission Indians

A project description and location map of the project was provided On October 29, 2019, the Twenty-Nine Palms Band of Mission Indians requested a copy of the previously completed cultural resources survey of the HRMF that includes the project area. A copy of the cultural survey report was provided to the Twenty-Nine Palms Band of Mission Indians on November 1, 2019. A second and third request via email to the Twenty-Nine Palms Band of Mission Indians to determine if the tribe had any additional questions was made on November 15 and 19, 2019; respectively.

The Morongo Band of Mission Indians provided a notification on October 11, 2019 that they had no additional comments regarding the project.

On October 21, 2019, the San Manuel Band of Mission Indians requested a copy of the soils and geotechnical reports and grading plans to show the depth of proposed ground disturbance associated with the project. The grading plan plus soils and geotechnical reports were provided to the tribe on October 23 and November 19, 2019; respectively. To reduce impacts to tribal resources, on November 22, 2019, the San Manuel Band of Mission Indians provided mitigation measures for both cultural resources that have been included in Section V and Tribal Cultural Resources. Based on consultation with the San Manuel Band of Mission Indians, the project has the potential for significant impact to Native American resources. Mitigation TRC-2 would reduce potentially significant impacts from the proposed project to tribal resources to a less than significant level.

Therefore, potential significant adverse impacts to tribal cultural resources have been identified, and the following mitigation measures are required:

TCR-1 The San Manuel Band of Mission Indians Cultural Resources Department shall be contacted if any prehistoric cultural resources are discovered during project implementation and shall be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA, a cultural resources Monitoring and Treatment Plan (Plan) shall be created by the archaeologist, in coordination with San Manuel Band of Mission Indians, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents San Manuel Band of Mission Indians for the remainder of the project, should San Manuel Band of Mission Indians elect to place a monitor on-site.

TCR-2 Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied by Lockheed Martin Aeronautics Corporation and/or the County of San Bernardino to San Manuel Band of Mission Indians. The County of San Bernardino shall, in good faith, consult with San Manuel Band of Mission Indians throughout the life of the project.

	Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XIX.	**UTILITIES AND SERVICE SYSTEMS -** Would the project:				
a)	Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b)	Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c)	Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d)	Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e)	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

SUBSTANTIATION:
County of San Bernardino General Plan 2007

a) **Less than Significant Impact.** The proposed project does not require or propose any wastewater treatment as sanitation will be managed with a septic system. No impacts would occur, and no mitigations are required.

b) **No Impact.** The proposed project will require extension of existing water facilities currently at the HRMF to the new warehouse. However, the existing water supply at the HRMF is adequate for the proposed warehouse and an expansion of those services are not needed. No impacts would occur, and no mitigations are required.

c) **No Impact.** The proposed project does not require or propose any wastewater treatment as sanitation will be managed with a septic system. No impacts would occur, and no mitigations are required.

d) **No Impact.** Debris and waste would be generated during construction but would not exceed state or local standards or cause an impairment of attaining County solid waste reduction goals. No increases in waste generation at the HRMF would occur once the warehouse construction was complete. No impacts would occur, and no mitigations are required.

e) **No Impact.** The proposed project would comply with federal, state and local management and reduction statues and regulations for solid waste. No impacts would occur, and no mitigations are required.

Therefore, no significant adverse impacts to utilities or service systems are identified or anticipated, and no mitigation measures are required.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XX. WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant	No Impact
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water resources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

SUBSTANTIATION:
County of San Bernardino General Plan 2007; Submitted Project Materials

a) **No Impact.** The proposed project would be constructed on undeveloped land that is part of the HRMF. The proposed project would not impair an adopted emergency response plan or emergency evacuation plan. No impacts would occur, and no mitigations are required.

b) **No Impact**. The project area is flat with minor relief. The final grade for the proposed project would also be flat and would not have a topography that would cause an exacerbation of wildfire risks due to slope. No impacts would occur, and no mitigations are required.

c) **No Impact**. The proposed project would not require significant changes to the infrastructure at the HRMF that would exacerbate risks from wildfire. No impacts would occur, and no mitigations are required.

d) **No Impact**. Final grade of the new warehouse would be level. No increased risks from flooding or landslides resulting from post fire slope instability would occur. No impacts would occur, and no mitigations are required.

Issues	*Potentially Significant Impact*	*Less than Significant with Mitigation Incorporated*	*Less than Significant*	*No Impact*
XXI. MANDATORY FINDINGS OF SIGNIFICANCE:				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of	☐	☒	☐	☐

the major periods of California history or prehistory?				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

SUBSTANTIATION:

a) **Less than Significant with Mitigations Incorporated.** The proposed project has the potential for adverse impacts to desert tortoise, a federally and state listed as threatened species. A Biological Opinion has been issued by the USFWS for operations at the HRMF that includes new construction. With incorporation of the conservation measures in the BO plus mitigation measures identified in Section III, a less than significant impact will occur.

b) **No Impact.** Impacts from the proposed project are limited and are not cumulatively considerable. No cumulative impacts from the proposed project are anticipated.

c) **No Impact.** All potential impacts have been thoroughly evaluated and have been deemed to be neither individually significant nor cumulatively considerable in terms of any adverse effects upon the region, the local community or its inhabitants. At a minimum, the project will be required to meet the conditions of approval for the project to be implemented. It is anticipated that all such conditions of approval will further insure that no potential for adverse impacts will be introduced by construction activities, initial or future land uses authorized by the project approval.

SUMMARY OF MITIGATION MEASURES

The following mitigations are proposed for the warehouse project.

BIO-1 Prior to project site disturbance, a clearance survey conducted by an Authorized Biologist for the HRMF will be conducted. Once the project area has been cleared, desert tortoise fencing will be installed to ensure exclusion of tortoise from adjacent undeveloped areas.

BIO-2 A preconstruction survey of the project site and soil stockpile for burrowing owl will be completed within 14 days prior to ground disturbance according to California Department of Fish and Wildlife guidelines (California Department of Fish and Game 2012). If active burrowing owl nests are present within the construction areas, they must be avoided by establishing a non-disturbance buffer until the young fledge or the nest fails. Nesting owls that are adjacent to construction will also be avoided by establishing buffer areas. The buffer areas should be delineated and flagged to facilitate avoidance.

BIO-3 All Conservation Measures identified in the 2007 BO for the HRMF will be adhered to during the Class II/Class III activities associated with the proposed project

CR-1 In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall ~~be hired to~~ assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CR-2 If significant pre-contact cultural resources are discovered and avoidance cannot be ensured, the archaeologist shall develop a cultural resources Monitoring and Treatment Plan (Plan), the drafts of which shall be provided to SMBMI for review and comment. The archaeologist shall monitor the remainder of the ground-disturbance portion of the project and implement the Plan accordingly

CR-3 In the unlikely event of an accidental discovery of any human remains are encountered during any earthwork activities, all work will cease in the immediate vicinity (within a 100-foot buffer of the find) until the San Bernardino County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. State law requires the Native American Heritage Commission (NAHC) be notified in the event the remains are determined to be prehistoric or of Native American origin. The NAHC shall determine and notify a Most Likely Descendant (MLD) who may inspect the site of the discovery within 48-hours of notification by the NAHC. The MLD may recommend scientific removal and non-destructive analysis of human remains and items associated with Native American burials. In addition, a Native American monitor will be present to identify the find in compliance with state law.

GEO-1 As a result of the high paleontological resource potential of the Quaternary older alluvium in the project area, further paleontological resource management, including construction monitoring by a qualified paleontologist in previously undisturbed sediments at depths greater than 3 feet below ground surface will be required. Encountered fossils exposed during grading would be recovered and preserved. A report of findings with an itemized accession inventory would be prepared as evidence that monitoring has been successfully completed.

TCR-1 The San Manuel Band of Mission Indians Cultural Resources Department shall be contacted if any prehistoric cultural resources are discovered during project implementation and shall be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA, a cultural resources Monitoring and Treatment Plan (Plan) shall be created by the archaeologist, in coordination with San Manuel Band of Mission Indians, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents San Manuel Band of

Mission Indians for the remainder of the project, should San Manuel Band of Mission Indians elect to place a monitor on-site.

TCR-2 Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied by Lockheed Martin Aeronautics Corporation and/or the County of San Bernardino to San Manuel Band of Mission Indians. The County of San Bernardino shall, in good faith, consult with San Manuel Band of Mission Indians throughout the life of the project.

GENERAL REFERENCES

California Department of Conservation

2019 California Important Farmland Finder, https://maps.conservation.ca.gov/DLRP/CIFF/, accessed 15 November 2019

California Department of Fish and Game

2012 *Staff Report on Burrowing Owl Mitigation*. State of California Natural Resources Agency. 34 pp.

County of San Bernardino

2007 *County of San Bernardino General Plan*. Adopted March 13, 2007. Effective April 12, 2007. Amended April 24, 2014.

PROJECT-SPECIFIC REFERENCES

Krazan & Associates, Inc,

2015 Geotechnical Engineering Investigation Proposed Warehouse Building, Indian Trail near Wheeler Road, Helendale California

2019a Results of Infiltration Testing, Proposed Light Industrial Facility, Indian Trail, Helendale, California, August 28, 2019.

2019b Updated to Geotechnical Engineering Investigation Proposed Warehouse Building, Indian Trail near Wheeler Road, Helendale California, August 28, 2019

Lockheed Martin Aeronautics Company

2018 Storm Water Pollution Prevention Plan – Plant 9 (Helendale) Revision Q.

Tetra Tech, Inc.

2015a Cultural Resources Assessment for Lockheed Martin Aeronautics' Proposed Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California

2015b Paleontological Resource Assessment for the Proposed Lockheed Martin Aeronautics' Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California

2011 *Final Biological Resources Technical Report. Lockheed Martin Aeronautics Company Radar Measurement Facility, Helendale, California*

United States Fish and Wildlife Service

2007 *Biological Opinion on Routine Operations at the Lockheed Martin Aeronautics Company Radar Measurement Facility, Helendale, San Bernardino County, California* (1-8-05-F-6)

APPENDIX A AIR QUALITY/GREENHOUSE GAS EMISSIONS CALCULATIONS

LM Helendale Radar Measurement Facility
Mojave Desert AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	19.39	1000sqft	0.45	19,395.00	0
Other Asphalt Surfaces	54.22	1000sqft	1.24	54,221.00	0

1.2 Other Project Characteristics

Urbanization Urban

Wind Speed (m/s) 2.6

Precipitation Freq (Days) 30

Climate Zone 10

Operational Year 2021

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 702.44

CH4 Intensity (lb/MWhr) 0.029

N2O Intensity (lb/MWhr) 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Per schedule

Grading - Grading as stated

Trips and VMT - Borrow Pit3 is 1.5 miles

Construction Off-road Equipment Mitigation - Tier 3 engines

Area Mitigation -

Table Name	Column Name	Default Value	New Value

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	200.00	130.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	2.00	15.00
tblGrading	AcresOfGrading	7.50	1.69
tblGrading	AcresOfGrading	7.50	1.00

tblGrading	MaterialImported	0.00	16,209.00
tblGrading	MaterialImported	0.00	16,209.00
tblLandUse	LandUseSquareFeet	19,390.00	19,395.00
tblLandUse	LandUseSquareFeet	54,220.00	54,221.00
tblTripsAndVMT	HaulingTripLength	20.00	1.50
tblTripsAndVMT	HaulingTripLength	20.00	1.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	48.9903	37.1034	14.5922	0.0534	5.7380	0.8320	6.5700	2.9942	0.7757	3.7601	0.0000	5,452.4784	5,452.4784	1.2027	0.0000	5,482.5453
Maximum	**48.9903**	**37.1034**	**14.5922**	**0.0534**	**5.7380**	**0.8320**	**6.5700**	**2.9942**	**0.7757**	**3.7601**	**0.0000**	**5,452.4784**	**5,452.4784**	**1.2027**	**0.0000**	**5,482.5453**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	48.8075	27.1659	14.8827	0.0534	2.7174	0.7388	3.1032	1.3843	0.7384	1.7696	0.0000	5,452.4784	5,452.4784	1.2027	0.0000	5,482.5453
Maximum	**48.8075**	**27.1659**	**14.8827**	**0.0534**	**2.7174**	**0.7388**	**3.1032**	**1.3843**	**0.7384**	**1.7696**	**0.0000**	**5,452.4784**	**5,452.4784**	**1.2027**	**0.0000**	**5,482.5453**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.37**	**26.78**	**-1.99**	**0.00**	**52.64**	**11.21**	**52.77**	**53.77**	**4.81**	**52.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Energy	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Mobile	0.3455	2.5013	3.4635	0.0136	0.8438	8.5300e-003	0.8523	0.2258	8.0100e-003	0.2339		1,392.8912	1,392.8912	0.1002		1,395.3967
Total	**0.9325**	**2.6707**	**3.6132**	**0.0147**	**0.8438**	**0.0214**	**0.8652**	**0.2258**	**0.0209**	**0.2467**		**1,596.0157**	**1,596.0157**	**0.1042**	**3.7200e-003**	**1,599.7292**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Energy	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Mobile	0.3455	2.5013	3.4635	0.0136	0.8438	8.5300e-003	0.8523	0.2258	8.0100e-003	0.2339		1,392.8912	1,392.8912	0.1002		1,395.3967

Total	0.9325	2.6707	3.6132	0.0147	0.8438	0.0214	0.8652	0.2258	0.0209	0.2467		1,596.0157	1,596.0157	0.1042	3.7200e-003	1,599.7292

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/29/2020	2/18/2020	5	15	
2	Grading	Grading	2/19/2020	3/17/2020	5	20	
3	Building Construction	Building Construction	3/18/2020	9/15/2020	5	130	
4	Paving	Paving	9/16/2020	9/29/2020	5	10	
5	Architectural Coating	Architectural Coating	9/30/2020	10/13/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.69

Acres of Paving: 1.24

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 29,093; Non-Residential Outdoor: 9,698; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29

Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Building Construction	7	31.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					5.4919	0.0000	5.4919	2.9271	0.0000	2.9271			0.0000			0.0000
Off-Road	1.6299	18.3464	7.7093	0.0172		0.8210	0.8210		0.7553	0.7553		1,667.4119	1,667.4119	0.5393		1,680.8937
Total	**1.6299**	**18.3464**	**7.7093**	**0.0172**	**5.4919**	**0.8210**	**6.3128**	**2.9271**	**0.7553**	**3.6824**		**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3883	18.7321	1.5669	0.0355	0.1804	0.0107	0.1910	0.0497	0.0102	0.0599		3,718.2509	3,718.2509	0.6611		3,734.7777
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0249	0.2901	6.7000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		66.8156	66.8156	2.3300e-003		66.8738
Total	**0.4278**	**18.7569**	**1.8570**	**0.0362**	**0.2461**	**0.0111**	**0.2571**	**0.0672**	**0.0106**	**0.0777**		**3,785.0665**	**3,785.0665**	**0.6634**		**3,801.6516**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4713	0.0000	2.4713	1.3172	0.0000	1.3172			0.0000			0.0000
Off-Road	0.4212	8.4089	9.8221	0.0172		0.3747	0.3747		0.3747	0.3747	0.0000	1,667.4119	1,667.4119	0.5393		1,680.8937

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**0.4212**	**8.4089**	**9.8221**	**0.0172**	**2.4713**	**0.3747**	**2.8461**	**1.3172**	**0.3747**	**1.6919**	**0.0000**	**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3883	18.7321	1.5669	0.0355	0.1804	0.0107	0.1910	0.0497	0.0102	0.0599		3,718.2509	3,718.2509	0.6611		3,734.7777
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0249	0.2901	6.7000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		66.8156	66.8156	2.3300e-003		66.8738
Total	**0.4278**	**18.7569**	**1.8570**	**0.0362**	**0.2461**	**0.0111**	**0.2571**	**0.0672**	**0.0106**	**0.0777**		**3,785.0665**	**3,785.0665**	**0.6634**		**3,801.6516**

3.3 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.7201	0.0000	4.7201	2.5096	0.0000	2.5096			0.0000			0.0000
Off-Road	1.3498	15.0854	6.4543	0.0141		0.6844	0.6844		0.6296	0.6296		1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**1.3498**	**15.0854**	**6.4543**	**0.0141**	**4.7201**	**0.6844**	**5.4044**	**2.5096**	**0.6296**	**3.1392**		**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2912	14.0491	1.1752	0.0266	0.1353	7.9900e-003	0.1433	0.0373	7.6400e-003	0.0449		2,788.6882	2,788.6882	0.4958		2,801.0833
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0249	0.2901	6.7000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		66.8156	66.8156	2.3300e-003		66.8738
Total	**0.3307**	**14.0739**	**1.4653**	**0.0273**	**0.2010**	**8.4100e-003**	**0.2094**	**0.0547**	**8.0200e-003**	**0.0628**		**2,855.5038**	**2,855.5038**	**0.4981**		**2,867.9571**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1240	0.0000	2.1240	1.1293	0.0000	1.1293			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106	0.0000	1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.1240**	**0.3106**	**2.4346**	**1.1293**	**0.3106**	**1.4399**	**0.0000**	**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.2912	14.0491	1.1752	0.0266	0.1353	7.9900e-003	0.1433	0.0373	7.6400e-003	0.0449		2,788.6882	2,788.6882	0.4958		2,801.0833
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0249	0.2901	6.7000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		66.8156	66.8156	2.3300e-003		66.8738
Total	**0.3307**	**14.0739**	**1.4653**	**0.0273**	**0.2010**	**8.4100e-003**	**0.2094**	**0.0547**	**8.0200e-003**	**0.0628**		**2,855.5038**	**2,855.5038**	**0.4981**		**2,867.9571**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**2.0305**	**14.7882**	**13.1881**	**0.0220**		**0.7960**	**0.7960**		**0.7688**	**0.7688**		**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0399	1.2363	0.2800	3.6000e-003	0.0814	5.6400e-003	0.0870	0.0234	5.3900e-003	0.0288		375.5431	375.5431	0.0316		376.3326
Worker	0.1529	0.0963	1.1241	2.6000e-003	0.2547	1.6100e-003	0.2563	0.0676	1.4900e-003	0.0690		258.9105	258.9105	9.0200e-003		259.1361
Total	**0.1928**	**1.3326**	**1.4041**	**6.2000e-003**	**0.3360**	**7.2500e-003**	**0.3433**	**0.0910**	**6.8800e-003**	**0.0979**		**634.4536**	**634.4536**	**0.0406**		**635.4686**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6407	12.0767	13.4786	0.0220		0.7315	0.7315		0.7315	0.7315	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**0.6407**	**12.0767**	**13.4786**	**0.0220**		**0.7315**	**0.7315**		**0.7315**	**0.7315**	**0.0000**	**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0399	1.2363	0.2800	3.6000e-003	0.0814	5.6400e-003	0.0870	0.0234	5.3900e-003	0.0288		375.5431	375.5431	0.0316		376.3326
Worker	0.1529	0.0963	1.1241	2.6000e-003	0.2547	1.6100e-003	0.2563	0.0676	1.4900e-003	0.0690		258.9105	258.9105	9.0200e-003		259.1361
Total	**0.1928**	**1.3326**	**1.4041**	**6.2000e-003**	**0.3360**	**7.2500e-003**	**0.3433**	**0.0910**	**6.8800e-003**	**0.0979**		**634.4536**	**634.4536**	**0.0406**		**635.4686**

3.5 Paving - 2020

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.3249					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1650**	**8.4514**	**8.8758**	**0.0135**		**0.4695**	**0.4695**		**0.4328**	**0.4328**		**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0641	0.0404	0.4714	1.0900e-003	0.1068	6.8000e-004	0.1075	0.0283	6.2000e-004	0.0290		108.5754	108.5754	3.7800e-003		108.6700
Total	**0.0641**	**0.0404**	**0.4714**	**1.0900e-003**	**0.1068**	**6.8000e-004**	**0.1075**	**0.0283**	**6.2000e-004**	**0.0290**		**108.5754**	**108.5754**	**3.7800e-003**		**108.6700**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.3195	6.6399	9.8512	0.0135		0.3864	0.3864		0.3864	0.3864	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246

Paving	0.3249					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6444**	**6.6399**	**9.8512**	**0.0135**		**0.3864**	**0.3864**		**0.3864**	**0.3864**	**0.0000**	**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0641	0.0404	0.4714	1.0900e-003	0.1068	6.8000e-004	0.1075	0.0283	6.2000e-004	0.0290		108.5754	108.5754	3.7800e-003		108.6700
Total	**0.0641**	**0.0404**	**0.4714**	**1.0900e-003**	**0.1068**	**6.8000e-004**	**0.1075**	**0.0283**	**6.2000e-004**	**0.0290**		**108.5754**	**108.5754**	**3.7800e-003**		**108.6700**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	48.7185					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**48.9607**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0296	0.0186	0.2176	5.0000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		50.1117	50.1117	1.7500e-003		50.1554
Total	**0.0296**	**0.0186**	**0.2176**	**5.0000e-004**	**0.0493**	**3.1000e-004**	**0.0496**	**0.0131**	**2.9000e-004**	**0.0134**		**50.1117**	**50.1117**	**1.7500e-003**		**50.1554**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	48.7185					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**48.7779**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0296	0.0186	0.2176	5.0000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		50.1117	50.1117	1.7500e-003		50.1554
Total	**0.0296**	**0.0186**	**0.2176**	**5.0000e-004**	**0.0493**	**3.1000e-004**	**0.0496**	**0.0131**	**2.9000e-004**	**0.0134**		**50.1117**	**50.1117**	**1.7500e-003**		**50.1554**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3455	2.5013	3.4635	0.0136	0.8438	8.5300e-003	0.8523	0.2258	8.0100e-003	0.2339		1,392.8912	1,392.8912	0.1002		1,395.3967
Unmitigated	0.3455	2.5013	3.4635	0.0136	0.8438	8.5300e-003	0.8523	0.2258	8.0100e-003	0.2339		1,392.8912	1,392.8912	0.1002		1,395.3967

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	135.15	25.59	13.19	298,008	298,008
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	135.15	25.59	13.19	298,008	298,008

4.3 Trip Type Information

	Miles	Trip %	Trip Purpose %

Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098
Other Asphalt Surfaces	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
NaturalGas Unmitigated	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1726.42	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0186**	**0.1693**	**0.1422**	**1.0200e-003**		**0.0129**	**0.0129**		**0.0129**	**0.0129**		**203.1083**	**203.1083**	**3.8900e-003**	**3.7200e-003**	**204.3153**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.72642	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0186**	**0.1693**	**0.1422**	**1.0200e-003**		**0.0129**	**0.0129**		**0.0129**	**0.0129**		**203.1083**	**203.1083**	**3.8900e-003**	**3.7200e-003**	**204.3153**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Mitigated	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Unmitigated	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1335					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4343					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-004	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Total	**0.5684**	**7.0000e-005**	**7.5400e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**		**0.0161**	**0.0161**	**4.0000e-005**		**0.0172**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1335					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4343					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-004	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172

Total	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

LM Helendale Radar Measurement Facility

Mojave Desert AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	19.39	1000sqft	0.45	19,395.00	0
Other Asphalt Surfaces	54.22	1000sqft	1.24	54,221.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Per schedule

Grading - Grading as stated

Trips and VMT - Borrow Pit3 is 1.5 miles

Construction Off-road Equipment Mitigation - Tier 3 engines

Area Mitigation -

Table Name	Column Name	Default Value	New Value

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	200.00	130.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	2.00	15.00
tblGrading	AcresOfGrading	7.50	1.69
tblGrading	AcresOfGrading	7.50	1.00

tblGrading	MaterialImported	0.00	16,209.00
tblGrading	MaterialImported	0.00	16,209.00
tblLandUse	LandUseSquareFeet	19,390.00	19,395.00
tblLandUse	LandUseSquareFeet	54,220.00	54,221.00
tblTripsAndVMT	HaulingTripLength	20.00	1.50
tblTripsAndVMT	HaulingTripLength	20.00	1.50

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	48.9885	36.3108	14.4147	0.0494	5.7380	0.8330	6.5710	2.9942	0.7758	3.7611	0.0000	5,042.1855	5,042.1855	1.2909	0.0000	5,074.4577
Maximum	**48.9885**	**36.3108**	**14.4147**	**0.0494**	**5.7380**	**0.8330**	**6.5710**	**2.9942**	**0.7758**	**3.7611**	**0.0000**	**5,042.1855**	**5,042.1855**	**1.2909**	**0.0000**	**5,074.4577**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	48.8058	26.3733	14.7052	0.0494	2.7174	0.7388	3.1042	1.3843	0.7384	1.7706	0.0000	5,042.1855	5,042.1855	1.2909	0.0000	5,074.4577
Maximum	**48.8058**	**26.3733**	**14.7052**	**0.0494**	**2.7174**	**0.7388**	**3.1042**	**1.3843**	**0.7384**	**1.7706**	**0.0000**	**5,042.1855**	**5,042.1855**	**1.2909**	**0.0000**	**5,074.4577**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.37**	**27.37**	**-2.02**	**0.00**	**52.64**	**11.31**	**52.76**	**53.77**	**4.81**	**52.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Energy	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Mobile	0.2931	2.4661	3.0188	0.0124	0.8438	8.6100e-003	0.8524	0.2258	8.0900e-003	0.2339		1,267.9657	1,267.9657	0.1058		1,270.6106
Total	**0.8802**	**2.6354**	**3.1685**	**0.0134**	**0.8438**	**0.0215**	**0.8653**	**0.2258**	**0.0210**	**0.2468**		**1,471.0901**	**1,471.0901**	**0.1097**	**3.7200e-003**	**1,474.9431**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Energy	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Mobile	0.2931	2.4661	3.0188	0.0124	0.8438	8.6100e-003	0.8524	0.2258	8.0900e-003	0.2339		1,267.9657	1,267.9657	0.1058		1,270.6106

Total	0.8802	2.6354	3.1685	0.0134	0.8438	0.0215	0.8653	0.2258	0.0210	0.2468		1,471.090 1	1,471.0901	0.1097	3.7200e-003	1,474.943 1

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/29/2020	2/18/2020	5	15	
2	Grading	Grading	2/19/2020	3/17/2020	5	20	
3	Building Construction	Building Construction	3/18/2020	9/15/2020	5	130	
4	Paving	Paving	9/16/2020	9/29/2020	5	10	
5	Architectural Coating	Architectural Coating	9/30/2020	10/13/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.69

Acres of Paving: 1.24

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 29,093; Non-Residential Outdoor: 9,698; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29

Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Building Construction	7	31.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					5.4919	0.0000	5.4919	2.9271	0.0000	2.9271			0.0000			0.0000
Off-Road	1.6299	18.3464	7.7093	0.0172		0.8210	0.8210		0.7553	0.7553		1,667.4119	1,667.4119	0.5393		1,680.8937
Total	**1.6299**	**18.3464**	**7.7093**	**0.0172**	**5.4919**	**0.8210**	**6.3128**	**2.9271**	**0.7553**	**3.6824**		**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4377	17.9389	2.4790	0.0316	0.1804	0.0117	0.1920	0.0497	0.0112	0.0609		3,316.0988	3,316.0988	0.7496		3,334.8393
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0372	0.0256	0.2316	5.9000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		58.6749	58.6749	1.9900e-003		58.7247
Total	**0.4749**	**17.9644**	**2.7106**	**0.0322**	**0.2461**	**0.0121**	**0.2582**	**0.0672**	**0.0115**	**0.0787**		**3,374.7737**	**3,374.7737**	**0.7516**		**3,393.5639**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4713	0.0000	2.4713	1.3172	0.0000	1.3172			0.0000			0.0000
Off-Road	0.4212	8.4089	9.8221	0.0172		0.3747	0.3747		0.3747	0.3747	0.0000	1,667.4119	1,667.4119	0.5393		1,680.8937

Total	**0.4212**	**8.4089**	**9.8221**	**0.0172**	**2.4713**	**0.3747**	**2.8461**	**1.3172**	**0.3747**	**1.6919**	**0.0000**	**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.4377	17.9389	2.4790	0.0316	0.1804	0.0117	0.1920	0.0497	0.0112	0.0609		3,316.0988	3,316.0988	0.7496		3,334.8393
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0372	0.0256	0.2316	5.9000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		58.6749	58.6749	1.9900e-003		58.7247
Total	**0.4749**	**17.9644**	**2.7106**	**0.0322**	**0.2461**	**0.0121**	**0.2582**	**0.0672**	**0.0115**	**0.0787**		**3,374.7737**	**3,374.7737**	**0.7516**		**3,393.5639**

3.3 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.7201	0.0000	4.7201	2.5096	0.0000	2.5096			0.0000			0.0000
Off-Road	1.3498	15.0854	6.4543	0.0141		0.6844	0.6844		0.6296	0.6296		1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**1.3498**	**15.0854**	**6.4543**	**0.0141**	**4.7201**	**0.6844**	**5.4044**	**2.5096**	**0.6296**	**3.1392**		**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3283	13.4542	1.8593	0.0237	0.1353	8.7500e-003	0.1440	0.0373	8.3700e-003	0.0457		2,487.0741	2,487.0741	0.5622		2,501.1295
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0372	0.0256	0.2316	5.9000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		58.6749	58.6749	1.9900e-003		58.7247
Total	**0.3655**	**13.4797**	**2.0909**	**0.0243**	**0.2010**	**9.1700e-003**	**0.2102**	**0.0547**	**8.7500e-003**	**0.0635**		**2,545.7490**	**2,545.7490**	**0.5642**		**2,559.8541**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1240	0.0000	2.1240	1.1293	0.0000	1.1293			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106	0.0000	1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.1240**	**0.3106**	**2.4346**	**1.1293**	**0.3106**	**1.4399**	**0.0000**	**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.3283	13.4542	1.8593	0.0237	0.1353	8.7500e-003	0.1440	0.0373	8.3700e-003	0.0457		2,487.0741	2,487.0741	0.5622		2,501.1295
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0372	0.0256	0.2316	5.9000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.8000e-004	0.0178		58.6749	58.6749	1.9900e-003		58.7247
Total	**0.3655**	**13.4797**	**2.0909**	**0.0243**	**0.2010**	**9.1700e-003**	**0.2102**	**0.0547**	**8.7500e-003**	**0.0635**		**2,545.7490**	**2,545.7490**	**0.5642**		**2,559.8541**

3.4 Building Construction - 2020

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**2.0305**	**14.7882**	**13.1881**	**0.0220**		**0.7960**	**0.7960**		**0.7688**	**0.7688**		**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0424	1.2164	0.3291	3.4200e-003	0.0814	5.6900e-003	0.0871	0.0234	5.4500e-003	0.0289		357.4766	357.4766	0.0356		358.3654
Worker	0.1440	0.0990	0.8975	2.2800e-003	0.2547	1.6100e-003	0.2563	0.0676	1.4900e-003	0.0690		227.3652	227.3652	7.7100e-003		227.5580
Total	**0.1864**	**1.3154**	**1.2266**	**5.7000e-003**	**0.3360**	**7.3000e-003**	**0.3434**	**0.0910**	**6.9400e-003**	**0.0979**		**584.8417**	**584.8417**	**0.0433**		**585.9234**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6407	12.0767	13.4786	0.0220		0.7315	0.7315		0.7315	0.7315	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**0.6407**	**12.0767**	**13.4786**	**0.0220**		**0.7315**	**0.7315**		**0.7315**	**0.7315**	**0.0000**	**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0424	1.2164	0.3291	3.4200e-003	0.0814	5.6900e-003	0.0871	0.0234	5.4500e-003	0.0289		357.4766	357.4766	0.0356		358.3654
Worker	0.1440	0.0990	0.8975	2.2800e-003	0.2547	1.6100e-003	0.2563	0.0676	1.4900e-003	0.0690		227.3652	227.3652	7.7100e-003		227.5580
Total	**0.1864**	**1.3154**	**1.2266**	**5.7000e-003**	**0.3360**	**7.3000e-003**	**0.3434**	**0.0910**	**6.9400e-003**	**0.0979**		**584.8417**	**584.8417**	**0.0433**		**585.9234**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.3249					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1650**	**8.4514**	**8.8758**	**0.0135**		**0.4695**	**0.4695**		**0.4328**	**0.4328**		**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0604	0.0415	0.3764	9.6000e-004	0.1068	6.8000e-004	0.1075	0.0283	6.2000e-004	0.0290		95.3467	95.3467	3.2300e-003		95.4276
Total	**0.0604**	**0.0415**	**0.3764**	**9.6000e-004**	**0.1068**	**6.8000e-004**	**0.1075**	**0.0283**	**6.2000e-004**	**0.0290**		**95.3467**	**95.3467**	**3.2300e-003**		**95.4276**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3195	6.6399	9.8512	0.0135		0.3864	0.3864		0.3864	0.3864	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246

Paving	0.3249					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6444**	**6.6399**	**9.8512**	**0.0135**		**0.3864**	**0.3864**		**0.3864**	**0.3864**	**0.0000**	**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0604	0.0415	0.3764	9.6000e-004	0.1068	6.8000e-004	0.1075	0.0283	6.2000e-004	0.0290		95.3467	95.3467	3.2300e-003		95.4276
Total	**0.0604**	**0.0415**	**0.3764**	**9.6000e-004**	**0.1068**	**6.8000e-004**	**0.1075**	**0.0283**	**6.2000e-004**	**0.0290**		**95.3467**	**95.3467**	**3.2300e-003**		**95.4276**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	48.7185					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**48.9607**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0279	0.0192	0.1737	4.4000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		44.0062	44.0062	1.4900e-003		44.0435
Total	**0.0279**	**0.0192**	**0.1737**	**4.4000e-004**	**0.0493**	**3.1000e-004**	**0.0496**	**0.0131**	**2.9000e-004**	**0.0134**		**44.0062**	**44.0062**	**1.4900e-003**		**44.0435**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Archit. Coating	48.7185					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**48.7779**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0279	0.0192	0.1737	4.4000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		44.0062	44.0062	1.4900e-003		44.0435
Total	**0.0279**	**0.0192**	**0.1737**	**4.4000e-004**	**0.0493**	**3.1000e-004**	**0.0496**	**0.0131**	**2.9000e-004**	**0.0134**		**44.0062**	**44.0062**	**1.4900e-003**		**44.0435**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.2931	2.4661	3.0188	0.0124	0.8438	8.6100e-003	0.8524	0.2258	8.0900e-003	0.2339		1,267.9657	1,267.9657	0.1058		1,270.6106
Unmitigated	0.2931	2.4661	3.0188	0.0124	0.8438	8.6100e-003	0.8524	0.2258	8.0900e-003	0.2339		1,267.9657	1,267.9657	0.1058		1,270.6106

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	135.15	25.59	13.19	298,008	298,008
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	135.15	25.59	13.19	298,008	298,008

4.3 Trip Type Information

	Miles	Trip %	Trip Purpose %

Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098
Other Asphalt Surfaces	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
NaturalGas Unmitigated	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1726.42	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0186**	**0.1693**	**0.1422**	**1.0200e-003**		**0.0129**	**0.0129**		**0.0129**	**0.0129**		**203.1083**	**203.1083**	**3.8900e-003**	**3.7200e-003**	**204.3153**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.72642	0.0186	0.1693	0.1422	1.0200e-003		0.0129	0.0129		0.0129	0.0129		203.1083	203.1083	3.8900e-003	3.7200e-003	204.3153
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0186**	**0.1693**	**0.1422**	**1.0200e-003**		**0.0129**	**0.0129**		**0.0129**	**0.0129**		**203.1083**	**203.1083**	**3.8900e-003**	**3.7200e-003**	**204.3153**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Mitigated	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Unmitigated	0.5684	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1335					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4343					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-004	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172
Total	**0.5684**	**7.0000e-005**	**7.5400e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**		**0.0161**	**0.0161**	**4.0000e-005**		**0.0172**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1335					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4343					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-004	7.0000e-005	7.5400e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005		0.0161	0.0161	4.0000e-005		0.0172

Total	**0.5684**	**7.0000e-005**	**7.5400e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**		**0.0161**	**0.0161**	**4.0000e-005**		**0.0172**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

LM Helendale Radar Measurement Facility

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	19.39	1000sqft	0.45	19,395.00	0
Other Asphalt Surfaces	54.22	1000sqft	1.24	54,221.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2021
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Per schedule

Grading - Grading as stated

Trips and VMT - Borrow Pit3 is 1.5 miles

Construction Off-road Equipment Mitigation - Tier 3 engines

Area Mitigation -

Table Name	Column Name	Default Value	New Value

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	200.00	130.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	2.00	15.00
tblGrading	AcresOfGrading	7.50	1.69
tblGrading	AcresOfGrading	7.50	1.00

tblGrading	MaterialImported	0.00	16,209.00
tblGrading	MaterialImported	0.00	16,209.00
tblLandUse	LandUseSquareFeet	19,390.00	19,395.00
tblLandUse	LandUseSquareFeet	54,220.00	54,221.00
tblTripsAndVMT	HaulingTripLength	20.00	1.50
tblTripsAndVMT	HaulingTripLength	20.00	1.50

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.4266	1.6657	1.1526	2.6900e-003	0.1144	0.0683	0.1827	0.0541	0.0653	0.1194	0.0000	234.3272	234.3272	0.0436	0.0000	235.4165
Maximum	**0.4266**	**1.6657**	**1.1526**	**2.6900e-003**	**0.1144**	**0.0683**	**0.1827**	**0.0541**	**0.0653**	**0.1194**	**0.0000**	**234.3272**	**234.3272**	**0.0436**	**0.0000**	**235.4165**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.3137	1.3224	1.2085	2.6900e-003	0.0658	0.0565	0.1223	0.0282	0.0565	0.0847	0.0000	234.3270	234.3270	0.0436	0.0000	235.4163
Maximum	**0.3137**	**1.3224**	**1.2085**	**2.6900e-003**	**0.0658**	**0.0565**	**0.1223**	**0.0282**	**0.0565**	**0.0847**	**0.0000**	**234.3270**	**234.3270**	**0.0436**	**0.0000**	**235.4163**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**26.48**	**20.61**	**-4.85**	**0.00**	**42.48**	**17.24**	**33.05**	**47.83**	**13.45**	**29.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2020**	**3-31-2020**	0.6825	0.4865
2	**4-1-2020**	**6-30-2020**	0.5962	0.4629
3	**7-1-2020**	**9-30-2020**	0.5712	0.4465
		Highest	0.6825	0.4865

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1037	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003
Energy	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	96.3504	96.3504	3.2300e-003	1.1500e-003	96.7747
Mobile	0.0393	0.3485	0.4331	1.7600e-003	0.1140	1.1800e-003	0.1151	0.0306	1.1000e-003	0.0317	0.0000	163.0720	163.0720	0.0127	0.0000	163.3899
Waste						0.0000	0.0000		0.0000	0.0000	4.8799	0.0000	4.8799	0.2884	0.0000	12.0898
Water						0.0000	0.0000		0.0000	0.0000	1.4226	18.6028	20.0254	0.1469	3.6100e-003	24.7727
Total	**0.1463**	**0.3794**	**0.4597**	**1.9500e-003**	**0.1140**	**3.5300e-003**	**0.1175**	**0.0306**	**3.4500e-003**	**0.0340**	**6.3025**	**278.0265**	**284.3290**	**0.4512**	**4.7600e-003**	**297.0284**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Area	0.1037	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003
Energy	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	96.3504	96.3504	3.2300e-003	1.1500e-003	96.7747
Mobile	0.0393	0.3485	0.4331	1.7600e-003	0.1140	1.1800e-003	0.1151	0.0306	1.1000e-003	0.0317	0.0000	163.0720	163.0720	0.0127	0.0000	163.3899
Waste						0.0000	0.0000		0.0000	0.0000	4.8799	0.0000	4.8799	0.2884	0.0000	12.0898
Water						0.0000	0.0000		0.0000	0.0000	1.4226	18.6028	20.0254	0.1469	3.6100e-003	24.7727
Total	**0.1463**	**0.3794**	**0.4597**	**1.9500e-003**	**0.1140**	**3.5300e-003**	**0.1175**	**0.0306**	**3.4500e-003**	**0.0340**	**6.3025**	**278.0265**	**284.3290**	**0.4512**	**4.7600e-003**	**297.0284**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/29/2020	2/18/2020	5	15	
2	Grading	Grading	2/19/2020	3/17/2020	5	20	
3	Building Construction	Building Construction	3/18/2020	9/15/2020	5	130	
4	Paving	Paving	9/16/2020	9/29/2020	5	10	
5	Architectural Coating	Architectural Coating	9/30/2020	10/13/2020	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.69

Acres of Paving: 1.24

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 29,093; Non-Residential Outdoor: 9,698; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	2,026.00	10.80	7.30	1.50	LD_Mix	HDT_Mix	HHDT
Building Construction	7	31.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0412	0.0000	0.0412	0.0220	0.0000	0.0220	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0122	0.1376	0.0578	1.3000e-004		6.1600e-003	6.1600e-003		5.6600e-003	5.6600e-003	0.0000	11.3449	11.3449	3.6700e-003	0.0000	11.4366
Total	**0.0122**	**0.1376**	**0.0578**	**1.3000e-004**	**0.0412**	**6.1600e-003**	**0.0474**	**0.0220**	**5.6600e-003**	**0.0276**	**0.0000**	**11.3449**	**11.3449**	**3.6700e-003**	**0.0000**	**11.4366**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0700e-003	0.1384	0.0148	2.5000e-004	1.3300e-003	8.0000e-005	1.4200e-003	3.7000e-004	8.0000e-005	4.5000e-004	0.0000	24.1494	24.1494	4.7600e-003	0.0000	24.2685
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	2.1000e-004	1.8600e-003	0.0000	4.8000e-004	0.0000	4.9000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4116	0.4116	1.0000e-005	0.0000	0.4120
Total	**3.3200e-003**	**0.1386**	**0.0167**	**2.5000e-004**	**1.8100e-003**	**8.0000e-005**	**1.9100e-003**	**5.0000e-004**	**8.0000e-005**	**5.8000e-004**	**0.0000**	**24.5610**	**24.5610**	**4.7700e-003**	**0.0000**	**24.6804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0185	0.0000	0.0185	9.8800e-003	0.0000	9.8800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1600e-003	0.0631	0.0737	1.3000e-004		2.8100e-003	2.8100e-003		2.8100e-003	2.8100e-003	0.0000	11.3449	11.3449	3.6700e-003	0.0000	11.4366
Total	**3.1600e-003**	**0.0631**	**0.0737**	**1.3000e-004**	**0.0185**	**2.8100e-003**	**0.0214**	**9.8800e-003**	**2.8100e-003**	**0.0127**	**0.0000**	**11.3449**	**11.3449**	**3.6700e-003**	**0.0000**	**11.4366**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0700e-003	0.1384	0.0148	2.5000e-004	1.3300e-003	8.0000e-005	1.4200e-003	3.7000e-004	8.0000e-005	4.5000e-004	0.0000	24.1494	24.1494	4.7600e-003	0.0000	24.2685
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	2.1000e-004	1.8600e-003	0.0000	4.8000e-004	0.0000	4.9000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4116	0.4116	1.0000e-005	0.0000	0.4120
Total	**3.3200e-003**	**0.1386**	**0.0167**	**2.5000e-004**	**1.8100e-003**	**8.0000e-005**	**1.9100e-003**	**5.0000e-004**	**8.0000e-005**	**5.8000e-004**	**0.0000**	**24.5610**	**24.5610**	**4.7700e-003**	**0.0000**	**24.6804**

3.3 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Fugitive Dust					0.0472	0.0000	0.0472	0.0251	0.0000	0.0251	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0135	0.1509	0.0645	1.4000e-004		6.8400e-003	6.8400e-003		6.3000e-003	6.3000e-003	0.0000	12.3896	12.3896	4.0100e-003	0.0000	12.4898
Total	**0.0135**	**0.1509**	**0.0645**	**1.4000e-004**	**0.0472**	**6.8400e-003**	**0.0540**	**0.0251**	**6.3000e-003**	**0.0314**	**0.0000**	**12.3896**	**12.3896**	**4.0100e-003**	**0.0000**	**12.4898**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0700e-003	0.1384	0.0148	2.5000e-004	1.3300e-003	8.0000e-005	1.4200e-003	3.7000e-004	8.0000e-005	4.5000e-004	0.0000	24.1494	24.1494	4.7600e-003	0.0000	24.2685
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.7000e-004	2.4800e-003	1.0000e-005	6.5000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5488	0.5488	2.0000e-005	0.0000	0.5493
Total	**3.4100e-003**	**0.1386**	**0.0173**	**2.6000e-004**	**1.9800e-003**	**8.0000e-005**	**2.0700e-003**	**5.4000e-004**	**8.0000e-005**	**6.3000e-004**	**0.0000**	**24.6982**	**24.6982**	**4.7800e-003**	**0.0000**	**24.8177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0212	0.0000	0.0212	0.0113	0.0000	0.0113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4500e-003	0.0690	0.0808	1.4000e-004		3.1100e-003	3.1100e-003		3.1100e-003	3.1100e-003	0.0000	12.3896	12.3896	4.0100e-003	0.0000	12.4898
Total	**3.4500e-003**	**0.0690**	**0.0808**	**1.4000e-004**	**0.0212**	**3.1100e-003**	**0.0244**	**0.0113**	**3.1100e-003**	**0.0144**	**0.0000**	**12.3896**	**12.3896**	**4.0100e-003**	**0.0000**	**12.4898**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0700e-003	0.1384	0.0148	2.5000e-004	1.3300e-003	8.0000e-005	1.4200e-003	3.7000e-004	8.0000e-005	4.5000e-004	0.0000	24.1494	24.1494	4.7600e-003	0.0000	24.2685
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.7000e-004	2.4800e-003	1.0000e-005	6.5000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5488	0.5488	2.0000e-005	0.0000	0.5493
Total	**3.4100e-003**	**0.1386**	**0.0173**	**2.6000e-004**	**1.9800e-003**	**8.0000e-005**	**2.0700e-003**	**5.4000e-004**	**8.0000e-005**	**6.3000e-004**	**0.0000**	**24.6982**	**24.6982**	**4.7800e-003**	**0.0000**	**24.8177**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1320	0.9612	0.8572	1.4300e-003		0.0517	0.0517		0.0500	0.0500	0.0000	118.0024	118.0024	0.0219	0.0000	118.5500
Total	**0.1320**	**0.9612**	**0.8572**	**1.4300e-003**		**0.0517**	**0.0517**		**0.0500**	**0.0500**	**0.0000**	**118.0024**	**118.0024**	**0.0219**	**0.0000**	**118.5500**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6500e-003	0.0809	0.0200	2.3000e-004	5.2100e-003	3.7000e-004	5.5800e-003	1.5000e-003	3.5000e-004	1.8600e-003	0.0000	21.6972	21.6972	1.9700e-003	0.0000	21.7464
Worker	8.5000e-003	6.8900e-003	0.0626	1.5000e-004	0.0163	1.0000e-004	0.0164	4.3200e-003	1.0000e-004	4.4100e-003	0.0000	13.8229	13.8229	4.7000e-004	0.0000	13.8347
Total	**0.0112**	**0.0878**	**0.0826**	**3.8000e-004**	**0.0215**	**4.7000e-004**	**0.0219**	**5.8200e-003**	**4.5000e-004**	**6.2700e-003**	**0.0000**	**35.5201**	**35.5201**	**2.4400e-003**	**0.0000**	**35.5811**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0417	0.7850	0.8761	1.4300e-003		0.0476	0.0476		0.0476	0.0476	0.0000	118.0023	118.0023	0.0219	0.0000	118.5499
Total	**0.0417**	**0.7850**	**0.8761**	**1.4300e-003**		**0.0476**	**0.0476**		**0.0476**	**0.0476**	**0.0000**	**118.0023**	**118.0023**	**0.0219**	**0.0000**	**118.5499**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6500e-003	0.0809	0.0200	2.3000e-004	5.2100e-003	3.7000e-004	5.5800e-003	1.5000e-003	3.5000e-004	1.8600e-003	0.0000	21.6972	21.6972	1.9700e-003	0.0000	21.7464
Worker	8.5000e-003	6.8900e-003	0.0626	1.5000e-004	0.0163	1.0000e-004	0.0164	4.3200e-003	1.0000e-004	4.4100e-003	0.0000	13.8229	13.8229	4.7000e-004	0.0000	13.8347

Total	**0.0112**	**0.0878**	**0.0826**	**3.8000e-004**	**0.0215**	**4.7000e-004**	**0.0219**	**5.8200e-003**	**4.5000e-004**	**6.2700e-003**	**0.0000**	**35.5201**	**35.5201**	**2.4400e-003**	**0.0000**	**35.5811**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.2000e-003	0.0423	0.0444	7.0000e-005		2.3500e-003	2.3500e-003		2.1600e-003	2.1600e-003	0.0000	5.8829	5.8829	1.8600e-003	0.0000	5.9295
Paving	1.6200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.8200e-003**	**0.0423**	**0.0444**	**7.0000e-005**		**2.3500e-003**	**2.3500e-003**		**2.1600e-003**	**2.1600e-003**	**0.0000**	**5.8829**	**5.8829**	**1.8600e-003**	**0.0000**	**5.9295**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	2.2000e-004	2.0200e-003	0.0000	5.2000e-004	0.0000	5.3000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4459	0.4459	2.0000e-005	0.0000	0.4463
Total	**2.7000e-004**	**2.2000e-004**	**2.0200e-003**	**0.0000**	**5.2000e-004**	**0.0000**	**5.3000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4459**	**0.4459**	**2.0000e-005**	**0.0000**	**0.4463**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6000e-003	0.0332	0.0493	7.0000e-005		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003	0.0000	5.8828	5.8828	1.8600e-003	0.0000	5.9295
Paving	1.6200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.2200e-003**	**0.0332**	**0.0493**	**7.0000e-005**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**5.8828**	**5.8828**	**1.8600e-003**	**0.0000**	**5.9295**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	2.2000e-004	2.0200e-003	0.0000	5.2000e-004	0.0000	5.3000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4459	0.4459	2.0000e-005	0.0000	0.4463
Total	**2.7000e-004**	**2.2000e-004**	**2.0200e-003**	**0.0000**	**5.2000e-004**	**0.0000**	**5.3000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4459**	**0.4459**	**2.0000e-005**	**0.0000**	**0.4463**

3.6 Architectural Coating - 2020

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Archit. Coating	0.2436					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2100e-003	8.4200e-003	9.1600e-003	1.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791
Total	**0.2448**	**8.4200e-003**	**9.1600e-003**	**1.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**	**0.0000**	**1.2766**	**1.2766**	**1.0000e-004**	**0.0000**	**1.2791**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	1.0000e-004	9.3000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2058	0.2058	1.0000e-005	0.0000	0.2060
Total	**1.3000e-004**	**1.0000e-004**	**9.3000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2058**	**0.2058**	**1.0000e-005**	**0.0000**	**0.2060**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2436					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.0000e-004	6.7800e-003	9.1600e-003	1.0000e-005		4.8000e-004	4.8000e-004		4.8000e-004	4.8000e-004	0.0000	1.2766	1.2766	1.0000e-004	0.0000	1.2791
Total	**0.2439**	**6.7800e-003**	**9.1600e-003**	**1.0000e-005**		**4.8000e-004**	**4.8000e-004**		**4.8000e-004**	**4.8000e-004**	**0.0000**	**1.2766**	**1.2766**	**1.0000e-004**	**0.0000**	**1.2791**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	1.0000e-004	9.3000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.2058	0.2058	1.0000e-005	0.0000	0.2060
Total	**1.3000e-004**	**1.0000e-004**	**9.3000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2058**	**0.2058**	**1.0000e-005**	**0.0000**	**0.2060**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0393	0.3485	0.4331	1.7600e-003	0.1140	1.1800e-003	0.1151	0.0306	1.1000e-003	0.0317	0.0000	163.0720	163.0720	0.0127	0.0000	163.3899
Unmitigated	0.0393	0.3485	0.4331	1.7600e-003	0.1140	1.1800e-003	0.1151	0.0306	1.1000e-003	0.0317	0.0000	163.0720	163.0720	0.0127	0.0000	163.3899

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	135.15	25.59	13.19	298,008	298,008
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	135.15	25.59	13.19	298,008	298,008

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098
Other Asphalt Surfaces	0.538252	0.036119	0.174699	0.110250	0.018708	0.005523	0.008817	0.093315	0.001422	0.002225	0.008861	0.000710	0.001098

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	62.7236	62.7236	2.5900e-003	5.4000e-004	62.9480
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	62.7236	62.7236	2.5900e-003	5.4000e-004	62.9480
NaturalGas Mitigated	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	33.6269	33.6269	6.4000e-004	6.2000e-004	33.8267

NaturalGas Unmitigated	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	33.6269	33.6269	6.4000e-004	6.2000e-004	33.8267

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	630144	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	33.6269	33.6269	6.4000e-004	6.2000e-004	33.8267
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**3.4000e-003**	**0.0309**	**0.0260**	**1.9000e-004**		**2.3500e-003**	**2.3500e-003**		**2.3500e-003**	**2.3500e-003**	**0.0000**	**33.6269**	**33.6269**	**6.4000e-004**	**6.2000e-004**	**33.8267**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	630144	3.4000e-003	0.0309	0.0260	1.9000e-004		2.3500e-003	2.3500e-003		2.3500e-003	2.3500e-003	0.0000	33.6269	33.6269	6.4000e-004	6.2000e-004	33.8267
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**3.4000e-003**	**0.0309**	**0.0260**	**1.9000e-004**		**2.3500e-003**	**2.3500e-003**		**2.3500e-003**	**2.3500e-003**	**0.0000**	**33.6269**	**33.6269**	**6.4000e-004**	**6.2000e-004**	**33.8267**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	196859	62.7236	2.5900e-003	5.4000e-004	62.9480
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**62.7236**	**2.5900e-003**	**5.4000e-004**	**62.9480**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	196859	62.7236	2.5900e-003	5.4000e-004	62.9480
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**62.7236**	**2.5900e-003**	**5.4000e-004**	**62.9480**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1037	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003
Unmitigated	0.1037	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0244					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0793					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003
Total	**0.1037**	**1.0000e-005**	**6.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3200e-003**	**1.3200e-003**	**0.0000**	**0.0000**	**1.4000e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0244					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0793					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	6.0000e-005	1.0000e-005	6.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3200e-003	1.3200e-003	0.0000	0.0000	1.4000e-003
Total	**0.1037**	**1.0000e-005**	**6.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3200e-003**	**1.3200e-003**	**0.0000**	**0.0000**	**1.4000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	20.0254	0.1469	3.6100e-003	24.7727
Unmitigated	20.0254	0.1469	3.6100e-003	24.7727

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	4.48394 / 0	20.0254	0.1469	3.6100e-003	24.7727
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**20.0254**	**0.1469**	**3.6100e-003**	**24.7727**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	4.48394 / 0	20.0254	0.1469	3.6100e-003	24.7727
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**20.0254**	**0.1469**	**3.6100e-003**	**24.7727**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	4.8799	0.2884	0.0000	12.0898
Unmitigated	4.8799	0.2884	0.0000	12.0898

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	24.04	4.8799	0.2884	0.0000	12.0898
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**4.8799**	**0.2884**	**0.0000**	**12.0898**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	24.04	4.8799	0.2884	0.0000	12.0898
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**4.8799**	**0.2884**	**0.0000**	**12.0898**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
2005-F-0002

December 20, 2007

Robert W. Wood, Chief
Environmental Management Division
95 ABW/CEV
5 East Popson Avenue, Building 2650A
Edwards Air Force Base, California 93524-8060

Laura Bean
(661) 572-3298

Subject: Biological Opinion on Routine Operations at the Lockheed Martin Aeronautics Company Radar Measurement Facility, Helendale, San Bernardino County, California (1-8-05-F-6)

Dear Mr. Wood:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of Air Force Fight Test Center's (AFFTC) mission defense support activities and projects accomplished at the Lockheed Martin Aeronautics Company (LM Aero) Radar Measurement Facility (facility). This biological opinion analyzes the effects of mission defense support activities on the federally threatened desert tortoise (*Gopherus agassizii*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your November 30, 2004, request for formal consultation was received on December 10, 2004.

This biological opinion is based on information in a memorandum of understanding between the U.S. Air Force and LM Aero (AFFTC 2004), a report on the status of the desert tortoise at the facility (CH2MHill 2002), personal communication with Ray Romero, and our files. A complete administrative record of this consultation is on file in the Ventura Fish and Wildlife Office.

The proposed action is not located within and will not affect critical habitat for this species. Therefore, we will not discuss critical habitat further in this document.

CONSULTATION HISTORY

We provided a draft biological opinion to the Air Force for its review in October 2007 (Service 2007). By letter dated December 5, 2007, the Air Force (2007) requested that we authorize two additional biologists to conduct work at the facility. The Air Force had no additional comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The facility is a state-of-the-art test range for radar. The main operations complex within the facility includes a 7,500-foot-long paved test range with 3 in-line pit stations capable of supporting a wide range of targets for radar testing, 10 buildings that provide over 75,000 square feet of space for building, modifying, and storing aircraft models that are used for radar testing, and a 4,600-foot-long lighted runway for special airlift requirements.

The facility requires routine inspections and maintenance to remain in operation. To ensure peak performance of the test range, LM Aero would repair, upgrade, and/or retrofit existing infrastructure. Most operations and maintenance and all new construction would take place within the developed areas.

Although LM Aero has no current plans for new construction, LM Aero may need to build new infrastructure in the future within the main operations complex. New construction may include expansion of existing paved parking lots, access roads and test range; installation of concrete foundations and buildings, addition of utility tie-ins; and implementation of other similar activities within the main operations complex.

Types of Proposed Activities

Class I. Actions that do not result in new surface disturbance;

Class II. Actions that result in surface disturbance during the season with typically the least desert tortoise activity; and

Class III. Actions that result in surface disturbance during the season with typically the greatest desert tortoise activity.

The distinction between activity classes recognizes the difference in risk to desert tortoises associated with surface disturbance within or outside its periods of greater activity. The season with the greatest activity is March 1 through October 31. The season with the least activity is November 1 through February 28. The following paragraphs describe the types of activities that would occur at the facility.

Class I Activities

Class I activities are generally performed by hand where tools, instruments, and non-ground-disturbing mechanical equipment may be appropriate for the given task. Non-ground-disturbing mechanical equipment includes vehicles primarily used for transportation or lifting purposes such as lowboy tractor and trailer, flat bed, utility trucks, forklifts, scissor lifts, cherry pickers, and mechanical hoists. The majority of these activities would take place within the main operations complex. Vehicles would remain on the existing paved test range, paved roads, or dirt roads. Additionally, vehicles would park within the road, parking lot, runway, or next to the infrastructure in need of maintenance. Labor may involve two to four workers confined to the area in need of maintenance. The area of potential effect would consist of the smallest practical area. Activities would occur on a daily to weekly basis. Class I activities would include, but not be limited to:

a) Model aircraft preparation and repairs
b) Testing model aircraft
c) Inspection and maintenance of buildings, test pits, and other supporting infrastructure
d) Security inspections including the site perimeter
e) Minor security fence repairs
f) Weed abatement adjacent to the test range, paved roads, and buildings

Class II Activities

Class II activities generally involve heavy equipment used to perform routine maintenance, repairs, and any new construction. The majority of operations and maintenance activities and all construction would take place within the main operations complex area. LM Aero would confine equipment to an area except when that equipment is needed to repair the existing paved test range and paved roads, and when grading dirt roads. Heavy equipment may include a motor grader, bulldozer, front-end loader, backhoe, water truck, asphalt pavers, and dump truck. Labor may involve one to eight workers confined to an area in need of maintenance or construction. The area of potential effect would consist of the smallest practicable area. LM Aero would perform these operations and maintenance activities and construction on a yearly basis. Class II activities would involve the following:

a) Under ground utility (i.e., water, sewage, electrical, communication, etc.) repairs, upgrades and tie-ins to new structures
b) New construction of buildings and concrete foundations
c) Removal and replacement of obsolete equipment or structures
d) Motor grading and repairs of existing dirt roads, shoulders, berms, and manmade drainages for flood control
e) Re-surfacing, pothole repairs, and expansion of the asphalt roads, parking lots, and test range
f) Major security fence repairs

Class III Activities

Class III activities are identical to those described under Class II, but LM Aero would carry out these activities during the season with the greatest desert tortoise activity. LM Aero recognizes these activities would present a greater potential risk to the desert tortoise. Therefore, LM Aero would implement an additional protection measure during Class III activities.

Protective Measures for the Desert Tortoise

LM Aero will implement several protection measures to avoid or reduce potential impacts to the desert tortoise during operations and maintenance and new construction within the facility. The following protection measures for the desert tortoise are organized according to the three classes identified for activities at the facility.

Class I Activities

LM Aero will implement the following measures for Class I activities.

a) LM Aero will continue to present desert tortoise awareness training to all facility staff and visitors prior to the onset of performing any work. The staff will receive a refresher course once a year. The Service will approve the final program for desert tortoise awareness. The program will include information on desert tortoise biology and ecology, threats, laws protecting the species, protection measures, penalties for violations, and reporting requirements. Only Service-authorized personnel will handle or relocate desert tortoises.

b) The authorized personnel will move the animal a safe distance from LM Aero activities. LM Aero will submit the credentials of these individuals to the Service for review and approval at least 15 days prior to the onset of activities. No activities will begin until the Service approves these individuals.

c) Service-authorized personnel will only collect and relocate desert tortoise shells from areas where activities may destroy them. Service-authorized personnel will move and place the shell a safe distance from the activities. The shell will remain in the desert.

d) Facility staff and visitors will report desert tortoise encounters to the Service-authorized personnel or designated LM Aero field contact representative.

e) The field contact representative and Service-authorized personnel will have the authority to halt any non-emergency activity.

f) LM Aero will post a sign at the facility entrance gate. This sign will inform people of the protected status of the desert tortoise and inform them not to handle them if encountered.

g) LM Aero will inspect for desert tortoises underneath parked vehicles prior to moving.

h) Vehicles will remain on designated routes of travel.

i) LM Aero will enforce a 25-mile-per-hour speed limit on dirt roads within desert tortoise habitat.

j) Litter will be properly contained within outdoor closed-lid receptacles.

k) LM Aero will undertake measures to reduce facility attractiveness to nesting common ravens (*Corvus corax*).

l) LM Aero will not allow firearms onsite with the exception of security personnel.

m) LM Aero will not allow employees and visitors to bring dogs onsite.

n) LM Aero will only use herbicides having minimal effects on wildlife.

o) Killed or injured desert tortoises resulting from activities at the facility will be reported to the Service within 3 days. The notification will be made in writing to the Service's Division of Law Enforcement in Torrance, 370 Amapola Avenue, Suite 114, Torrance, California 90501; telephone (310) 328-1516 and the Service's Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California 93003; telephone (805) 644-1766. The report will include the date and time of the finding, location of the carcass, a photograph, cause of death if known, and other pertinent information.

p) LM Aero will transport desert tortoises that are injured as a result of activities at the facility to a qualified veterinarian at the expense of LM Aero. If the animal survives, LM Aero will contact the Service regarding the final disposition of the animal.

q) Each year, LM Aero will submit an annual report to the AFFTC documenting the number of desert tortoises killed, injured, handled, and relocated as well as the acreage of habitat disturbance. The AFFTC will be responsible for submitting the LM Aero report along with its own reports to the Service each year.

Class II Activities

In addition to the measures identified under Class I, LM Aero will also implement the following measures for Class II activities within desert tortoise habitat. Activities taking place within the paved main operations complex would not be subject to these measures.

a) Service-authorized personnel will perform a full coverage pre-activity survey of the area of potential effect within 24 hours of the maintenance activity.

b) If LM Aero is unable to avoid a desert tortoise within the area of potential effect, the Service-authorized personnel will relocate the animal to outside the area of potential effect.

c) If LM Aero is unable to avoid an occupied burrow, the Service-authorized personnel will be responsible for excavating and placing the desert tortoise within a nearby abandoned natural burrow or constructed artificial burrow outside the area of potential effect.

d) Service-authorized personnel will adhere to the Desert Tortoise Council's (1999) guidelines for handling desert tortoises or more recent guidance provided by the Service.

e) Steep dirt road shoulders will be graded and sloped to no greater than a 3:1 ratio.

f) LM Aero will inspect open trenches from operation and maintenance activities in the morning, afternoon, and evening. Either the trench will be fenced or ramped or some other method will be implemented to prevent desert tortoise entrapment. If a desert tortoise becomes trapped, Service-authorized personnel will carefully remove and relocate the animal before work continues.

g) Activities, vehicles, and staging areas will be restricted to pre-determined corridors, access routes, and previously disturbed areas as practicable. Stakes, flagging or any other suitable means of marking will designate these areas.

h) Activities will take place within the smallest practical area to minimize habitat disturbance.

Class III Activities

In addition to the measures identified under Class I and II, LM Aero will implement the following measures for Class III activities within desert tortoise habitat.

a) Service-authorized personnel will be onsite to monitor activities, minimize potential impacts to the desert tortoise, and ensure the protection measures are enforced.

LM Aero has requested that the Service approve Ray Romero, Kathy Buescher-Simon, and Kent W. Hughes as authorized biologists under the auspices of this biological opinion. LM Aero proposes to have an authorized biologist, who has been approved by the Service, perform the awareness trainings, pre-activity surveys, monitoring, relocations, and reporting requirements. The authorized biologist will be responsible for training LM Aero employees to take over these long-term responsibilities. LM Aero employees will also attend a Desert Tortoise Council workshop in Ridgecrest; this annual workshop provides general information on the status of the desert tortoise and how to protect it while working in its habitat.

STATUS OF THE DESERT TORTOISE

Basic Ecology of the Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave desert scrub, and the lower Colorado River Valley subdivision of Sonoran desert scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally found in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet Luckenbach 1982, Schamberger and Turner 1986).

Desert tortoises may spend more time in washes than in flat areas outside of washes; Jennings (1997) notes that, between March 1 and April 30, desert tortoises "spent a disproportionately longer time within hill and washlet strata" and, from May 1 through May 31, hills, washlets, and washes "continued to be important." Jennings' paper does not differentiate between the time desert tortoises spent in hilly areas versus washes and washlets; however, he notes that, although washes and washlets comprised only 10.3 percent of the study area, more than 25 percent of the plant species on which desert tortoises fed were located in these areas. Luckenbach (1982) states that the "banks and berms of washes are preferred places for burrows;" he also recounts an incident in which 15 desert tortoises along 0.12 mile of wash were killed by a flash flood.

Desert tortoises are most active in California during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Desert tortoises spend most of their time in the remainder of the year in burrows, escaping the extreme conditions of the desert; however, recent work has demonstrated that they can be active at any time of the year. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and Service (1994c).

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, which is greatly influenced by climatic factors, such as the timing and amount of rainfall, temperatures, and wind (Beatley 1969, 1974, Congdon 1989, Karasov 1989, Polis 1991 in Avery 1998). In the Mojave Desert, these climatic factors are typically highly variable; this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet often consists of a few species (Nagy and Medica 1986, Jennings 1993 in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring; they ate cacti and herbaceous perennials once the winter annuals began to disappear. Medica et al. (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable; Avery (1998) found that desert tortoises rarely ate perennial grasses.

Desert tortoises can produce from one to three clutches of eggs per year. On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), which, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals must survive each year until they reach adult size; after this time, annual survivorship exceeds 90 percent (Congdon et al. 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient information on the demography of the desert tortoise to determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac; the yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring. However, neonates will eat if food is available to them at the time of hatching; when food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different than those of subadults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults. They are active earlier in the season. Finally, small desert tortoises rely on smaller annual plants with greater protein content to be able to gain access to food and to grow, respectively.

Status of the Desert Tortoise

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326).

In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178).

The desert tortoise was listed in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species.

The following paragraphs provide general information on the results of efforts to determine the status and trends of desert tortoise populations across a large portion of its range; we present information on the status of the desert tortoise within the action area in the Environmental Baseline section of this biological opinion. We have grouped these paragraphs by recovery unit and critical habitat unit; we will describe these units in more detail later in this biological opinion.
Before entering into a discussion of the status and trends of desert tortoise populations across its range, a brief discussion of the methods of estimating the numbers of desert tortoises would be useful. Three primary methods have been widely used: permanent study plots, triangular transects, and line distance sampling.

Generally, permanent study plots are defined areas that are visited at roughly 4-year intervals to determine the numbers of desert tortoises present. Desert tortoises found on these plots during the spring surveys were registered; that is, they were marked so they could be identified individually during subsequent surveys. Between 1971 and 1980, 27 plots were established in

California to study the desert tortoise; 15 of these plots were used by the Bureau to monitor desert tortoises on a long-term basis (Berry 1999). Range-wide, 49 plots have been used at one time or another to attempt to monitor desert tortoises (Tracy et al. 2004).

Triangular transects are used to detect sign (i.e., scat, burrows, footprints, etc.) of desert tortoises. The number of sign is then correlated with standard reference sites, such as permanent study plots, to allow the determination of density estimates.

Finally, line distance sampling involves walking transects while trying to detect live desert tortoises. Based on the distance of the desert tortoise from the centerline of the transect, the length of the transect, and a calculation of what percentage of the animals in the area were likely to have been above ground and visible to surveyors during the time the transect was walked, an estimation of the density can be made. Each of these methods has various strengths and weaknesses; the information we present on the density of desert tortoises across the range and in the action area is based on these methods of collecting data.

Note that, when reviewing the information presented in the following sections, determining the number of desert tortoises over large areas is extremely difficult. The report prepared by the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) acknowledges as much. Desert tortoises spend much of their lives underground or concealed under shrubs, are not very active in years of low rainfall, and are distributed over a wide area in several different types of habitat. Other factors, such as the inability to sample on private lands and rugged terrain, further complicate sampling efforts. Consequently, the topic of determining the best way to estimate the abundance of desert tortoises has generated many discussions over the years. As a result of this difficulty, we cannot provide concise estimations of the density of desert tortoises in each recovery unit or desert wildlife management area that have been made in a consistent manner.

Given the difficulty in determining the density of desert tortoises over large areas, the reader needs to understand fully that the differences in density estimates in the recovery plan and those derived from subsequent sampling efforts may not accurately reflect on-the-ground conditions.

Despite this statement, the reader should also be aware that the absence of live desert tortoises and the presence of carcasses over large areas of some desert wildlife management areas provide at least some evidence that desert tortoise populations seem to be in a downward trend in some regions.

Upper Virgin River Recovery Unit

The Upper Virgin River Recovery Unit is located in the northeastern most portion of the range of the desert tortoise; the Red Cliffs Reserve was established as a conservation area within this critical habitat unit. The recovery plan states that desert tortoises occur in densities of up to 250 adult animals per square mile within small areas of this recovery unit; overall, the area supports a mosaic of areas supporting high and low densities of desert tortoises (Service 1994c).

We have summarized the information in this paragraph from a report by the Utah Division of Wildlife Resources (McLuckie et al. 2003). The Utah Division of Wildlife Resources has intensively monitored desert tortoises, using a distance sampling technique, since 1998. Monitoring in 2003 indicated that the density of desert tortoises was approximately 44 per square mile throughout the reserve. This density represents a 41 percent decline since monitoring began in 1998. The report notes that the majority of desert tortoises that died within one year (n=64) were found in areas with relatively high densities; the remains showed no evidence of predation. Upper respiratory tract disease has been observed in this population; the region also experienced a drought from 1999 through 2002, with 2002 being the driest year. McLuckie et al. (2003) attribute the primary cause of the die-off to drought, but note that disease, habitat degradation, direct mortality of animals, and predation by domestic dogs and common ravens were also factors in the decline. The average density of desert tortoises in this recovery unit, based on line-distance sampling conducted in 2001, 2003, and 2005 was 59.4 per square mile (Service 2006c).

Northeastern Mojave Recovery Unit

The Northeastern Mojave Recovery Unit is located to the southwest of the Upper Virgin River Recovery Unit and extends through Nevada and into California in Ivanpah Valley. Several critical habitat units and four desert wildlife management areas are located within this recovery unit. Tracy et al. (2004) note that densities of adult desert tortoises for the overall region do not show a statistical trend over time.

The Beaver Dam Slope Desert Wildlife Management Area covers portions of Nevada, Utah, and Arizona; it is located to the southwest of the Red Cliffs Reserve. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 5 to 56 animals per square mile (Service 1994c). McLuckie et al. (2001) estimated the density in 2001 to be approximately 7.9 reproductive desert tortoises per square mile, using a distance sampling method. However, they also note several problems with the sampling effort, including too few transects and transects placed in habitat types not normally inhabited by desert tortoises; we also note that, as described in the previous paragraph, the survey occurred during a year of lower-than-average rainfall, which would decrease activity levels of desert tortoises and make them more difficult to detect. The encounter rate during this survey was so low that the precision level of the results is low; other monitoring plots, from earlier years, showed higher density estimates.

The Gold Butte-Pakoon Desert Wildlife Management Area covers portions of Nevada and Arizona, generally south of the Beaver Dam Slope Desert Wildlife Management Area. The recovery plan states that densities of desert tortoises in this recovery unit vary from 5 to 56 animals per square mile (Service 1994c).

The Mormon Mesa Desert Wildlife Management Area is located entirely in Nevada, generally west and northwest of the Beaver Dam Slope and Gold Butte-Pakoon desert wildlife management areas, respectively. The recovery plan states that densities of desert tortoises in this recovery unit vary from 41 to 87 subadult and adult animals per square mile (Service 1994c).

The Coyote Springs Desert Wildlife Management Area is located entirely in Nevada, generally west of the Mormon Mesa Desert Wildlife Management Area and east of the Desert National Wildlife Refuge. The recovery plan states that densities of desert tortoises in this recovery unit vary from 0 to 90 adult animals per square mile (Service 1994c). Kernel analysis for the Coyote Springs Desert Wildlife Management Area showed areas where the distributions of carcasses and living desert tortoises do not overlap (Tracy et al. 2004); this scenario is indicative of a higher than average rate of mortality. (The Desert Tortoise Recovery Plan Assessment Committee used a kernel analysis to examine the distribution of live desert tortoises and carcasses over large areas of the range of the species (Tracy et al. 2004). The intent of this analysis is to determine where large areas with numerous carcasses do not overlap large areas with live animals. Regions where the areas of carcasses do not overlap areas of live animals likely represent recent die-offs or declines in desert tortoise populations.) Because permanent study plots for this region were discontinued after 1996, recent declines in numbers would not be reflected in the kernel analysis if they had occurred.

The Ivanpah Desert Wildlife Management Area lies east of the Mojave National Preserve and covers approximately 36,795 acres. It is contiguous with National Park Service lands; note that the National Park Service did not designate desert wildlife management areas within the Mojave National Preserve because it considers that all of its lands are managed in a manner that is conducive to the recovery of the desert tortoise. The permanent study plot in the Ivanpah Valley is located within the Mojave National Preserve and provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1986, 1990, and 1994; the densities of desert tortoises of all sizes per square mile were 386, 393, 249, and 164, respectively (Berry 1996). (Numerous data sets are collected from the study plots and various statistical analyses conducted to provide information on various aspects of trends. We cannot, in this biological opinion, provide all of this information; therefore, we have selected the density of desert tortoises of all sizes per square mile to attempt to indicate trends.) The number of juvenile and immature desert tortoises on the study plot declined, although the number of adult animals remained fairly constant. The notes accompanying this report indicated that the "ill juvenile and dead adult male (desert) tortoises salvaged for necropsy contained contaminants;" it also cited predation by common ravens and the effects of cattle grazing as causative factors in the decline in the number of juvenile and immature desert tortoises on the study plot (Berry 1996). In 2002, workers found 55 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005).
The average density of desert tortoises in this recovery unit was 5.1 per square mile (Service 2006c). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Eastern Mojave Recovery Unit

The Eastern Mojave Recovery Unit extends from west of Clark Mountain, south through the Mojave National Preserve, and east into southern Nevada. Within this recovery unit, the Bureau designated the Shadow Valley and Piute-Fenner desert wildlife management areas within California and the Piute-El Dorado Desert Wildlife Management Area in Nevada.
The Shadow Valley Desert Wildlife Management Area, which occupies approximately 101,355 acres, lies north of Interstate 15 and west of the Clark Mountains. The Mojave National Preserve is located to the south of the interstate. Data on desert tortoises on a permanent study plot in this area were collected in 1988 and 1992; the densities of desert tortoises of all sizes per square mile were 50 and 58, respectively (Berry 1996). Although these data seem to indicate a slight increase in the number of desert tortoises, in 2002, workers found five desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). Some signs of shell disease have been observed in the population in recent years (Bureau 2002).

The Bureau's Piute-Fenner Desert Wildlife Management Area lies to the east of the southeast portion of the Mojave National Preserve and is contiguous with National Park Service lands. It occupies approximately 173,850 acres. The Goffs permanent study plot, which is located within the Mojave National Preserve, provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1990, and 1994; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 440, 362, and 447 individuals per square mile, respectively. As Berry (1996) noted, these data seem to indicate that this area supported "one of the more stable, high density populations" of desert tortoises within the United States. Berry (1996) also noted that "a high proportion of the animals (had) shell lesions." In 2000, only 30 live desert tortoises were found; Berry (2000) estimated the density of desert tortoises at approximately 88 animals per square mile. The shell and skeletal remains of approximately 393 desert tortoises were collected; most of these animals died between 1994 and 2000. Most of the desert tortoises exhibited signs of shell lesions; three salvaged desert tortoises showed abnormalities in the liver and other organs and signs of shell lesions. None of the three salvaged desert tortoises tested positive for upper respiratory tract disease.

The Piute-Eldorado Desert Wildlife Management Area is located entirely in southern Nevada and is contiguous with California's Piute-Fenner Desert Wildlife Management Area. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 40 to 90 adults per square mile (Service 1994c). A kernal analysis of the results of distance sampling data from 2001 depicted large areas where only carcasses were detected (Tracy et al. 2004). Only six live desert tortoises were encountered in approximately 103 miles of transects during this sampling effort; this encounter rate is very low.

The average density of desert tortoises in this recovery unit was 54.3 per square mile (Service 2006c). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Northern Colorado Recovery Unit

The Northern Colorado Recovery Unit extends from Interstate 40 south, almost to Interstate 10 and from the eastern portions of Joshua Tree National Park east to the Colorado River; it is located immediately south of the Eastern Mojave Recovery Unit. The 874,843-acre Chemehuevi Desert Wildlife Management Area, which is managed by the Bureau, is the sole conservation area for the desert tortoise in this recovery unit.

Two permanent study plots are located within this desert wildlife management area. At the Chemehuevi Valley and Wash plot, 257 and 235 desert tortoises were registered in 1988 and 1992, respectively (Berry 1999). During the 1999 spring survey, only 38 live desert tortoises were found. The shell and skeletal remains of at least 327 desert tortoises were collected; most, if not all, of these animals died between 1992 and 1999. The frequency of shell lesions and nutritional deficiencies appeared to be increasing and may be related to the mortalities.

The Upper Ward Valley permanent study plot was surveyed in 1980, 1987, 1991, and 1995; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 437, 199, 273, and 447 individuals per square mile, respectively. In 2002, workers found 17 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). The average density of desert tortoises in this recovery unit was 19.0 per square mile (Service 2006c). The line-distance sampling from which this density was derived was conducted in 2001, 2003, 2004, and 2005.

Eastern Colorado Recovery Unit

The Eastern Colorado Recovery Unit, which is located immediately south of the Northern Colorado Recovery Unit, extends from just north of Interstate 10 south to the Mexico border near Yuma, Arizona; the Salton Sink and Imperial Valley form the western edge of this recovery unit, which extends east to the Colorado River. The Chuckwalla Desert Wildlife Management Area, which covers 818,685 acres, is the sole conservation area for the desert tortoise in this recovery unit. The Marine Corps (Chocolate Mountains Aerial Gunnery Range), Bureau, and National Park Service (Joshua Tree National Park) manage the Federal lands in this recovery unit and desert wildlife management area. Two permanent study plots are located within this desert wildlife management area.

At the Chuckwalla Bench plot, Berry (1996) calculated approximate densities of 578, 396, 167, 160, and 182 desert tortoises per square mile in 1979, 1982, 1988, 1990, and 1992, respectively. In 1997, workers found 52 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). At the Chuckwalla Valley plot, Berry (1996) calculated approximate densities of 163, 181, and 73 desert tortoises per square mile in 1980, 1987, and 1991, respectively. Tracy et al. (2004) concluded that these data show a statistically significant decline in the number of adult desert tortoises over time; they further postulate that the decline on the Chuckwalla Bench plot seemed to be responsible for the overall significant decline within the recovery unit.

The average density of desert tortoises in this recovery unit was 18.1 per square mile (Service 2006c). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Western Mojave Recovery Unit

Although desert tortoises were historically widespread in the western Mojave Desert, their distribution within this region was not uniform. For example, desert tortoises likely occurred at low densities in the juniper woodlands of the western Antelope Valley and in the sandier habitats in the Mojave River valley. They were also likely largely absent from the higher elevations of the Ord and Newberry mountains and from playas and the areas immediately surrounding these dry lakes. Several large areas of land that are not managed by the Bureau lie within the Western Mojave Recovery Unit; because of their size, these areas are not affected by the Bureau's management of public lands and are therefore not part of the action area for this consultation.

These areas lie primarily on military bases, within Joshua Tree National Park, and in areas of private land.

Desert tortoises occur over large areas of Fort Irwin, which is managed by the Department of the Army (Army). At Fort Irwin, the Army conducts realistic, large-scale exercises with large numbers of wheeled and tracked vehicles. In areas where training has occurred for many decades, desert tortoises persist in relatively low numbers primarily on the steep, rugged slopes of the mountain ranges that occur throughout Fort Irwin. Through Public Law 107-107, approximately 118,600 acres were added to Fort Irwin along its southwestern and eastern boundaries in 2002. Approximately 97,860 acres of the Superior-Cronese Critical Habitat Unit lie along the original southern boundary of Fort Irwin and in the parcel to the southwest that was added in 2002 (Charis Professional Services Corporation 2003, Army 2004). Currently, the Army may conduct some low intensity training in these areas on occasion and some preparations for the onset of force-on-force training should begin soon. To date, these parcels have not been used for force-on-force training; within the next few years, the Army will begin to use a large portion of these lands for maneuvers with numerous wheeled and tracked vehicles. In our biological opinion regarding the effects of the use of these lands for training on the desert tortoise (Service 2004), we noted that approximately 1,299 to 1,349 adult desert tortoises may occur within the action area for that consultation. The Army established several conservation areas, totaling approximately 16,900 acres, just inside the boundaries of Fort Irwin where maneuvers would not occur. The Army calculated that approximately 152 desert tortoises may reside within these areas; these animals are unlikely to be affected by use of the new training lands. Additionally, because of other restrictions that the Army will follow during training, approximately 5,500 acres of critical habitat of the desert tortoise within the additional training lands will not be used for force-on-force training. These lands lie primarily on and around dry lakes, which generally do not support large numbers of desert tortoises, because the lake beds themselves do not provide suitable habitat and the areas immediately surrounding the playas usually support substrates composed of clays and silt that are not suitable for burrowing. Finally, in the Eastgate portion of Fort Irwin, approximately 288 desert tortoises may be exposed to additional training; however, most of these animals are located in an area that is unlikely to receive much used by vehicles and are thus unlikely to be affected. The Army and Service have agreed that desert tortoises within new training areas that are likely to be killed by maneuvers will be translocated to newly acquired lands to the south of Fort Irwin; a plan for this translocation is currently under development.

The Navy has designated approximately 200,000 acres of the South Range at the Naval Air Weapons Station, China Lake as a management area for the desert tortoise (Service 1995). Through a consultation with the Service (1992), the Navy agreed to try to direct most ground-disturbing activities outside of this area, to use previously disturbed areas for these activities when possible, and to implement measures to reduce the effects of any action on desert tortoises. This area also encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station; it continues to be used as an active bombing range for military test and training operations by the Navy and Department of Defense. In the 3 years for which we had annual reports available, activities conducted by the Navy did not kill or injure any desert tortoises (Navy 1995, 2001, 2002). In general, desert tortoises occur in low densities on the North Range of the Naval Air Weapons Station; Kiva Biological Consulting and McClenahan and Hopkins Associates (in Service 1992) reported that approximately 136 square miles of the North Range supported densities of 20 or fewer desert tortoises per square mile. The South Range supported densities of 20 or fewer desert tortoises per square mile over an area of approximately 189 square miles and densities of greater than 20 per square mile on approximately 30 square miles. The higher elevations and latitude in this area may be responsible for these generally low densities (Weinstein 1989 in Bureau et al. 2005).

The Indian Wells Valley, which is located to the southwest of the Naval Air Weapons Station, likely supported desert tortoises at higher densities in the past. Urban, suburban, and agricultural development in this area is likely cause of the lower densities that are currently found in this area.

Edwards Air Force Base is used primarily to test aircraft and weapons systems used by the Department of Defense. Desert tortoises occur over approximately 220,800 acres of the installation. Approximately 80,640 acres of the base have been developed for military uses or are naturally unsuitable for use by desert tortoises, such as Rogers and Rosamond dry lakes. Based on surveys conducted between 1991 and 1994, approximately 160,640 acres of the base supported 20 or fewer desert tortoises per square mile. Approximately 55,040 acres supported densities between 21 and 50 desert tortoises per square mile; from 51 to 69 desert tortoises per square mile occurred on several smaller areas that totaled 5,120 acres (U.S. Air Force 2004). We expect that current densities are somewhat lower, given the regional declines in desert tortoise numbers elsewhere in the Western Mojave Recovery Unit.

Desert tortoises may have been more common in the past the area west of Highway 14 between the town of Mojave and Walker Pass; high levels of off-road vehicle use and extensive livestock grazing are potential causes for the current scarcity of desert tortoises in this area. Four townships of private land east of the city of California City and south of the Rand Mountains supported large numbers of desert tortoises as late as the 1970s; high levels of off-road vehicle use, extensive grazing of sheep, scattered development, and possibly poaching have greatly reduced the density of desert tortoises in this area.

The direct and indirect effects of urban and suburban development extending from Lancaster in the west to Lucerne Valley in the east has largely eliminated desert tortoises from this area. A few desert tortoises remain on the northern slopes of the San Bernardino Mountains, south of Lucerne Valley; however, they seem to be largely absent from the portion of this area in Los Angeles County (Bureau et al. 2005).

The northern portion of Joshua Tree National Park is within the planning area for the West Mojave Plan. Given the general patterns of visitor use at Joshua Tree National Park, we expect that this area receives little use.

Private lands between the northern boundary of Joshua Tree National Park and the southern boundary of the Marine Corps Air Ground Combat Center continue to support desert tortoises; the primary threat to desert tortoises in this area is urbanization.

Desert tortoises occur within the Marine Corps Air Ground Combat Center in densities of greater than 50 per square mile in limited areas; most of the installation, however, supports from 0 to 5 animals per square mile (Jones and Stokes Associates 1998 in Natural Resources and Environmental Affairs Division 2001). The Marine Corps' integrated natural resource management plan also notes that the number of desert tortoises may have declined in the more heavily disturbed areas of the Marine Corps Air Ground Combat Center and that vehicles, common ravens, and dogs are responsible for mortalities. In general, the Marine Corps Air Ground Combat Center supports a wide variety of training exercises that include the use of tracked and wheeled vehicles and live fire.

The average density of desert tortoises in this recovery unit was 16.4 per square mile (Service 2006c). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Recovery Plan for the Desert Tortoise

The recovery plan for the desert tortoise is the basis and key strategy for recovery and delisting of the desert tortoise. The recovery plan divides the range of the desert tortoise into 6 distinct population segments or recovery units and recommends the establishment of 14 desert wildlife management areas throughout the recovery units. Within each desert wildlife management area, the recovery plan recommends implementation of reserve level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that desert wildlife management areas be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994c). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;

2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;

3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (lambdas) are maintained at or above 1.0;

4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Endangered Species Act in the foreseeable future.

The recovery plan based its descriptions of the six recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994c). The recovery plan (pages 24 to 26 from Service 1994c) describes the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotype across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

Assessment of the Recovery Plan

In 2003, the Service appointed a group of researchers to conduct a scientific assessment of the recovery plan for the desert tortoise, which was completed in 1994. This group, called the Desert Tortoise Recovery Plan Assessment Committee, completed its assessment in 2004. The group found that the recovery plan was "fundamentally sound, but some modifications for contemporary management will likely make recovery more successful" (Tracy et al. 2004). The group also found that analyses showed desert tortoise populations were declining in some portions of the range, assessing the density of desert tortoises is difficult, and "the original paradigm of desert tortoises being recovered in large populations relieved of intense threats may be flawed…"(Tracy et al. 2004). Finally, the group reviewed the distinct population segments (or recovery units) described in the recovery plan and concluded they should be modified; briefly, the Desert Tortoise Recovery Plan Assessment Committee recommends leaving the Western Mojave and Upper Virgin River units intact and recombining the remaining four into three distinct population segments.

The Service subsequently determined that the recovery plan for the desert tortoise should be revised, with a substantial level of input from stakeholders. We propose to release a draft revised recovery plan in late 2007.

Relationship of Recovery Units, Distinct Population Segments, Desert Wildlife Management Areas, and Critical Habitat Units

The recovery plan (Service 1994c) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between these areas are vaguely defined. In some cases, such as where the Western Mojave Recovery Unit borders the Eastern Mojave Recovery Unit, a long, low-lying, arid valley provides a fairly substantial separation of recovery units. In other areas, such as where the Eastern Mojave Recovery Unit borders the Northern Colorado Recovery Unit, little natural separation exists. Because of the vague boundaries, the acreage of these areas has not been quantified. Over the years, workers have commonly referred to the areas as "recovery units;" the term "distinct population segment" has not been in common use. As mentioned previously in the Assessment of the Recovery Plan section of this biological opinion, the Desert Tortoise Recovery Plan Assessment Committee suggests that five recovery units (or distinct population segments) would more appropriately represent variation across the range of the desert tortoise rather than the six described in the recovery plan; because this concept is not yet universally accepted, we will continue to refer to the recovery units described in the recovery plan in this biological opinion.

The recovery plan recommended that land management agencies establish one or more desert wildlife management areas within each recovery unit. As mentioned previously in the Recovery Plan for the Desert Tortoise section of this biological opinion, the recovery plan recommended that these areas receive reserve-level management to remove or mitigate the effects of the human activities responsible for declines in the number of desert tortoises. As was the case for the recovery units, the recovery plan did not determine precise boundaries for the desert wildlife management areas; the recovery team intended for land management agencies to establish these boundaries, based on the site-specific needs of the desert tortoise. At this time, desert wildlife management areas have been established throughout the range of the desert tortoise, except in the Western Mojave Recovery Unit.

Based on the recommendations contained in the draft recovery plan for the desert tortoise (59 *Federal Register* 5820), the Service designated critical habitat units throughout the range of the desert tortoise. The 14 critical habitat units have defined boundaries and cover specific areas throughout the 6 recovery units.

The Bureau used the boundaries of the critical habitat units and other considerations, such as conflicts in management objectives and more current information, to propose and designate desert wildlife management areas through its land use planning processes. In California, the Bureau also classified these desert wildlife management areas as areas of critical environmental concern, which, as we mentioned in the Description of the Proposed Action section of this biological opinion, allows the Bureau to establish management goals for specific resources in defined areas. Through the land use planning process, the Bureau established firm boundaries for the desert wildlife management areas.

Finally, we note that the Department of Defense installations and National Park Service units in the California desert did not establish desert wildlife management areas on their lands. Where the military mission is compatible with management of desert tortoises and their habitat, the Department of Defense has worked with the Service to conserve desert tortoises and their habitat. Examples of such overlap include the bombing ranges on the Navy's Mojave B and the Chocolate Mountains Aerial Gunnery Ranges; although the target areas are heavily disturbed, most of the surrounding land remains undisturbed. Additionally, the Army has established several areas along the boundaries of Fort Irwin where training with vehicles is prohibited; desert tortoises persist in these areas, which are contiguous with lands off-base. We discussed the situation at Joshua Tree National Park in the Status of Critical Habitat section of this biological opinion. The National Park Service did not establish desert wildlife management areas within the Mojave National Preserve, because the entire preserve is managed at a level that is generally consistent with the spirit and intent of the recovery plan for the desert tortoise.

The following table depicts the relationship among recovery units, desert wildlife management areas, and critical habitat units through the range of the desert tortoise.

Critical Habitat Unit	**Desert Wildlife Management Area**	**Recovery Unit**	**State**	**Size of Critical Habitat Unit (acres)**
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/ Eastern Colorado	CA	171,700
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado- CA Piute-Eldorado- NV	Fenner Piute-Eldorado	Eastern Mojave Northeastern Mojave/ Eastern Mojave	CA NV	453,800 516,800
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam: NV UT AZ	 Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)	 NV UT AZ	 87,400 74,500 42,700
Gold Butte-Pakoon NV AZ	 Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)	 NV AZ	 192,300 296,000
Mormon Mesa	Mormon Mesa Coyote Spring	Northeastern Mojave	NV	427,900
Upper Virgin River	Upper Virgin River	Upper Virgin River	UT	54,600

Recent Fires

Since December 2004, numerous wildfires have occurred in desert tortoise habitat across its range. Although we know that some desert tortoises were killed by the wildfires, mortality estimates are not available at this time. We estimate that approximately 500,000 acres of potential desert tortoise habitat burned in the Northeastern Mojave Recovery unit in 2005. This number includes areas of critical habitat that burned, which are noted in the following table. All data are from Clayton (2005).

Recovery Unit	Critical Habitat Unit	Acres Burned
Upper Virgin River	Upper Virgin River	10,446
Northeastern Mojave	Beaver Dam Slope	46,757
Northeastern Mojave	Gold Butte-Pakoon	62,466
Northeastern Mojave	Mormon Mesa	15,559
Eastern Mojave	Piute-Eldorado	154
Eastern Mojave	Ivanpah	1,065
Total		136,447

The 136,447 acres of critical habitat that burned represent approximately 2.1 percent of the total amount of critical habitat that was designated for the desert tortoise. Given the patchiness with which the primary constituent elements of critical habitat are distributed across the critical habitat units and the varying intensity of the wildfires, we cannot quantify precisely the extent to which these fires disrupted the function and value of the critical habitat.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a) (2) define the action area of a consultation as the area that may be directly or indirectly affected by the proposed action (50 *Code of Federal Regulations* 402.02). Therefore, we consider the action area to be the entire 5,760 acres of the LM Aero Facility.

The facility is located approximately 15 miles southwest of the city of Barstow. The Fremont-Kramer Desert Wildlife Management Area, as designated by the Bureau of Land Management, borders the northern and western boundaries of the facility. The facility lies within the Western Mojave Recovery Unit, as defined by the recovery plan for the desert tortoise (Service 1994).

The main operations complex currently includes infrastructure such as, but not limited too, dirt and paved roads, runways, and support buildings. In general, these areas do not support desert tortoise habitat or have sparse, stunted vegetation and highly disturbed soils (e.g., land adjacent to runways is bladed and sprayed with herbicide to prevent growth of vegetation) (Romero 2007a). However, desert tortoises do occasionally enter the complex.

The terrain within the facility is relatively flat with elevations ranging between 2,000 and 2,500 feet. Soils consist primarily of alluvium, small amounts of caliche, and desert pavement. Dominant plant species are creosote (*Larrea tridentata*) and allscale (*Atriplex polycarpa*).

Desert tortoises and their habitat are present throughout the facility, with varying densities of individuals and quality of habitat. In 1981, LM Aero conducted a field survey to determine the density and distribution of desert tortoises prior to the construction of the facility. Six triangular transects were walked in each of the sections. Desert tortoise sign was observed within every section. The density of desert tortoises was not uniform over the entire area; it ranged from less than 20 to over 250 desert tortoises per square mile (Schneider 1981 in CH2MHill 2002). The total estimated number of desert tortoises within the surveyed area ranged from 710 to over 1,399.

LM Aero conducted an additional desert tortoise survey in 2002. Desert tortoise sign was again observed within every section of the facility. During the 2-day survey, surveyors detected 3 live desert tortoises, 13 carcasses, 35 cover sites, approximately 134 scats, 2 sets of tracks, and one set of eggshell fragments.

The facility is surrounded by a chain-linked fence, and to the best of our knowledge, most desert tortoises cannot cross this fence. Some individuals may occasionally enter or leave through the gate or periodic breaks in the fence; smaller individuals may occasionally pass directly through the fence. Overall, we do not expect that the desert tortoises within the boundaries of the facility interact to a large degree with individuals outside its fences (Romero 2007b).

LM Aero has documented both common ravens and coyotes (*Canis latrans*) preying on desert tortoises within the facility. Common ravens have nested in two separate surveillance security towers. Evidence of common raven predation includes carcasses of at least 10 juvenile desert tortoises found beneath the nests. Coyote dig marks around several desert tortoise burrows suggest potential predation by this species. Additionally, several carcasses showed evidence of chew marks along the margins of the shells.

EFFECTS OF THE ACTION

Desert tortoises within the facility would generally be affected by operations and maintenance activities as a result of the use of access roads, the killing or injury of individuals during projects, handling, and loss of habitat. We will discuss these potential effects in the following sections.

Use of Access Roads

Desert tortoises are struck and killed by vehicles both on and off roads. Although drivers usually observe desert tortoises more easily on roads, vehicles can travel at increased speed. This speed, along with rises and turns in roads, decreases the ability of drivers to detect desert tortoises. Mortality associated with vehicle strikes, both on and off roads, will be greatest in the spring and fall, in areas where desert tortoises are most common.

The number of desert tortoises is depressed for some distance from the edge of heavily used roads; this distance varies with the level of use of the road. For example, Hoff and Marlow (2002) found that "reductions in (desert) tortoise sign are easily detectable more than (2.48 miles) from the roadway" on heavily used paved roads. They also found "evidence from unpaved utility access roads … that even lower traffic levels may have a significant detectable impact." Of the roads that Hoff and Marlow (2002) investigated, only a poorly maintained paved road, with a traffic volume of approximately 25 vehicles per day seemed to have no effect on the distribution of sign of the desert tortoise. The decrease in the number of desert tortoises near roads may be a result of vehicle strikes; however, other factors, such as collection of and avoidance of the road by desert tortoises, may also contribute to this decrease.

Killing or Injuring of Desert Tortoises during Projects

Crushing or collapsing their burrows adversely affects desert tortoises; these burrows would no longer be available to desert tortoises to escape the extreme weather conditions and predators of the Mojave Desert.

The movement of heavy machinery through habitat and clearing of worksites can kill or injure desert tortoises that are not removed from work areas; it can also crush their burrows. Because LM Aero will move desert tortoises from harm's way during work activities, we expect that few individuals will be killed or injured as a result of the use of heavy machinery. We note, however, that some desert tortoises, particularly small ones, can be missed during surveys. Consequently, the potential for desert tortoises to be killed or injured by heavy machinery cannot be completely eliminated.

Steep-sided dirt berms created by grading access roads could prevent desert tortoises from exiting roads; if desert tortoises cannot exit roads, they could be killed by temperature extremes or predators. Desert tortoises trying to cross such berms may flip over. While they are inverted, they are particularly vulnerable to predators; righting themselves causes them to expend energy, which may compromise their ability to breed, feed, and seek shelter. Additionally, because desert tortoises will burrow into the sides of dirt berms and spoils piles, future grading could crush desert tortoises, their burrows, and eggs. LM Aero's proposal to construct berms with a 3:1 slope should eliminate the potential that desert tortoises would be trapped within roads or flip over while crossing the berm; the proposed pre-project clearance surveys should prevent most mortalities associated with crushing desert tortoises during future grading of roads.

Desert tortoises have fallen into trenches excavated for various types of projects; they could then be trapped and buried. Checking any trenches for trapped desert tortoises three times a day, installing ramps, and fencing trenches, as proposed by LM Aero, should greatly reduce the likelihood that desert tortoises will be killed or injured by trenches.

People working in the desert could step on and kill hatchlings and slightly larger desert tortoises because of their small size; we expect that mortality from this source would be unlikely, given that small desert tortoises are not very common and the amount of walking is likely to be relatively minor. Nests are also vulnerable, but their typical location, near the mouth of a burrow, likely protects them to some degree.

Handling of Desert Tortoises

The capture and handling of desert tortoises for any reason, such as, removing them from a work area, will disturb those individuals involved. Mortality may occur because of improper handling or transport of individuals, or from releasing them into unsuitable habitat or exposing them to increased risks of predation. Handling or disturbing desert tortoises places them at risk if they void the contents of their bladders (stored water critical to the desert tortoise's ability to survive in an arid climate) or if they become exposed to the disease agent causing upper respiratory tract disease, which is contagious and often fatal. Because only experienced biologists authorized by the Service will handle desert tortoises, we expect losses from these potential effects to be minimal.

Relocating desert tortoises from an area of potential effect to adjacent habitat could result in competitive interactions between resident and translocated animals for forage, breeding and cover sites. Translocated animals may also be unfamiliar with the terrain and resources of a new location. These factors can cumulatively decrease the level of fitness and cause animals to be less resistant to diseases and environmental stressors, such as drought. However, because the area of disturbance is small relative to distances generally covered by desert tortoises, any relocated individuals are likely somewhat familiar with the terrain and may have already encountered the resident desert tortoises. These risk factors would also be most severe when numerous desert tortoises are involved; we do not expect any individual project within the facility to be so large that many desert tortoises would be involved.

Loss of Habitat

Most operations, maintenance, and new construction would occur in the complex, in areas that have been heavily disturbed by previously activities. Consequently, although the new disturbance could cause some loss of areas where desert tortoises seek food and shelter, these impacts are likely to be minor because habitat values have already been substantially lessened.

Miscellaneous Effects

Desert tortoises may seek shelter in the shade of vehicles and be crushed when those vehicles are subsequently moved. Improper disposal of food wastes and trash often attracts predators of the desert tortoise, especially common ravens; these predators then may consume more desert tortoises than under conditions where humans are not attracting them to an area. LM Aero has proposed measures, such as checking under vehicles before they are moved and managing trash effectively, to reduce these threats.

We do not expect LM Aero's use of herbicides to have a measurable effect on desert tortoises. We have reached this conclusion because LM Aero would use herbicides only within the complex, where most plants have already been removed and the ground surface has been highly disturbed; additionally, few desert tortoises enter the complex. Consequently, we expect that desert tortoises are unlikely to be exposed to herbicides and would have little opportunity to ingest them because of the general lack of plants within the complex.

Summary

Although operations, maintenance, and new construction may kill or injure desert tortoises, we expect that few individuals will be affected because most activities would occur in areas that have been previously disturbed by various activities and support few desert tortoises. We understand, from information provided by LM Aero, that desert tortoises do, on occasion, enter the developed complex. However, because LM Aero will implement numerous protective measures, including education programs, we expect that few, if any, desert tortoises will be killed or injured during operations, maintenance, and new construction.

Because of the variables involved, such as the number of desert tortoises within the facility and when work activities would occur in the presence of desert tortoises, we cannot predict how many desert tortoises will be killed or injured as a result of operations, maintenance, and new construction. However, based on our previous experience with the implementation of these types of activities, along with the protective measures, we anticipate that few, if any, desert tortoises will be killed or injured annually. The loss of these few individuals is not likely to substantially reduce the reproduction or number of desert tortoises in the wild because they comprise a very small portion of the overall population.

The loss of a small amount of suitable habitat and of highly disturbed habitat will not substantially reduce the distribution of the desert tortoise in the wild because large amounts of habitat remain available in the recovery unit, much of the habitat that will be lost or disturbed is already disturbed, and the area is not located within a region that is considered crucial for the recovery of the species. Finally, the 5,760-acre facility has been fenced in a manner that likely precludes most desert tortoises from entering or leaving since the early 1980s; consequently, to some degree, this area has already been isolated from the remainder of the Western Mojave Recovery Unit for more than 25 years.

CUMULATIVE EFFECTS

Cumulative effects are those impacts of future State and private actions that are reasonably certain to occur in the action area. Future Federal actions would be subject to the consultation requirements established in Section 7 of the Act and, are therefore not considered cumulative to the proposed action. Because the Air Force manages the land within the action area, any future action would be subject to the consultation requirements of section 7(a)(2) of the Endangered Species Act. Consequently, we do not anticipate any cumulative effects.

CONCLUSION

After reviewing the current status of the desert tortoise, the environmental baseline, the effects of operations, maintenance, and new construction, and the cumulative effects, it is our biological opinion that LM Aero's activities are not likely to jeopardize the continued existence of the desert tortoise. We have reached our conclusion regarding the desert tortoise because:

1. The majority of the operations, maintenance, and new construction will occur within previously disturbed areas that currently do not provide optimal desert tortoise habitat.

2. Protection measures proposed by the Air Force and LM Aero will reduce and minimize adverse effects to the desert tortoise and its habitat.

3. LM Aero activities would kill or injure few desert tortoises.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(a)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement.

The measures described below are non-discretionary. The Air Force must undertake these measures or make them binding conditions of any authorization provided to LM Aero with regards to operations, maintenance, and new construction for the exemption under section 7(a)(2) to apply. The Air Force has a continuing duty to regulate the activities covered by this incidental take statement. If the Air Force fails to abide by and enforce these terms and conditions or fails to ensure that LM Aero complies with them, the protective coverage of section 7(a)(2) may lapse. To monitor the impact of incidental take, the Air Force must report the progress of the action and its impact on the desert tortoise to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

We anticipate that few desert tortoises will be taken during operations, maintenance, and new construction within the facility. Of the desert tortoises taken, we anticipate that most will be captured as a result of moving them from harm's way. We cannot provide an accurate estimate of the numbers of individuals that will be taken because of the uncertainty regarding when LM Aero operations will occur in an area when desert tortoises are present.

The exemption from the prohibitions against take applies only to activities within the 5,760-acre facility.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoises resulting from operations, maintenance, and new construction within the facility:

1. The Air Force ~~must ensure~~ must ensure that the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.

2. The Air Force must ensure that only experienced biologists conduct surveys for and translocate desert tortoises during operations, maintenance, and new construction within the facility.

Our evaluation of the proposed action includes consideration of the protective measures proposed by the Air Force in its request for consultation and re-iterated in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 *Code of Federal Regulations* 402.16). The following reasonable and prudent measures and terms and conditions are intended to compliment and clarify the protective measures proposed by the Air Force.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Air Force must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outlined in the reporting and monitoring requirements. These terms and conditions are non-discretionary.

DESERT TORTOISE MONITOR -- Approved by the Fish and Wildlife Service to monitor project activities within desert tortoise habitat, ensure proper implementation of protective measures, record and report desert tortoise and sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with a biological opinion or permit, and move desert tortoises from harm's way when desert tortoises enter project sites and place these animals in "safe areas" pre-selected by authorized biologists or maintain the desert tortoises in their immediate possession until an authorized biologist assumes care of the animal.

Monitors assist authorized biologists during surveys and often serve as "apprentices" to acquire experience. Monitors are not authorized to conduct presence/absence or clearance surveys unless directly supervised by an authorized biologist; "directly supervised" means the authorized biologist is direct voice and sight contact with the monitor.

AUTHORIZED BIOLOGIST – Approved by the Fish and Wildlife Service to conduct all activities described in the previous section for desert tortoise monitors, and to locate desert tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with a biological opinion incidental take permit. Authorized Biologists must keep current with the latest information on U.S. Fish and Wildlife Service protocols and guidelines. An authorized biologist must have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and demonstrated substantial field experience and training to safely and successfully:
- handle and temporarily hold desert tortoises
- excavate burrows to locate desert tortoise or eggs
- relocate/translocate desert tortoises
- reconstruct desert tortoise burrows
- unearth and relocate desert tortoise eggs
- locate, identify, and record all forms of desert tortoise sign

1. The following terms and conditions implement reasonable and prudent measure 1:

    a. The Air Force must contact the Service if a desert tortoise is killed during operations, maintenance, or new construction. The Service will discuss the circumstances of the take and the effectiveness of the protective measures with the Air Force to determine if any improvements or modifications are needed. Operations, maintenance, or new construction may continue during this review period provided all protective measures proposed by the Air Force and LM Aero, and the terms and conditions of this biological opinion continue to be implemented.

    b. The Air Force must reinitiate formal consultation with the Service if 3 desert tortoises are killed or injured during operations, maintenance, or new construction within any 12-month period. We are not establishing a reinitiation threshold for capturing desert tortoises to move them from harm's way because we do not expect this form of take to injure, kill, or substantially affect these individuals.

2. The following term and condition implements reasonable and prudent measure 2:

    The Service approves Ray Romero, Kathy Buescher-Simon, and Kent W. Hughes as authorized biologists. If the Air Force wishes to use additional individuals as authorized biologists or biological monitors, it must provide their credentials for our review and approval at least 30 days prior to the onset of the work they intend to perform.

Reporting Requirements

By January 31 of each year, the Air Force must submit an annual report to the Service that details proposed operations, maintenance, and new construction activities for the coming calendar year that will result in surface disturbance (Class II-III activities). This report must also provide information on the activities that occurred in the previous calendar year; specifically, it must provide information on the amount and type of take, acreage of desert tortoise habitat that was disturbed and, the effectiveness and practicality of the protective measures and terms and conditions. We request that you provide recommendations for improving the effectiveness and efficiency of the protective measures. We recommend that the Air Force inform us of any observations of desert tortoises within the boundaries of the facility that exhibit the clinical signs of any disease.

Disposition of Dead and Injured Desert Tortoises

Death/injury reporting 3 days

Within 3 days of locating any dead or injured desert tortoise, you must notify the Service's Division of Law Enforcement in writing 370 Amapola Avenue, Suite 114, Torrance, California 90501 and the Ventura Fish and Wildlife Office by telephone (805) 644-1766 and in writing (2493 Portola Road, Suite B, Ventura, California 93003). The report must include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

Injured desert tortoises must be transported to a qualified veterinarian for treatment. If injured desert tortoises survive, the Service must be contacted regarding their final disposition.

Dead specimens must be handled carefully to preserve biological material in the best possible state for later analysis. The remains of desert tortoises must be placed with the appropriate office of the U.S. Geological Survey if they are in any condition that is useful for research. We recommend that arrangements regarding proper disposition of potential museum specimens be made with the U.S. Geological Survey prior to the onset of work activities. If the remains are not useful for research, they must be returned to native habitat in an area within the facility that is unlikely to be disturbed and left. The location of the remains should be recorded such that they will not be confused with other dead desert tortoises in the future; this information must be provided in the annual report. Disarticulated shells and other remains found in the field that are not useful for research may be left in the field.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that you notify us if you intend to pursue any of these recommendations.

1. The Air Force should work with LM Aero to schedule routine maintenance and new construction that result in surface disturbance during times of the year when desert tortoises are less active.

2. Because the fence surrounding the facility precludes most desert tortoises from entering or leaving, we recommend that the Air Force consider allowing this area to be used to hold desert tortoises, if, at some point in the future, we require such a facility to promote the conservation of the species.

REINITIATION NOTICE

This concludes formal consultation on operations, maintenance, and new construction at the LM Aero Facility. Reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Ray Bransfield of my staff at (805) 644-1766, extension 317.

Sincerely,

Carl T. Benz
Assistant Field Supervisor

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APPENDIX C BIOLOGICAL RECONNAISSANCE SURVEY

Biological Reconnaissance Survey
Proposed Warehouse Construction Project
Lockheed Martin Aeronautics Company
Helendale Radar Measurement Facility
San Bernardino County, California

Prepared for:

LOCKHEED MARTIN

TETRA TECH

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SECTION 1 INTRODUCTION

Tetra Tech, Inc. was contracted by Lockheed Martin Aeronautics Company – Palmdale (LM Aero) to conduct a biological reconnaissance survey of undeveloped land associated with the Lockheed Martin Aeronautics Company Helendale Radar Measurement Facility (HRMF) located at 17452-Wheeler Road, Helendale, San Bernardino County, California, 92342 (Figure 1). The HRMF is located on a 5,760-acre site and is comprised of a main operation complex and a 7,500-foot paved test range with three in-line measurement positions identified as pits due to their underground capabilities. The project would be the construction of a 19,395 square foot temperature-controlled secure warehouse that would be designated as Building 944. This warehouse would be used to store models used for testing at the HRMF. The purpose of the reconnaissance survey was to determine if suitable habitat exists within the project foot print to support sensitive biological species.

SECTION 2 PROJECT LOCATION

The HRMF and project location are located in the Mojave Desert. The Mojave Desert is bounded to the east by the Colorado River and the California-Nevada border, on the north by the Garlock fault and on the south-west by San Gabriel and San Bernardino Mountains and the San Andreas fault (Harden, 1998). Locally, the project site in undeveloped desert habitat and is characterized as generally level terrain with a gentle gradient trending from the north to the south (Figure 2). The proposed warehouse location is bounded by a paved road to the south and west and undeveloped lands to the north and east. A dirt road is found on the northeastern corner. A study area that encompasses the proposed warehouse location plus an area of the undeveloped lands to the north and east were included in the reconnaissance survey and are identified as the study area.

SECTION 3 ENVIRONMENTAL SETTING

The study area is undeveloped and supports relatively undisturbed native habitat that is dominated by creosote (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*) scattered across the landscape. During construction of the HRMF in the early 1980's, the study area was disturbed likely during the construction of adjacent paved roads found on the southern and eastern borders of the study area. Soils at the HRMF have been classified as moderately well drained fine loamy sands and sandy loam soils (United States Department of Agriculture 2019). Soils found within the drainage located at the eastern border of the study area have been classified as somewhat excessively well drained sandy soils. The climate of the study area is similar to that experienced in the Mojave Desert and is characterized by cool winter and hot summer temperatures. Most rainfall with occasional snowfall occurs in the winter months.

In December 2007, a Biological Opinion (BO) related to desert tortoise (*Gopherus agassizii*) for routine operations at the HRMF was issued by the United States Fish and Wildlife Service (USFWS). This BO was issued based on a review of Air Force Flight Test Center's (AFFTC), Edwards Air Force Base, mission defense support activities and projects accomplished at the HRMF. The BO provides a description of proposed activities at the HRMF and protective measures. The following is list of activities by type that occur within the HRFM and are detailed in the 2007 BO (United States Fish and Wildlife Service 2007).

- Class I: Activities that do not result in new surface disturbance.
- Class II Activities that result in new surface disturbance during the season with typically the least desert tortoise activity (November 1 through February 28).
- Class III Activities that result in new surface disturbance during the season with typically the most desert tortoise activity (March 1 through October 31).

Class II and III activities include use of heavy equipment used to perform routine maintenance repairs and any new construction.

The following Protective Measures are used to ensure no take or injury to desert tortoise at the HRMF

1. Workers attend Instructor lead Desert Tortoise Awareness Training once a year.
2. All visitors and workers at the HRMF stay on existing roads and keep speeds under 20 miles per hour on all roads.
2. Workers at the HRMF will report tortoise sightings to HRMF Security immediately, including dead or injured tortoises.
3. Do not handle a desert tortoise unless it is in imminent danger – call your authorized biologist.
4. Visual inspection beneath all vehicles and equipment is required prior to movement.
5. Dogs and firearms are not allowed at the HRMF (except firearms used by security personnel).
6. Keep trash in closed containers to reduce raven and coyotes on the HRMF.
7. Herbicides used at the facility must be approved before use and must be wildlife-safe.
8. Killed or injured desert tortoise resulting from activities at HRMF will be reported to the USFWS within 3 days. Injured tortoise will be transported to a qualified veterinarian.
9. Provide the USFWS an annual report documenting any tortoise that have been injured or killed plus any new habitat disturbances.
10. Presurvey of area proposed for construction activities within 24-hours of activity.
11. Relocate desert tortoise within a construction area using a USFWS approved biologist.
12. Inspection of any open trench morning, afternoon and evening. The trench will either be fenced off or ramped to prevent desert tortoise entrapment.
13. Activities, vehicles and staging areas will be restricted to pre-determined corridors, access routes and previously disturbed areas as practicable.
14. Activities will take place within the smallest practical area to minimize habitat disturbance.

In 2011, focused surveys for desert tortoise (*Gopherus agassizii*) was conducted May 9 through 17, 2011 at the HRMF (Lockheed Martin 2011). The HRMF is located adjacent to, but outside the Fremont Kramer Desert Wildlife Management Area (DWMA). Focused surveys for desert tortoise of the entire HRMF that included the study area for the proposed warehouse resulted in the documentation of 130 live tortoises and 479 active burrows. Observations of active tortoise sign were evenly distributed throughout the undeveloped area of the HRMF although slightly higher concentrations of tortoise sign were evident in regions that are a greater distance from development and regular human activity.

Focused burrowing owl surveys were conducted simultaneously with the May 2011 desert tortoise surveys. The focused surveys identified a total of 12 live burrowing owls and approximately 57 active burrows with recent burrowing owl sign (whitewash with pellets, and/or prey remains). One burrow contained an active nest of burrowing owl fledglings.

Special status plants that were incidentally observed at the HRMF included Mojave fish hook cactus (*Sclerocactus polyancistrus*), Mojave spineflower (*Chorizanthe spinosa*) and Beaver dam breadroot (*Pediomelum castoreum*). Special status wildlife species observed at the HRMF during the 2011 survey included loggerhead shrike (*Lanius ludovicianus*), LeConte's thrasher (*Toxostoma lecontei*), and prairie falcon (*Falco mexicanus*).

The 2011 survey concluded that based on the presence of suitable habitat, other special-status wildlife that have a potential to occur at the HRMF included the following:

- Mohave ground squirrel (*Xerospermophilus mohavensis* – State of California Threatened)
- American badger (*Taxidea taxus* – California Species of Special Concern).

The HRMF was determined to have suitable habitat for nesting by the following sensitive bird:

- Loggerhead shrike (*Lanius ludovicianus* - California Species of Special Concern)

SECTION 4 BIOLOGICAL RECONNAISSANCE SURVEY

4.1 METHODS

Prior to mobilizing into the field, Tetra Tech conducted a review of recent satellite aerial photographs. A field investigation was conducted by a Tetra Tech environmental specialist on September 30, 2019, to identify potential habitat within the study area that could support sensitive biological species. A LM Aero photographer accompanied the environmental specialist to take photographs. A series of linear transects as plants present allowed were walked through the study area to document the presence or absence of any potential habitat for special-status species. Weather conditions for temperature and wind speed were obtained using a Kestrel 3000 weather meter and were recorded at the start and conclusion of the habitat assessment. Cloud cover was recorded based on visual observations. No rain had occurred within 5 days of the biological reconnaissance and are summarized below.

	Time	Temperature (F °)	Cloud Cover (percent)	Wind Speed (miles per hour)
Start of the Reconnaissance Survey (09/30/19)	1030	62	0	2 to 4
Conclusion of the Reconnaissance Survey (09/30/19)	1130	66	0	2 to 4

4.2 FIELD RESULTS

The following subsections present the results of the reconnaissance survey of the study area. Photographs 1 through 8 depict conditions observed during the reconnaissance.

4.2.1 Vegetation

Plants observed within the study area are characteristic of those associated with creosote scrub habitat and are noted in Appendix A. While no sensitive plants were observed within the study area, habitat is suitable for Mojave fish hook cactus, Mojave spineflower and Beaver dam breadroot. One silver cholla (*Opuntia echinocarpa*) was observed near the eastern boundary of the study area.

4.2.2 Wildlife

No sensitive wildlife was observed within the study area during the reconnaissance survey (Appendix A). One possibly active desert tortoise burrow was observed on the northern border of the study area (Figure 2).

Desert Tortoise. The desert tortoise is a desert dwelling reptile that occurs throughout the Mojave and Sonoran deserts. It is found in California, Arizona, Nevada and Utah, occurring in almost every type of habitat except dry lakes or playas, sand dunes and sand sheets and rocky slopes (except in Arizona, where they occur almost exclusively on rocky slopes). Tortoises construct underground burrows as living quarters and spend most of the year down in the burrows. They come out for forage in the early spring (February and March) and remain active above ground until early June, when they retreat to their burrows for most of the summer, fall and winter months. They will emerge and be active during the fall months of September and October, depending upon late summer weather conditions. Although they stay underground for most of the year, tortoises can be found active above ground at all times of the year (United States Fish and Wildlife Service 2011).

Tortoises forage on spring annual wildflowers and grasses. During the foraging season, they also breed and lay eggs in preparation for the next spring. The desert tortoise hibernates or estivates underground for much of the year as an adaptation to the extreme temperature changes characteristic of desert winters and summers. As a result, determining whether desert tortoise is present in a particular area is generally restricted to locating signs, or evidence, of recent activity.

The adult burrows are distinctly shaped like the overall cross profile of a tortoise and range in size from less than eighty millimeters (three inches) to 300 millimeters (twelve inches) or greater in width, with corresponding heights. The general shape is half-moon with a flat bottom surface and a large sloping mound in front of the entrance. Animals typically bask on this mound in the morning hours. Juvenile burrows are not as distinctive and are not easily distinguished from small rodent burrows. In addition to burrows, signs generally takes the form of scat (fecal matter) consisting entirely of plant parts, tracks, pallets and remains. The remaining signs are less common and require special circumstances for formation and preservation.

The tortoise has been undergoing a decline in population due to a number of factors. These include loss or destruction of habitat, killing or harming of animals in the wild, collection of individual animals, raven predation and disease. The California Department of Fish and Wildlife listed the tortoise as threatened on June 22, 1989. The tortoise was emergency listed as endangered by the USFWS on August 4, 1989. The United States Fish and Wildlife listing was later changed to threatened. Both listings were made on the basis of declining populations due to the factors listed above. The discovery that the tortoise was rapidly disappearing throughout its range as a result of a disease known as Upper Respiratory Disease Syndrome (URDS) was a critical part of the listing decisions.

4.3 RESULTS DISCUSSION AND RECOMMENDATIONS

4.3.1 Vegetation

The study area has suitable habitat for the presence of plants previously noted during the 2011 survey of the HRMF. While none were observed during the survey, the field reconnaissance was outside the survey period for Mojave spineflower which is an annual that blooms from May to July. Only one cactus, a silver cholla, was observed within the study area.

4.3.2 Wildlife

The study area is suitable habitat for desert tortoise, Mohave ground squirrel and burrowing owl. One active desert tortoise burrow was noted within the study area. No shrubs that may be suitable as nesting sites for loggerhead shrike, LeConte’s thrasher, prairie falcon or other raptors such as ravens are present within the study area

4.3.3 Recommendations

The following recommendations are provided to avoid potential sensitive species that may be present in the study area.

- Within 30-days and again within 24-hours of construction activities, a survey to include the study area or any other previously undisturbed areas will be conducted to determine if desert tortoise or burrowing owl are present. Small mammal burrows will be noted for the presence of possible Mohave ground squirrel. Active desert tortoise or burrowing owl burrows will be flagged, and an exclusion perimeter will be established to ensure no construction-related impacts occur.

- In compliance with BO1-8-05-F-6, a USFWS Authorized Biologist will monitor all construction activities and will document compliance with the Protective Measures listed in Section 3 and identified in the BO .

SECTION 5 REFERENCES

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FIGURES

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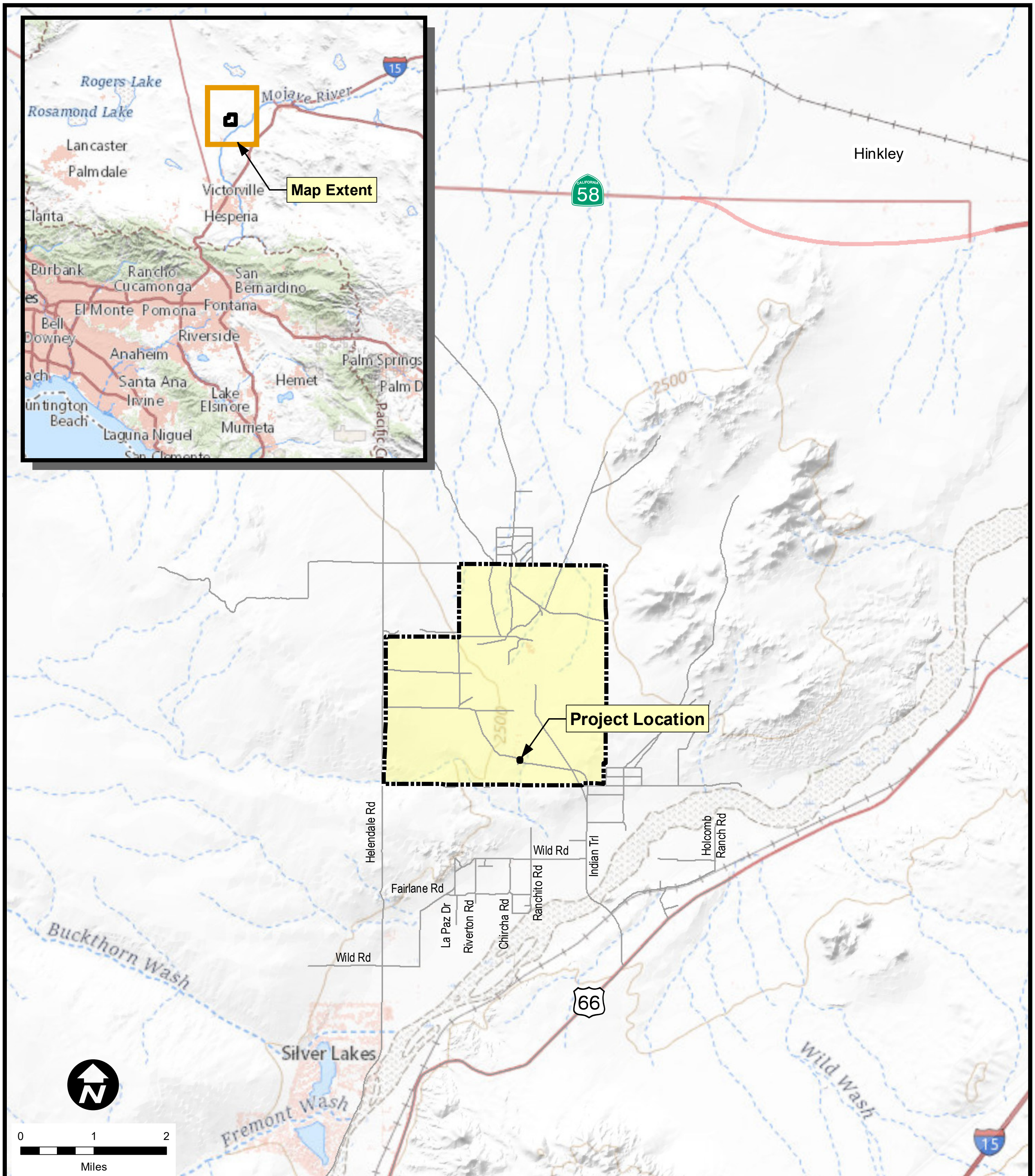

Helendale Radar Measurement Facility Boundary

Helendale Radar Measurement Facility
Lockheed Martin Aeronautics
Proposed Warehouse Construction Project

Figure 1

Regional Setting

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Helendale Radar Measurement Facility
Lockheed Martin Aeronautics
Proposed Warehouse Construction Project

Figure 2

Habitat and Study Area

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PHOTOGRAPHS

Site Photographs
Biological Reconnaissance and Habitat Assessment
Proposed Warehouse Construction Project
Helendale Radar Measurement Facility

Photograph 1: **View of the project study area from the northwestern corner. View to the southeast.**	

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Photograph 7:

View of a minor pile of asphalt rubble located in the northeastern corner of the project study area. View to the north.

Photograph 8:

Long-nosed lizard (*Gambelia wislizenii*) observed within the study area.

APPENDIX

APPENDIX A
FLORA AND FAUNA COMPENDIUM

Appendix A
Flora and Fauna Compendium
Helendale Radar Measurement Facility
Helendale, California

Flora	**Flowering Plants**
Gymnospermae	**Pollen Producing Woody Gymnosperms**
Ephedraceae	**Ephedra Family**
Ephedra californica	Desert tea
Angiospermae: Monocotyledonae	**Monocot Flowering Plants**
Poaceae	**Grass Family**
Bromus madritensis	Foxtail chess*
Schismus barbatus	Common Mediterranean grass*
Angiospermae: Dicotyledonae	**Dicot Flowering Plants**
Asteraceae	**Aster Family**
Ambrosia dumosa	Burro bush
Ericameria nauseosus	Rabbit brush
Brassicaceae	**Mustard Family**
Brassica tournefortii	Sahara mustard*
Sisymbrium irio	London rocket*
Cactaceae	**Cactus Family**
Opuntia echinocarpa	Silver cholla
Chenopodiaceae	
Salsola kali	Russian thistle*
Geraniaceae	**Geranium Family**
Erodium cicutarium	Redstem filaree*
Solanaceae	**Nightshade Family**
Lycium cooperi	Peach thorn
Zygophyllaceae	**Caltrop Family**
Larea tridentata	Creosote
Fauna	**Birds, Reptiles and Mammals**
Aves	**Birds**
Corvidae	**Crows and Jays**
Corvus corvax	Raven
Passeriformes	**Passerines**
Haemorhous mexicanus	House finch
Reptilia	**Reptiles**
Crotaphytidae	**Collared lizards**
Gambelia wislizenii	Long-nosed lizard

* Denotes non-native plant

Baldwin, B.G., D. H. Goldman, D. J. Keil, R, Pattterson, T. J. Rosatti, and D.H. Wilkin, editors.
2012 *The Jepson manual: Vascular plants of California, second edition.* University of California Press.

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1997 *Weeds of the West*. Western Society of Weed Science in cooperation with the Western United States Land Grant Universities Cooperative Extension Services.

APPENDIX D CULTURAL RESOURCES ASSESSMENT

TETRA TECH

August 30, 2015

Ms. Melinda Massey
Lockheed Martin Aeronautics Company-Palmdale
1011 Lockheed Way
Palmdale, California 93599

Subject: Submittal of Final Cultural Resources Assessment for the Proposed Expansion Project at the Helendale Radar Measurement Facility in San Bernardino County, California

Dear Ms. Massey:

Tetra Tech is pleased to provide to you with the attached Final Cultural Resources Assessment for the proposed expansion area at the Helendale facility completed by our subcontractor, Applied Earthworks, Inc. During the field survey portion of the project, a total of 11 cultural resources were documented. These resources been documented on Department of Parks and Recreation Primary Record forms and Department of Parks and Recreation-assigned trinomial identification numbers have been included. All documented resources were determined to not require collection or curation. None of these resources were determined to be eligible for listing on the California Register of Historic Resources. Further, these resources were determined to not be considered "historic resources" under the California Environmental Quality Act. No further treatment or management of these resources was recommended.

As we indicated in our draft submittal of this report, Native American consultation was undertaken by requesting a Sacred Lands File search from the Native American Heritage Commission (NAHC). The NAHC also provided a list of tribes and individuals requesting information regarding cultural resources in the project area. No recommendations were identified as related to the Native American consultation undertaken for this task.

Do not hesitate to contact the undersigned at (909) 381-1674 or Ms. Nisha Bansal at (916) 276-7846 if there are any questions.

Sincerely,
TETRA TECH, INC.

Stephanie Pacheco

Stephanie Pacheco
Task Manager/Environmental Scientist

cc: Nisha Bansal, Tt

Cultural Resource Assessment for Lockheed Martin Aeronautics' Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California

Tiffany Clark, Ph.D., RPA, and Josh Smallwood M.A., RPA

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August 2015

MANAGEMENT SUMMARY

At the request of Tetra Tech, Inc., Applied EarthWorks, Inc. (Æ) performed a cultural resource assessment of 299.5 acres of private land in support of Lockheed Martin Aeronautics' (LM Aero's) Proposed Radar Cross Section Test Range Facility Expansion Project (Project) near Helendale, San Bernardino County, California. The proposed Project involves improvements to the facility that include the construction of a large crane or pit structure and a new warehouse building and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act (CEQA), as amended.

This report summarizes the methods and results of the cultural resource investigation of the areas of proposed improvements. This assessment included archaeological and historical background research, communication with Native American tribal representatives, an intensive pedestrian (Phase I) survey, and an evaluation of significance of all identified cultural resources within the Project area. The purpose of the investigation was to determine the potential of the proposed Project to impact historical resources as defined at Section 15064.5 of the CEQA Guidelines.

Æ conducted a California Historical Resources Information System (CHRIS) records search in May 2015 at the South Central Coastal Information Center (SCCIC), located at California State University, Fullerton. The record search encompassed the Project area, along with a 1-mile buffer. The CHRIS database indicates that at least seven cultural resource projects have been conducted within 1 mile of the Project area, including several surveys that were conducted within the current Project area. The CHRIS database also indicated that 12 cultural resources had been recorded within 1 mile of the Project area, including three prehistoric archaeological sites, two historical archaeological sites, and seven isolated occurrences. None of these known cultural resources are located within the Project area.

Æ also requested a Sacred Lands File (SLF) search from the Native American Heritage Commission (NAHC) located in Sacramento, California in May 2015. The NAHC responded that no SLF resources are known to exist within the Study area, but cautioned that the absence of specific site information does not indicate the absence of such resources. The NAHC provided a list of regional Native Americans who have knowledge of cultural resources within the Project area. A letter was subsequently sent to all of the listed tribes and individuals requesting information regarding cultural resources in the Project area. Tribal communities listed on the NAHC list include the Morongo Band of Mission Indians, the San Fernando Band of Mission Indians, the San Manuel Band of Mission Indians, and the Serrano Nation of Mission Indians.

The intensive pedestrian survey of the Project area resulted in the identification and documentation of 11 cultural resources that included five archaeological sites (two prehistoric and three historical), two built-environment resources, and four isolated artifacts (three prehistoric and one historical). Significance evaluations indicate that none of these cultural resources are recommended as eligible for listing on the California Register of Historical Resources.

Field notes documenting the current investigation are on file at Æ's Hemet office. A copy of the final report will be placed on file at the SCCIC.

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1
INTRODUCTION

Lockheed Martin Aeronautics (LM Aero) proposes an expansion to their Radar Cross Section (RCS) Test Range Facility near Helendale, San Bernardino County, California. The proposed RCS Test Range Facility Expansion Project (Project) involves improvements to the facility that include the construction of a large crane or pit structure and a new warehouse building and the widening of existing roads. Applied EarthWorks, Inc. (Æ) was retained by Tetra Tech, Inc. to conduct a cultural resource assessment of the Project area in accordance with the California Environmental Quality Act (CEQA). The County of San Bernardino is the Lead Agency for the purposes of CEQA.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project footprint consists of approximately 299.5 acres (ac) of private land situated within the LM Aero RCS Test Range Facility. The Project area is located approximately 5 miles (mi) northeast of Helendale in western San Bernardino County, California (Figure 1-1). The Project area encompasses portions of Township 8 North/Range 4 West, Sections 3 and 4, and Township 9 North/Range 4 West, Sections 27, 28, 33, and 34, San Bernardino Baseline & Meridian, as depicted on the Wild Crossing, CA 7.5' U.S. Geological Survey (USGS) quadrangle map (Figure 1-2).

The Project area lies on the broad alluvial fans that saddle Iron Mountain to the east and an unnamed ridge to the west. Several unnamed washes flow through the Project area in a southerly direction to drain into the Mojave River, which is located less than 2 mi to the south. Vegetation within the Project area consists of small creosote bush and saltbush scrub. Elevations range from approximately 2,443 to 2,501 feet (ft) above mean sea level (amsl).

LM Aero has proposed several improvements to the RCS Test Range Facility. These improvements include the construction of a large crane or possible pit structure and a new warehouse building and the widening of existing roads. An area containing a large, soil spoils pile in the northern portion of the proposed Project area may also be used during construction. Ground-disturbing activities associated with the proposed Project include grading and trenching for the preparation and construction of the crane and building sites, excavation of the pit structure, slope and drainage easements, and utility installations.

1.2 REGULATORY CONTEXT

1.2.1 State

As currently proposed, this Project is subject to compliance with CEQA, as amended through 2013. Therefore, cultural resource management work conducted as part of the Project shall comply with the CEQA Statutes and Guidelines, which directs lead agencies to first determine whether cultural resources are “historically significant” resources. A project with

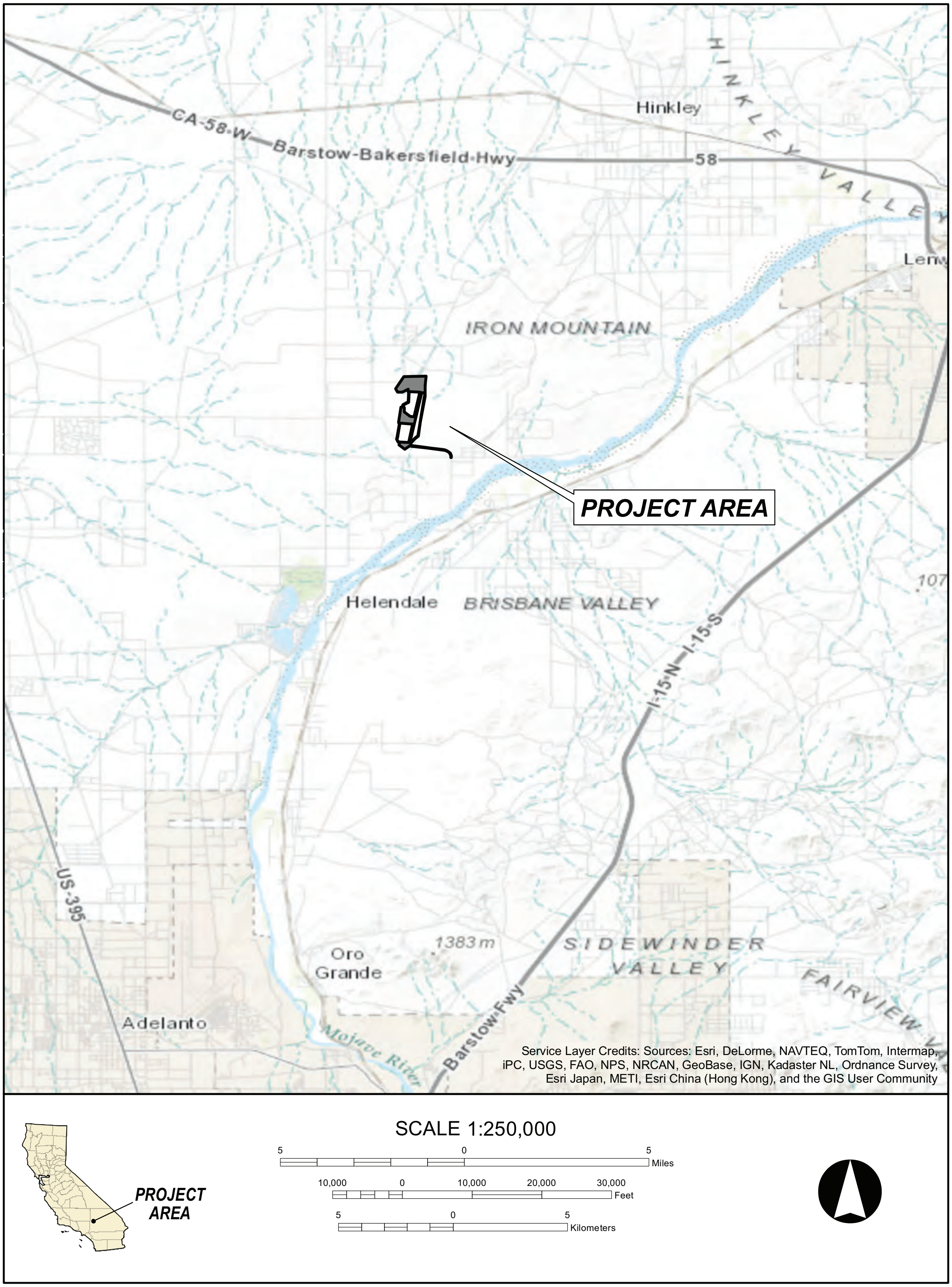

Figure 1-1 Project vicinity map.

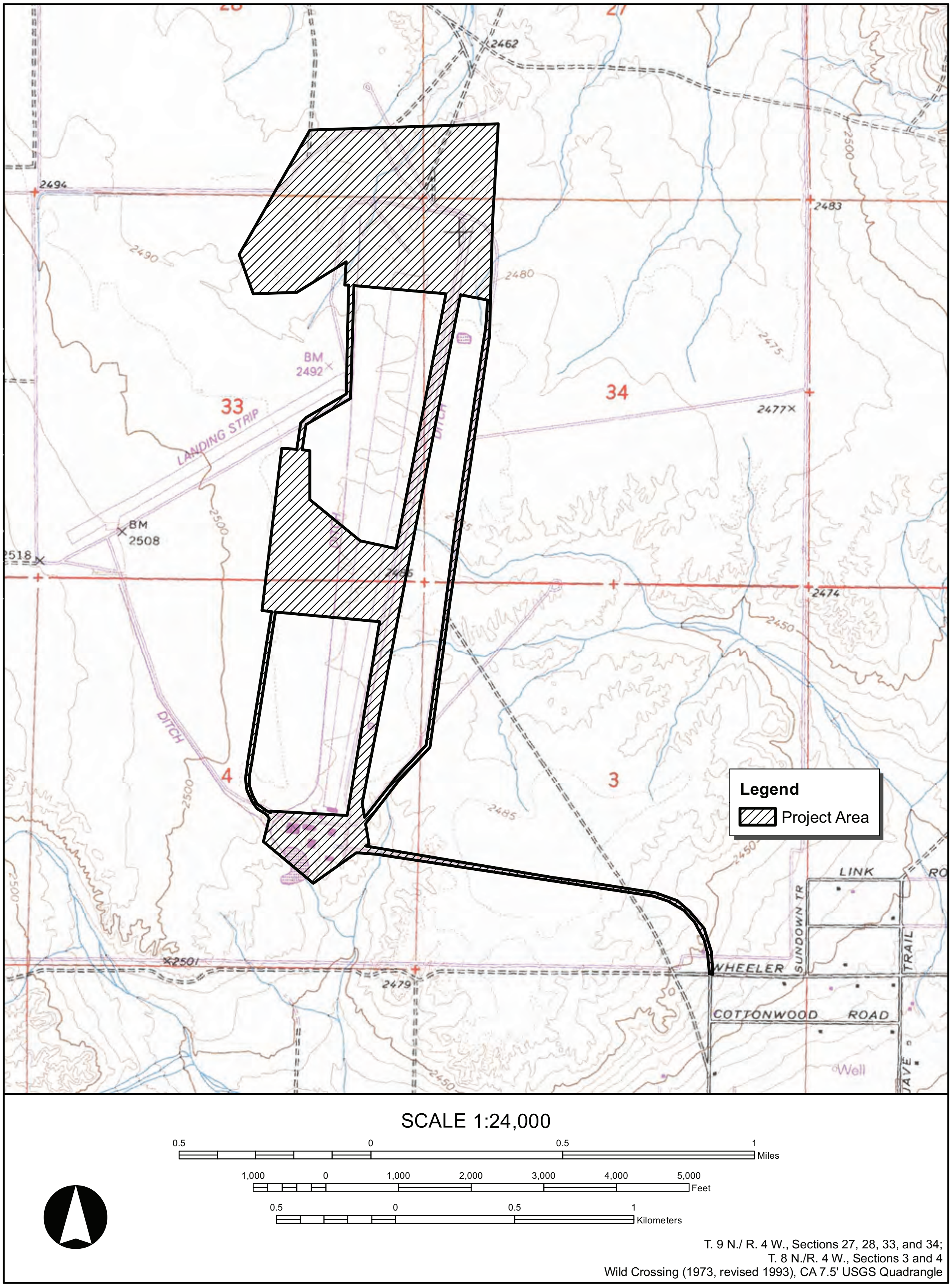

Figure 1-2 Project location map.

an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment (California Code of Regulations [CCR], § 15064.5[b]).

CEQA statutes and guidelines specify how cultural resources are to be managed in the context of proposed projects, such as the LM Aero RCS Test Range Facility Expansion Project. Briefly, archival and field surveys must be conducted, and identified cultural resources must be inventoried and evaluated in prescribed ways. Prehistoric and historical archaeological resources as well as built-environment resources such as standing structures, buildings, and objects, deemed "historically significant" must be considered in project planning and development.

1.2.2 County

The Conservation element of the San Bernardino County General Plan (County of San Bernardino 2007:V-18 through V-22) contains a Goal and five Policies to protect the County's cultural and paleontological resources. The Goal states that the "County will preserve and promote its historic and prehistoric cultural heritage." The policies and associated programs state:

> **CO-3.1:** Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.
>
> > **Program 1:** Require a cultural resources field survey and evaluation prepared by a qualified professional for projects located within the mapped Cultural Resources Overlay area.
> >
> > **Program 2:** Mitigation of impacts to important cultural resources will follow the standards established in Appendix K of the CEQA Guidelines, as amended to date.
>
> **CO-3.2:** Identify and protect important archaeological and historic cultural resources in all lands that involve disturbance of previously undisturbed ground.
>
> > **Program 1:** Require the Archaeological Information Center [AIC] at the San Bernardino County Museum to conduct a preliminary cultural resources review prior to the County's application acceptance for all land use applications in planning regions lacking Cultural Resources Overlays and in lands located outside of planning regions.
> >
> > **Program 2:** Should the County's preliminary review indicate the presence of known cultural resources or moderate to high sensitivity for the potential presence of cultural resources, a field survey and evaluation prepared by a qualified professional will be required with project submittal. The format of the report and standards for evaluation will follow the "Guidelines for Cultural Resource Management reports" on file with the San Bernardino County Land Use Services Department.

CO-3.3: Establish programs to preserve the information and heritage value of cultural and historical resources.

CO-3.4: The County shall comply with Government Code Section 65352.2 (SB 18) by consulting with tribes as identified by the California Native American Heritage Commission (NAHC) on all General Plan and specific plan actions.

Program 1: Site record forms and reports of surveys, test excavations, and data recovery programs will be filed with the Archaeological Information Center at the San Bernardino County Museum, and will be reviewed and approved in consultation with that office.

- **a.** Preliminary reports verifying that all necessary archaeological and historical fieldwork has been completed will be required prior to project grading and/or building permits.
- **b.** Final reports will be submitted and approved prior to project occupancy permits.

Program 2: Any artifacts collected or recovered as a result of cultural resource investigations will be catalogued per County Museum guidelines and adequately curated in an institution with appropriate staff and facilities for their scientific information potential to be preserved. This shall not preclude the local tribes from seeking the return of certain artifacts as agreed to in a consultation process with the developer/project archaeologist.

Program 3: When avoidance or preservation of an archaeological site or historic structure is proposed as a form of mitigation, a program detailing how such long-term avoidance or preservation is assured will be developed and approved prior to conditional approval

Program 4: In areas of potential but unknown sensitivity, field surveys prior to grading will be required to establish the need for paleontologic monitoring.

Program 5: Projects requiring grading plans that are located in areas of known fossil occurrences, or demonstrated in a field survey to have fossils present, will have all rough grading (cuts greater than 3 feet) monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Fossils include large and small vertebrate fossils, the latter recovered by screen washing of bulk samples.

Program 6: A report of findings with an itemized accession inventory will be prepared as evidence that monitoring has been successfully completed. A preliminary report will be submitted and approved prior to grading of occupancy permits. The adequacy of paleontologic reports will be determined in consultation with the Curator of Earth Science, San Bernardino County Museum.

CO-3.5: Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

Program 1: Consistent with SB 18, as well as possible mitigation measures identified through the CEQA process, the County will work and consult with local tribes to identify, protect, and preserve "traditional cultural properties" (TCPs). TCPs include both man-made sites and resources as well as natural landscapes that contribute to the cultural significance of areas.

Program 2: The County will protect confidential information concerning Native American cultural resources with internal procedures, per the requirements of SB 922, an addendum to SB 18. The purpose of SB 922 is to exempt cultural site information from public review as provided for in the Public Records Act. Information provided by tribes to the County shall be considered confidential or sacred.

Program 3: The County will work in good faith with the local tribes, developers/applicants, and other parties if the local affected tribes request the return of certain Native American artifacts from private development projects. The developer is expected to act in good faith when considering the local tribe's request for artifacts. Artifacts not desired by the local tribe will be placed in a qualified repository as established by the California State Historical Resources Commission. If no facility is available, then all artifacts will be donated to the local tribe.

Program 4: The County will work with the developer of any "gated community" to ensure that the Native Americans are allowed future access, under reasonable conditions, to view and/or visit known sites within the "gated community." If a site is identified within a gated community project, and preferably preserved as open space, the development will be conditioned by the County to allow future access to Native Americans to view and/or visit that site.

Program 5: Because contemporary Native Americans have expressed concern over the handling of the remains of their ancestors, particularly with respect to archaeological sites containing human burials or cremations, artifacts of ceremonial or spiritual significance, and rock art, the following actions will be taken when decisions are made regarding the disposition of archaeological sites that are the result of prehistoric or historic Native American cultural activity:

- **a.** The Native American Heritage Commission and local reservation, museum, and other concerned Native American leaders will be notified in writing of any proposed evaluation or mitigation activities that involve excavation of Native American archaeological sites, and their comments and concerns solicited.
- **b.** The concerns of the Native American community will be fully considered in the planning process.

c. If human remains are encountered during grading and other construction excavation, work in the immediate vicinity will cease and the County Coroner will be contacted pursuant to the state Health and Safety Code.

d. In the event that Native American cultural resources are discovered during project development and/or construction, all work in the immediate vicinity of the find will cease and a qualified archaeologist meeting U.S. Secretary of Interior standards will be hired to assess the find. Work in the overall project may continue during this assessment period.

e. If Native American cultural resources are discovered, the County will contact the local tribe. If requested by the tribe, the County, will in good faith, consult on the discovery and its disposition with the tribe.

1.3 REPORT ORGANIZATION

This report documents the results of a cultural resource assessment of the Project area. Chapter 1 has introduced the project location and description and stated the regulatory context. Chapter 2 synthesizes the natural and cultural setting of the Project area and surrounding region. Chapter 3 presents the methods and procedures used in the cultural resources investigation including the record searches, pedestrian survey, and significance evaluation. Chapter 4 presents the results of the assessment of cultural resources within the Project area. Management recommendations are included in Chapter 5, followed by bibliographic references (Chapter 6) and appendices.

2
SETTING

This chapter describes the prehistoric, ethnographic, and historical cultural setting of the general Project area to provide a context for understanding the nature and significance of cultural resources identified in the region. Prehistorically, ethnographically, and historically, the nature and distribution of human activities in the region have been affected by such factors as topography, climate, geology, and the availability of water and biological resources. Therefore, the environmental setting of the general Project area is summarized below followed by a discussion of the cultural setting.

2.1 ENVIRONMENTAL SETTING

2.1.1 Geological Setting

The Project is set within the middle Mojave River Valley in San Bernardino County, California. The elongated east-west valley runs from the south near the town of Helendale to the east and into the Lower Mojave River Valley Basin at the Waterman fault. The Middle Mojave River Valley Basin is bounded on the north by a combination of surface and subsurface divides, the Helendale fault, and the contact between Quaternary alluvium and consolidated basement rock of the Kramer Hills and Iron Mountain (California Department of Water Resources 2003).

The Mojave River is the largest drainage system in the Mojave Desert. Its modern extent and capacity is only a fraction compared to its extent during the Last Glacial Maximum. At this peak period, waters of the Mojave River drainage system flowed through, or contributed water to, several great Pleistocene Lakes: Lake Manix (which incorporated modern dry lake basins Afton, Troy, Coyote, and Cronese basins) and Lake Mojave (including dry Soda Lake and dry Silver Lake basins) (USGS 2009).

The Mojave drainage system evolved along with the changing landscape beginning in the late Tertiary, when concurrent tectonic uplift of mountain ranges around the Mojave region and changes in regional climatic conditions were occurring. The modern river system began developing as westward-flowing stream drainages were blocked by the uplift of the Transverse Ranges along the greater San Andreas Fault system. The combination of blocked drainage systems and increased precipitation with the onset of cooler or ice age conditions at the close of the Tertiary resulted in the filling of basins with water (and sediments). Progressively through the latest Tertiary and into the Quaternary periods, lakes filled and streams overflowed through low divides between ranges and flooded adjacent basins. In this manner, the Mojave River evolved from the spilling over of lakes in the western Mojave Desert region. These large lakes do not exist today.

Two large lakes that played significant roles in the development of the landscape of this portion of the Mojave Desert were Lake Harper and Lake Manix. These dry lakes are located northwest and northeast of the Project area, respectively. Sediments associated with these ancient lake deposits (and others in the region) record a story of climate change in the region (USGS 2009).

2.1.2 Climate, Vegetation, and Fauna

The general Project area is located within the Mojave Desert ecological and geographic province. Minimal precipitation (8–18 centimeters [cm]), low humidity (10–40 percent), wide diurnal temperature ranges (up to 77 degrees Fahrenheit [°F]), high mean summer temperatures (77–102 °F), and strong seasonal winds characterize the modern climate in the Mojave Desert. Summers in the Mojave Valley are long and hot, with the average high temperature in July, the warmest month, at 108.3 ºF (average low 88.3 ºF). Winters are mild, with the average high temperature in December, the coolest month, at 63.4 ºF (average low 42.0 ºF). Precipitation derives mainly from the subtropical monsoons from the gulfs of California and Mexico during the summer months (Hall 1993:7), resulting in thundering rainstorms within the upland areas which, in turn, create vigorous runoff resulting in the occurrence of alluvial fans, braided drainages, intermittent streams, and wetland features on the valley floors. Pacific maritime air masses during the winter months account for the remainder of the precipitation. Average annual precipitation is approximately 4.5 inches (in.), and annual evaporation rates exceed 6 ft. Most months receive 0.4 to 0.5 in. of rainfall, although rainfall in May and June is very rare, and rainfall in August is above the monthly average. During the spring and late fall, strong winds prevail, occasionally resulting in dust storms. In some portions of the desert, the loss of the sandy matrix around cobbles allows individual stones to settle into a packed mass known as desert pavement. In other areas, windblown sands gather against obstacles (e.g., creosote bushes), forming large expanses of active dunes.

Natural vegetation within the general Project area was dominated by plant species typical of the creosote bush scrub plant community. Creosote bush scrub is common in deserts and along well-drained slopes, fans, and valleys below 3,500 ft and dominates the bajada terrace slopes, or bluffs, in the western Mojave Desert region. Typical species associated with this plant community include creosote bush (*Larrea* spp.*)* and white bursage (*Ambrosia dumosa)*. Desert saltbush scrub was identified in disturbed areas within the Project area and included typical species of seepweed (*Suaeda moquinii*) and saltbush (*Atriplex* sp.).

Fauna found within the Project study area include the common side-blotched lizard (*Uta stansburiana*), desert tortoise (*Xerobates* [*Gopherus*] *agassizii*), desert iguana (*Dipososaurus dorsalis*), chuckwalla (*Sauromalus obesus*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), mourning dove (*Zenaida macroura*), turkey vultures (*Cathartes aura*), common raven (*Corves corax*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Haemorhous mexicanus*), desert cottontail (*Sylvilagus audubonii*), and kangaroo rat (*Dipodomys* sp.).

2.2 PREHISTORIC SETTING

Probably the most widely cited prehistoric cultural chronology for the California deserts is based on Warren's (1984; Warren and Crabtree 1986) Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Protohistoric periods. These five temporal periods are based on distinctive projectile point and shell bead styles as period markers and radiometric assays to provide absolute dates (Warren

1984). With a postulated basal date of circa (ca.) 8000 B.C., Warren's initial Lake Mojave Period is believed to have persisted until approximately 5000 B.C., when it was succeeded by the Pinto (ca. 5000 to 2000 B.C.), Gypsum (ca. 2000 B.C. to A.D. 500), Saratoga Springs (ca. A.D. 500 to 1200), and Protohistoric (ca. A.D. 1200 to Historic) periods.

2.2.1 Lake Mojave Period (ca. 8,000 to 5000 B.C.)

The onset of the Lake Mojave Period is marked by climatic changes, which resulted in a population shift as people living in the desert regions migrated towards the coastal region to exploit littoral resources. A small frequency of ground stone implements is present during this time, from which limited hard seed grinding activities can be inferred (Sutton et al. 2007:234, 237) representing a shift toward a more diversified and generalized economy (Sutton 1996:228). The high incidence of extra-local materials and marine shell is interpreted as wider spheres of interaction than witnessed previously. Sutton and others (2007:237) interpret these and other data as indicators of "a forager-like strategy organized around relatively small social units."

Cultural materials dating from this complex encompass the Playa cultures (Rogers 1939), the San Dieguito complex (Warren 1967), and the Lake Mojave period (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto complex. The Lake Mojave assemblages (Campbell et al. 1937) include Lake Mojave series projectile points (leaf-shaped, long-stemmed points with narrow shoulders) and Silver Lake points (short-bladed, stemmed points with distinct shoulders). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, and heavy core tools (Sutton et al. 2007:234).

2.2.2 Pinto Period (5000 to 2000 B.C.)

The Pinto period represents a broad continuity in the use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates as well as the prevalence of ground stone implements in the material culture (Sutton et al. 2007:238), which distinguishes it from the Lake Mojave complex. Warren (1984) argues that cultural adaptation to the changing desert environment between 7500 and 5000 B.P. may account for the material characteristics of the Pinto complex, which gradually replaced those of the preceding Lake Mojave complex. The age and motivations for technological adaptation noted in the Pinto complex remains one of dispute, as Sutton and others (2007:238) cite recent work conducted on Fort Irwin and Twentynine Palms that produced radiocarbon dates as early as 8820 B.P. associated with Pinto complex assemblages, thus pushing back the inception of the complex coincidental with the Lake Mojave complex.

The Pinto complex is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases, as well as bifacial and unifacial core tools, and an increase in milling stones. Pinto points were typically produced by percussion reduction, with limited pressure retouch.

2.2.3 Gypsum Period (2000 B.C. to A.D. 500)

Humboldt, Gypsum, and Elko series projectile points mark the Gypsum Period. A few Gypsum Period sites from the deserts of California, Nevada, and Arizona have been excavated, including

Gypsum Cave; Newberry Cave; Willow Beach; Rose Spring; Indian Hill Rockshelter; and Ray, Baird, and Chapman caves. In addition to diagnostic projectile points, Gypsum Period sites include leaf-shaped points; rectangular-based knives; flake scrapers; T-shaped drills; and occasionally, large scraper planes, choppers, and hammerstones (Warren 1984:416). Manos and milling stones are common; the mortar and pestle also were introduced during this period. Other artifacts include shaft smoothers, incised slate and sandstone tablets and pendants, bone awls, *Olivella* shell beads, and *Haliotis* beads and ornaments. A wide range of perishable items dating to this period was recovered from Newberry Cave, including atlatl hooks, dartshafts and foreshafts, sandals and S-twist cordage, tortoise-shell bowls, and split-twig animal figurines. The presence of both *Haliotis* and *Olivella* shell beads and ornaments and split-twig animal figurines indicates that the California desert occupants were in contact with populations from the Southern California coast and southern Great Basin (e.g., Arizona, Utah, and Nevada).

Warren (1984) proposed that the beginning of the Gypsum Period coincides with a return to more favorable climatic conditions known as the Little Pluvial, which apparently allowed for more intensive occupation of the California deserts. During the succeeding arid periods, it appears that these populations had gradually adapted in a variety of technological and socioeconomic ways to the more arid desert environment. Technologically, the artifact assemblage of this period is similar to that of the preceding Pinto Period; new tools also were added either as innovations or as “borrowed” cultural items. Included are the mortar and pestle, used for processing hard seeds (e.g., mesquite pods), and the bow and arrow, as evidenced by the presence of Rose Spring projectile points late in this period. Ritual activities became important, as evidenced by split-twig figurines (likely originating from northern Arizona) and petroglyphs depicting hunting scenes. Finally, increased contact with neighboring groups likely provided the desert occupants important storable foodstuffs during less productive seasons or years, in exchange for valuable lithic materials such as obsidian and cryptocrystalline silicates. Warren (1984:420) states, “as a result of these new adaptive means, the return to arid conditions at the end of the Little Pluvial had relatively little influence on the distribution of the populations of the late Gypsum Period.”

2.2.4 Saratoga Springs Period (ca. A.D. 500 to 1200)

In the Mojave Desert, the succeeding Saratoga Springs Period saw essentially a continuation of the Gypsum Period subsistence adaptation throughout much of the California desert. Unlike the preceding period, however, the Saratoga Springs Period is marked by strong regional cultural developments, especially in the Southern California desert regions, which were heavily influenced by the Hakataya culture of the lower Colorado River area. Warren has divided the Saratoga Springs Period into three, possibly four, distinct regional developments based largely on pottery types and projectile point styles: Northwestern Mojave, Eastern Mojave, Southern Desert, and possibly Antelope Valley (Warren 1984:420–424).

In the northwestern Mojave, the Saratoga Springs Period is marked by the dominance of Rose Spring and Eastgate arrow points over the earlier Elko and Humboldt series dart points. Accepting this technological change, there appears to be a strong continuity of the Gypsum Period cultural assemblages in the northwestern Mojave.

In the Antelope and Apple valleys of the western Mojave Desert, the Saratoga Springs Period is identified by Rose Spring and Cottonwood Triangular projectile points at large village sites containing deep middens and cemeteries which have been dated from 250 B.C. to A.D. 1650 (Sutton 1981:217). These sites also contain large quantities of shell beads and steatite items that originated from the Southern California coastal regions. It appears that the occupants of Antelope Valley traded heavily with the coastal populations, developed large villages as early as the Saratoga Springs Period, and may represent another divergent regional development during this period.

In the eastern Mojave Desert, Anasazi interest in turquoise likely influenced populations living in the Mojave Desert as far west as the Halloran Springs area where hundreds of small turquoise mines existed. The presence of Anasazi pottery at many of the turquoise mines suggests that the Anasazi initially operated these mines between A.D. 500 and 700.

In the Southern Desert region, the impetus for change appears to have derived from Hakataya influences from the lower Colorado River, evidenced by the introduction of Buff and Brown Ware pottery and Cottonwood and Desert Side-notched projectile points. The initial date for the first Hakataya influence on the southern Mojave Desert remains unknown; however, it does appear that by A.D. 800 to A.D. 900 the Mojave Sink, which is located in the central Mojave Desert, was heavily influenced, if not occupied by, lower Colorado River peoples. Additionally, trade along the Mojave River extended Hakataya influence west and appears to have blocked all Anasazi influence west of the Cronise Basin and south of the New York and Providence mountains by A.D. 1000; this influence apparently continued well after the Saratoga Springs Period (Warren 1984:423).

In summary, the Saratoga Springs Period is characterized by cultural diversification with strong regional developments. Turquoise mining and long-distance trade networks appear to have attracted both the Anasazi and Hakataya peoples into the California deserts from the east and southeast, respectively. Trade with the California coastal populations also appears to have been important in the Antelope Valley region and stimulated the development of large, complex villages. In the northwestern Mojave Desert, however, the basic pattern established during the Gypsum Period changed little during the Saratoga Springs Period. Toward the end of the Saratoga Springs Period, the Hakataya apparently moved far enough north to gain control of the turquoise mines in the central Mojave Desert, thus replacing the Anasazi occupation of the eastern California desert.

2.2.5 Protohistoric Period (ca. A.D 1200 to Historic Period)

During the Protohistoric Period, the regional cultural developments established during the preceding Saratoga Springs Period continued with some modifications. The major cultural regions identified in the California desert region during this period include the Southern Desert, Northern Mojave, and Antelope Valley (Warren 1984:425). In the Southern Desert region, Brown and Buff Ware pottery, first appearing on the lower Colorado River at about A.D. 800, started to diffuse across the California deserts by about A.D. 900 (Warren 1984:425). Associated with the diffusion of this pottery were Desert Side-notched and Cottonwood Triangular projectile points dating to about A.D. 1150 to A.D. 1200, suggesting a continued spread of Hakataya influences. Trade along the Mojave River also expanded, resulting in middlemen between coastal and Colorado River populations. Large, complex housepit village sites were established along the headwaters of the Mojave River (Smith 1963) and were somewhat similar to those reported in Antelope Valley (Sutton 1981). Although both of these areas appear to have participated in extensive trade between the desert and the coast, the lack of Buff and Brown Ware pottery at the Antelope Valley sites suggests that these people were minimally influenced by the Hakataya developments along the Mojave River (Warren 1984:426).

In the Protohistoric Period, the cultural expressions of the northwestern and eastern Mojave of the Saratoga Springs Period appear to have coalesced, forming a single cultural unit that roughly corresponds to the boundary of the Numic-speaking peoples. Hakataya influence in this region is marked by Desert Side-notched and Cottonwood Triangular projectile points, and Brown Ware (Warren 1984:427). This influence appears to have diminished during the late Protohistoric Period when the extensive trade networks along the Mojave River and in Antelope Valley appear to have broken down and the large village sites were abandoned. Warren (1984:428) provides two possible explanations for the disruption of trade networks: (1) the drying up of the lakes in the Cronise Basin and (2) the movement of Chemehuevi southward across the trade routes during late protohistoric times.

2.3 ETHNOGRAPHIC SETTING

At Spanish contact, the vicinity of the Project area was likely utilized by the Takic-speaking Desert Serrano (Vanyumé) who occupied settlements along the Mojave River drainage and to the southeast in the foothills of the San Bernardino Mountains. (Bean and Smith 1978; Earle 1990, 1997; Kroeber 1925). Seasonal or permanent Desert Serrano settlements occurred where water and other resources were available, such as along the Mojave River. However, the upland or higher altitude areas within their territory were preferred for permanent settlement because of the availability of tree crops there (acorns and piñon) as well as the availability of water, forage, and the greater seasonal availability of certain classes of game (Earle 1997:62).

For the most part, the harsh desert environment that characterizes the general Project region permitted only the sparsest of populations composed of groups of nuclear families joined by kinship ties. These small groups practiced a hunter-gatherer lifestyle, moving seasonally, or more frequently, in response to the local availability of water and food resources. Generally speaking, winter was a time in which nuclear families camped together at the more permanent settlements in the San Bernardino Mountains or along the Mojave River, living off of stored seeds or pine nuts and dried meats (Earle 1997:62). In the spring or whenever the winter stored foodstuffs were exhausted, the camps broke up into family units, which began foraging for the buds and stalks of the Joshua tree (*Yucca brevifolia*), mesquite bean (*Prosopis* sp.), and seasonally available seeds and tubers. Summer was a time of maximum population dispersion, in which very small groups of people could be found exploiting rice grass (*Oryzopsis hymenoides*) on the large alluvial fans. During the fall months, piñon (*Pinus monophylla*), California juniper (*Juniperus californica*), and live oak (*Quercus* sp.) were harvested in anticipation of the lean winter months.

The sparse resources of the study region also produced a highly diverse hunting economy, where small game was an important source of protein. Mammals such as antelope, deer, mountain sheep, rabbits, squirrels, wood rats, and desert chipmunks were hunted; lizards, chuckwallas, rattlesnakes, desert tortoises, birds and bird eggs, and insects were also eaten when encountered (Steward 1938:33–34).

Baskets were used extensively for carrying, seed beating, winnowing and parching, boiling water, and storage. Digging sticks were used for procuring roots and tubers. The mano and milling stone, mortar and pestle, and pottery were also used. The sinew-backed bow and arrows of willow or cane were used for hunting both large and small game.

As with most Native groups in California, the basic division of labor was by sex and there were few individual specializations; thus, the nuclear family was a self-sufficient unit as long as communal tasks (e.g., animal drives) were unnecessary. Women were typically responsible for the gathering of the plant foods and food preparation, while the men conducted most of the hunting. Each sex was also responsible for the manufacture of the tools required for their respective tasks: women made the baskets, pottery, and clothing; men generally produced the flaked stone tools and built the houses (Steward 1938:44).

Trade was conducted with other Native groups on the Pacific Coast and Central Valley to the west as well as with groups along the Colorado River and the greater Southwest. The Serrano groups apparently traded for goods that were consumed locally and served as intermediaries in longer distance commerce relationships.

Several ethnohistoric Desert Serrano village sites were identified within the Project area (Earle 2005). These include the villages of *Topipabit*, *Sisugenat*, and *Cacaumeat*, all of which are situated along the Mojave River between modern-day Victorville and Barstow. Traveling with a military expedition down the Mojave River in 1819, Father Pascual Nuez chronicled his visits to each of the settlements. Earle's (2005:9) analysis of the early Spanish travel and expeditions accounts suggests that *Topipabit* was likely located just north of Victorville and *Sisugenat* was positioned along the river in the Helendale – Hodge area. *Cacaumeat* may also have been located around Helendale or slightly further downstream at the Bryman – La Delta area.

2.4 HISTORICAL SETTING

2.4.1 Spanish and Mexican Period (1542 to 1846)

For the most part, the western Mojave Desert has a somewhat abbreviated history, as it was a frontier to be crossed rather than settled. As discussed above, the earliest non-Native people to enter the general Project region were the Spanish explorers. In 1776, Francisco Garcés, a priest associated with a Spanish mission in Tucson, traveled with several Indian guides along the Old Mojave Indian Trail and approached the Mojave River area near present-day Hesperia in March of that year. During subsequent years, several other Spanish explorers traversed the Project area.

In 1821, Mexico declared its independence, and as the colonial administration disintegrated, American explorers and entrepreneurs began exploring the California desert, the first of which was Jedediah Strong Smith, who first crossed the Colorado River into California in 1826. As with Garcés, several Indian guides along the Old Mojave Indian Trail led Smith and his group of approximately 30 trappers over the Cajon Pass, to the Mission San Gabriel. As early as 1828, Indian horse thieves, including some from the Mojaves, the Chemehuevis, and the Utes, as well as white men and runaway mission Indians, began raiding the large coastal missions and

Mexican ranchos stealing hundreds of fine horses. Summit Valley, just east of the Cajon Pass, likely became a rendezvous point for the horse thieves prior to crossing the Mojave Desert (De Barros 1990:2-51).

By the early 1830s, the Old Mojave Trail had become a part of the Old Spanish Trail, a major commercial caravan route that linked northern New Mexico with Los Angeles. The first charted route across the Great Basin, the Old Spanish Trail witnessed heavy commercial traffic in wool products, horses, livestock, and other goods traded between New Mexico and California during the Mexican rancho period (1833–1848) (Parsons 2004:21). After gold was discovered on the western slope of the Sierra Nevada Mountains in 1849, many immigrants followed the Old Spanish Trail in search of riches in California. California became a state of the United States in 1850.

One of the most important journeys along the Old Spanish Trail was that of John C. Frémont, whose explorations of the Great Basin in 1843–1845 for the U.S. Corps of Topographical Engineers provided the first reliable descriptions and maps of the region and paved the way for the United States' annexation of what are now the states of New Mexico, Utah, Arizona, Nevada, and California. It was Frémont who named and—through his widely published maps—popularized the Old Spanish Trail (Parsons 2004:22). Historical documents indicate the Frémont reached the Mojave River at the Points of Rocks near Helendale, at which point he turned and followed the Mojave upstream along the Old Spanish Trail (Mendenhall 1909: 25).

2.4.2 Euro-American Period (1846 to 1960)

The Euro-American period in the middle Mojave River Valley can be thought about in terms of several research themes—each of which provides a framework for understanding the historical cultural resources in this portion of the Mojave Desert. These themes include: transportation, mining, agriculture, and the military. In the summary presented below, each of these themes is discussed in relation to the major historic developments that occurred in the general Project area during the Euro-American period.

Mexico ceded California to the United States through the Treaty of Guadalupe Hidalgo in 1846. Prior to this time, Euro-Americans had begun traveling west in pursuit of personal wealth, religious freedom, and the ability to acquire land. A large gold deposit discovered in 1849 in the mountains east of San Francisco resulted in a massive Euro-American population boom in California. Towns were established to outfit miners, and some towns, such as San Francisco, became cities as a result of the Gold Rush. In order for the U.S. government to claim ownership of the natural resources located within Alta California, California was established as a state in 1850.

The San Bernardino Baseline and Meridian was established in 1853 and mapping of the desert lands began in earnest, followed by settlers seeking land to homestead (Sturm 1993:17). Also in the early 1850s, a graded road had been built up the southern face of the San Bernardino Mountains, making it possible to freight wagon loads of supplies and lumber to and from the sawmills in the mountains that provided lumber for residences and commercial businesses in the San Bernardino Valley.

Developments in the middle Mojave River Valley during the Euro-American period are closely tied to its location along a major travel corridor. As discussed above, this area was used as a trade route during both the prehistoric and early historic periods. After the Mormons colonized Utah in the mid-1800s, Salt Lake City gradually supplanted Santa Fe as a destination of commerce. The Old Spanish Trail became a favored route for Mormon settlers traveling from the Great Salt Lake to the San Bernardino area of Southern California, thus becoming known as the "Mormon Trail." Point of Rocks, which is located near present-day Helendale, was a stopping point for many Mormon wagon trains in the 1850s (Stickel and Lois Weinman-Roberts 1980:183). In the early 1860s, a stagecoach station was established in the site; the station was subsequently burned by the Paiute Indians in 1863.

A great impetus to growth in the area was the arrival of the California Southern Railroad. A subsidiary of the Atchinson, Topeka, and Santa Fe (Santa Fe) Railway, the California Southern Railway Company began construction of a line from San Diego to Barstow in 1881. A rail station was established at Point of Rocks in 1885 to provide water for the steam engine locomotive moving trains across the Mojave Desert. In 1897, the name of the station was changed to Helen in honor of a daughter of a Santa Fe Railroad executive (Stickel and Weinman-Robert 1980:163). The community was subsequently renamed Helendale in 1918.

During the late nineteenth century and early part of the twentieth century, the middle Mojave River Valley was also the scene of mining activity. Gold and silver was first discovered in the area south of Oro Grande in the early 1870s. The Silver Mountain Mining District, which contained the Oro Grande Mine, was subsequently established in the area. Sometime during the 1880s, operations at the Oro Grande Mine were suspended due to the high costs associated with transporting ore and the scarcity of water (Vredenburgh 1992). Mining resumed at the Oro Grande Mine in the 1920s and continued intermittently until 1941. Although iron ore was also discovered at Iron Mountain northeast of Helendale, these deposits do not appear to have been extensively exploited in the historic period.

From 1885 through 1900, the wetter and more southwesterly areas of the Mojave Desert experienced a cycle of boom and bust in pioneer settlement. Following the extension of rail transport to the desert in the 1870s and 1880s, attempts were made to establish agricultural communities in several desert regions. The most important of these were the Antelope Valley and the upper Mojave River valley, west and south of the Project area, respectively (Earle 1992, 1998:43–67; Thompson 1929:290–297, 381–384). In both of these regions, before the 1880s, stock grazing had been the principal agricultural activity. This was in areas where typically fewer than five head of cattle might be grazed per square mile, so that access to open public rangeland was essential to cattlemen (Thompson 1929:41). However, by the late 1880s, both the establishment of organized colony communities and the undertaking of homesteading or desert land entry had become common. The colonies often emphasized shared political, ethnic, or religious values among participating members, emphasized community cooperation, and often counted on being able to use California's Wright Act to build community-governed gravity-flow irrigation systems in areas downslope from desert-edge mountain ranges. In low-lying areas in the center of desert basins, such as the vicinity of dry lakes, subterranean water with artesian flow characteristics could also sometimes be exploited for at least limited irrigation purposes. In these low-lying areas, alkali-tolerant crops such as alfalfa might be grown, and cattle and other stock grazed (Earle 1998:59–67).

As settlement activity increased in middle Mojave River Valley, lands that had once been used for cattle grazing were transformed for use as farms and orchards. Agrarian, mining, and commercial activities spurred the growth of Helendale and the neighboring communities of Victorville, Apple Valley, Lucerne Valley, Hesperia, Adelanto, and Oro Grande. The discovery of large deposits of limestone and granite in the 1910s and the construction of the Southwestern Portland Cement Company plant in 1917 solidified cement manufacturing as a major industry in Victor Valley.

A further impetus to growth in the middle Mojave River Valley was the paving of the National Trails Highway, which later became U.S. Route 66, in the late 1920s. The highway paralleled the Santa Fe Railway from Victorville to Barstow passing through both Oro Grande and Helendale. Access to the transcontinental highway strengthened the region's industrial and commercial base and brought increased settlement.

The military has also played a key role in the development of the middle Mojave River Valley during the period of World War II (WW II). Victorville Army Air Field (VAAF), located 8 mi northwest of central Victorville, was established in July 1941 as part of the build-up of Army air fields across the nation in preparation for WW II. The VAAF provided Primary, Basic and Advanced (both single and multi-engine) pilot training under the Army Air Force Flying Training Command. In the following year, four satellite Army fields serving the Victorville Army Air Field (Brooks 2012; Freeman 2015) were also constructed, including: Hawes Auxiliary Air Field (No. 1; 23 mi north of Adelanto), Helendale Auxiliary Army Air Field (No. 2; 6 mi north of Helendale); Mirage Auxiliary Air Field (No. 3; 3 mi west of El Mirage), and Grey Butte Auxiliary Air Field (No. 4; 25 mi east of Palmdale). Each of these auxiliary air fields was nearly identical in design, comprising four landing strips in a triangular configuration which allowed for multiple landings and variable wind direction. The VAAF was closed at the end of WW II but was activated again as a training base for the United States Air Force in 1950 and renamed George Air Force Base.

3
METHODS AND PROCEDURES

The objectives of the cultural resource investigations of the proposed RCS Test Range Facility Project were twofold: first, to complete a cultural resource inventory of the 299.5-ac Project area in order to identify and document all cultural resources that may be impacted by the proposed Project, and second, to evaluate the significance of the identified cultural resources within the Project area in order to determine their eligibility for listing on the California Register of Historical Resources (CRHR).

In order to accomplish these two objectives, Æ conducted records searches, archaeological field surveys, and archival research. The methods used to for each of the work efforts are described below. Results of these investigations provide baseline information with which to evaluate the significant associative and research value of each cultural resource as well as to assess their integrity. Research goals used in the evaluation process focused on a narrow array of problem domains by gathering and analyzing specific sets of data. For prehistoric archaeological sites, research domains focused on basic questions related to chronology, technology, subsistence, and land use patterns. One major research domain–WW II military development and use–was identified for the historical cultural resources. These research domains are discussed in greater detail below.

3.1 BACKGROUND STUDIES

3.1.1 Cultural Resource Literature and Records Search

As part of the proposed Project, Æ completed a cultural resource literature and records search of the Project area plus a 1-mile buffer area. The objective of this records search was to more fully document the various types of cultural resources that had been previously identified within the Project area. The records search was conducted through the South Central Coastal Information Center (SCCIC), housed at California State University, Fullerton. Sources consulted during the records search at the SCCIC include:

- National Register of Historic Places (NRHP) web site (www.cr.nps.gov/nr), through July 20, 2007;
- California Historical Landmarks (State of California, 1996); and
- California Points of Historical Interest (State of California, 1992)

Historical maps were also consulted as part of the records search. These maps include the Bureau of Land Management's (BLM's) Government Land Office (GLO) maps for Township 8 North, Range 4 West (1855) and Township 9 North Range 4 West (1857); Barstow, CA (1934) and Hawes (1956) 15' USGS Quadrangle maps and Wild Crossing, CA (1973) 7.5' USGS Quadrangle maps.

3.1.2 Sacred Lands Filed Search and Native American Coordination Efforts

As part of the cultural resource assessment, Æ also requested a Sacred Lands File (SLF) search from the NAHC located in Sacramento, California in May 2015. This SLF search encompassed the Project area and surrounding 1-mile buffer. In addition, letters requesting information on Native American cultural resources were sent on June 1, 2015 to Native American tribes and individuals whose contact information was provided by the NAHC. Tribal communities contacted as part of this effort include the Morongo Band of Mission Indians, the San Fernando Band of Mission Indians, the San Manuel Band of Mission Indians, and the Serrano Nation of Mission Indians. Follow-up telephone calls were conducted by Æ on June 15, 2015.

3.2 CULTURAL RESOURCE SURVEY

A Phase I survey of the proposed Project area was carried out by Æ Field Director Josh Smallwood, M.A., RPA, and Field Technician Julia Carvajal between May 12 and May 15, 2015. Smallwood and Carvajal were accompanied by LM Aero photographers who were responsible for taking photographs of the survey areas and cultural resources that were encountered. Of the 299.5 ac that comprises the Project area, approximately 120 ac were intensively surveyed by the archaeologists walking parallel transects; an additional 40 ac was subject to a reconnaissance-level windshield survey. The remainder of the Project area, which totals approximately 140 ac, has been previously developed and exhibits a high level of disturbance of the native desert sediments. These developed areas were not surveyed as they are unlikely to contain any intact archaeological resources.

All areas likely to contain or exhibit archaeologically or historically sensitive cultural resources were inspected carefully to ensure that visible, potentially significant cultural resources were discovered and documented. Additionally, surveyors investigated any unusual landforms, contours, soil changes, features (e.g., road cuts, drainages), and other potential cultural site markers. A Daily Work Record was completed each day by the Field Supervisor. The Daily Work Record documented survey personnel, hours worked, weather, ground surface visibility, vegetation, soils, exposure/slope, topography, natural depositional environments, and identified cultural resources.

Systematic efforts were made to characterize and define the areal extent of each cultural resource encountered during the field investigation. For purposes of this survey, one or more cultural features or three or more artifacts greater than 45 years of age within a 30-m (98-ft) radius were deemed to constitute a cultural resource (or site). Cultural features or clusters of artifacts more than 30 m away from the nearest known cultural resource were generally considered a separate site area. Fewer than three prehistoric or historical artifacts within a 30 m radius, but outside of a known site, were considered an isolated find and were recorded appropriately as such.

When encountered, any newly identified cultural resources were recorded on State of California Department of Parks and Recreation (DPR) Primary Records and Archaeological Site Forms (DPR 523 [1995]). Site locations were plotted on the appropriate 1:24,000 scale USGS 7.5' quadrangle using a Trimble GeoXH hand-held global positioning system (GPS) unit using real-time satellite based augmentation system (SBAS) corrections achieving sub-meter accuracy. The GPS unit was also used to determine and document the precise locations and Universal Transfer

Mercator (UTM) coordinates of all activity loci, cultural features, and temporally or functionally diagnostic artifacts identified within site areas. Site maps of each archaeological site were drawn to scale, indicating the location of activity loci, features, and temporally or functionally diagnostic artifacts. All cultural features were documented fully, inventoried, and mapped by UTM coordinates.

In order to more fully define the distribution of surface artifacts, the ground surface within and surrounding each site and isolated occurrence was carefully inspected by the archaeologists. Identified artifacts were flagged and point-provenienced. Once the identification process was complete, an in-field analysis of each artifact was conducted; no artifacts were collected during these investigation.

A summary of the specific methodology used to inventory cultural resources in different portions of the Project area, along with the environmental conditions encountered across the Project area, are provided below.

Northern block: The northern survey block consists of an approximately 160 ac area located within the northern extent of the RCS Test Range Facility. More than half of the acreage is developed and covered with a large soil spoils pile. The range itself was built in the early 1980s and is not historic in age. The remaining portion of the northern block consists of relatively undisturbed native desert environs covered with sand and scattered exposures of well-developed desert pavements. These desert pavements are comprised of a mix of quartzite and igneous rocks with small amounts of cryptocrystalline silicate rocks (Figure 3-1). The pavement surface exhibits a brown varnish from thousands of years of exposure to sunlight and weathering. The desert sands that are located between these areas of desert pavement are a light grayish brown color. Vegetation in the area consists of scattered creosote and low desert brush. The undisturbed areas were surveyed intensively by the archaeologists walking parallel transects spaced no more than 15 m apart.

Central block: The central block is situated immediately southwest of the paved runway and is approximately 50 ac in size. Approximately 20 ac of this area are graded and developed as part of the RCS Test Range Facility. This 20-ac area was not surveyed, as it is highly disturbed due to the construction of the facility in the 1980s. The remaining portion of the central block contains relatively undisturbed areas of native desert environs covered with sand and occasional scattered exposures of well-developed desert pavements. Vegetation in the area consists of scattered creosote and low desert brush. The undisturbed areas were surveyed intensively by the archaeologists walking parallel transects spaced no more than 15 m apart.

Figure 3-1 Portion of survey area with desert pavement, facing northeast.

Southern block: The southern block is situated around the RCS Test Range Facility Plant at the southern end of the Project property. This area is approximately 20 ac in size and is largely developed with existing buildings and hardscape (Figure 3-2). The northern and central portions of the southern block were not surveyed as they are highly disturbed due to the construction of the facility in the 1980s. The proposed location of the 21,000-ft^2 warehouse building, along with peripheral areas of the southern block, was relatively undisturbed and was covered with sand and rocks with scattered vegetation. These undisturbed areas were surveyed intensively by the archaeologists walking parallel transects spaced no more than 15 m apart.

Figure 3-2 Buildings in southern block, facing south.

Roadways: The Project area also includes three existing segments of roadways that will be used during the construction and one road that will be widened for purposes of the proposed Project. These areas total approximately 70 ac in size. The roadway segments run parallel to one another in a northeast-to-southwest direction across the Project area (Figure 1-2). The western and eastern roadways were surveyed at an intensive level by walking a single transect along the outside edge of the shoulder parallel to the road (Figure 3-3). This method provided coverage along both sides of the roadway out to 15 m from the edge of the roadbed.

The central roadway consists of an existing 32-ft-wide roadbed that will be widened to 48 ft for the purposes of the proposed Project. Except for its northern and southern extremities, the entire width of the road and adjacent shoulder areas has been previously graded and is therefore highly disturbed. As such, these disturbed areas were surveyed at a reconnaissance level by driving the length at a speed below 20 mi per hour while inspecting the shoulder. The shoulder along the northern and southern extremities of this road where disturbances was minimal was surveyed at an intensive level by walking parallel transects spaced no more than 15 m apart.

Figure 3-3 Portion of existing road in western portion of Project area, facing north.

Finally, as part of the proposed Project, the paved roadway leading from the facility entrance at Indian Trail to the plant's main buildings will be lined with tortoise fence along the outer edge of the existing shoulder berm. The roadway itself dates to the early 1980s, when the facility was built, and therefore is not historic in age. It rests on a graded alignment and is paved smooth. Due to the disturbed nature and modern age of this roadway, it was surveyed at a reconnaissance level by driving along the route at a speed of less than 20 mi per hour while looking at both sides of the shoulder.

3.3 EVALUATION OF CULTURAL RESOURCES

Æ evaluated each identified cultural resource within the Project area for significance and eligibility for listing in the CRHR. To qualify for listing in the CRHR, a property must represent a significant theme in American history, archaeology, architecture, engineering, or culture, and it must be a good representative of that theme. Moreover, the property must retain integrity; that is, an ability to convey its association with important events, individuals, or themes by means of its physical characteristics. A point worth emphasizing is that CRHR eligibility is being assessed, but not determined, in this document. The professional evaluations offered here are subject to final concurrence by the lead agency.

3.3.1 CRHR Significance Criteria

Section 15064.5(a)(3) of the CEQA Guidelines (as amended) states that a resource shall be considered by the lead agency to be "historically significant" if the resource is 45 years or older and meets the criteria for listing on the CRHR (Public Resources Code [PRC] Section 5024.1, Title 14 California Code of Regulations Section 4852). A site meets the criteria of eligibility for the CRHR if it:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) Is associated with the lives of persons important in our past;

(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 or history.

Cultural resources meeting one or more of these criteria are defined as "historical resources" under CEQA. Resources included in a local register of historical resources (pursuant to PRC Section 5020.1[k]), or identified as significant in a historical resources survey (meeting the criteria in PRC Section 5024.1[g]), also are considered "historical resources" for the purposes of CEQA. The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources, or identified in a historical resources survey, does not preclude a lead agency from determining that the resource may be a historical resource as defined in PRC Sections 5020.1(j) or 5024.1. 3.

3.3.2 Contexts for Evaluation

The archaeological and historical contexts presented in Chapter 2 establish the framework within which decisions about significance are based. The evaluation process essentially weighs the relative importance of events, people, and places against the larger backdrop of prehistory and history; the contexts provide the comparative standards and/or examples as well as the theme(s) necessary for this assessment. A theme is a pattern or trend that has influenced the history of an area for a certain period and is typically couched in geographic (i.e., local, state, or national) and temporal terms to focus and facilitate the evaluation process (National Park Service [NPS] 2002:9).

Significance is based on how well the subject resource represents one or more of these themes, provides important scientific information about the theme, or helps to understand the important events or people associated with the resource and its inherent qualities. A resource must demonstrate more than just association with a theme; it must be a good representative of the theme, capable of illustrating or explaining the various thematic elements of a particular time and place in history.

3.3.3 Integrity

All properties change over time. Therefore, it is not necessary for a property to retain all of its historic physical features or characteristics in order to be eligible for listing in the CRHR. The property must, however, retain enough integrity to enable it to convey its historic identity; in other words, to be recognizable to a historical contemporary. Several aspects or qualities that, in various combinations, define integrity:

1. **Location**—the place where the historic property was constructed or the place where the historic event occurred.

2. **Design**—the combination of elements that create the form, plan, space, structure, and style of a property.

3. **Setting**—the physical environment of a historic property.

4. **Materials**—the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.

5. **Workmanship**—the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.

6. **Feeling**—a property's expression of the aesthetic or historic sense of a particular period of time.

7. **Association**—the direct link between an important historic event or person and a historic property [NPS 2002:44-45].

These elements of integrity are most appropriately applied to built-environment resources (i.e., standing buildings, structures, and objects). Although location (as described above) is relevant for all types of resources, the other aspects of integrity are not readily applicable to most archaeological sites. Instead, physical properties—like vertical and horizontal structure—provide a more relevant measure of integrity for archaeological sites. To illustrate, a site is conventionally considered to possess integrity if its original stratigraphy remains generally unaltered such that the chronology of activity can be determined, and if indications of disturbance do not obscure the full range of activity that occurred at the site, as expressed in its features and artifacts. If both conditions are generally met, the site will have likely retained its ability to yield scientifically important information. To retain historic integrity, a property will always possess several, and usually most, of these aspects. In order to properly assess integrity, however, significance (why, where, and when a property is important) must first be fully established. Only after significance is established can the issue of integrity be addressed. To be eligible for listing in the CRHR, a resource must possess both significance and integrity. Thus, cultural resources that are not significant per CRHR criteria are by definition not eligible to either register and do not require an integrity assessment.

3.3.4 Linkage

Under CRHR Criterion 4, the data potentials of a particular archaeological site are identified through the linkage of specific artifact classes present at the site with research themes such as those outlined above. For example, charcoal or other organic remains suitable for radiocarbon dating, source-identified obsidian, projectile points, or other stylistic artifacts would permit the study of cultural chronology. Flaked stone tools and debitage may provide information on lithic technology, while faunal and floral remains provide information on food procurement, diet, seasonality, and the biotic environment. The presence of these kinds of remains in an undisturbed context would indicate a significant cultural deposit. If such remains are lacking, or if their contextual integrity has been seriously impaired by post-depositional disturbances, then the site likely would not be considered eligible under Criterion 4.

A key factor in assessing archaeological data potentials is the capacity for chronological control of the cultural assemblage. Temporally diagnostic artifact forms, historical documents, datable carbon, source-identified obsidian specimens, and preserved stratigraphy are among the major sources of chronological data. Sufficient samples of obsidian debitage, even in the absence of diagnostic tool types, can also yield chronologically controlled data on raw material procurement, lithic reduction sequences, and tool manufacturing techniques through obsidian sourcing and hydration studies.

If site chronology and function can be defined, a site can usually provide data on land use and settlement patterns. These data are usually embodied in the locational, functional, and contextual information about the site. Similarly, almost all prehistoric sites have some potential to provide data on lithic technology, given chronological control of a sufficient sample of tools and/or debitage. However, if this information cannot be placed in a larger cultural context, the data is not considered of great importance; thus, sites having only limited settlement or technological data are not generally deemed significant or important under Criterion D/4. Likewise, sparse scatters of flaked or ground stone without temporal diagnostics have limited data potential due to the low density and low variability of the cultural assemblage and the lack of datable material.

Thus, archaeological sites in the Project area generally were judged to meet the CRHR eligibility criteria under Criterion 4 if they exhibited one or more of the following characteristics:

- Temporally discrete features, strata, or components;
- Variability in flaked and ground stone assemblages and faunal remains;
- Sufficient quantities of artifacts and debris to provide statistically valid samples;
- Internal spatial variability that might reflect functional differentiation in site use;
- Vertical or horizontal structure that might reflect discrete single component occupations or readily separable multicomponent occupations; and/or
- Documentation of important historical associations.

Sites with these characteristics were judged to contain the kinds of data useful for understanding the local chronological sequence, defining discrete cultural components, and learning how these relate to more well-known cultural sequences. At the next hierarchical level, such sites can provide information on dimensions of flaked and ground stone technology, prehistoric diet and subsistence, trade and exchange, and other regionally important research questions.

4
RESULTS OF THE CULTURAL RESOURCE ASSESSMENT

This chapter presents the results of the assessment of the cultural resources located within the Project area. The findings of the background studies are presented first, followed by a discussion of the results of the Phase I pedestrian survey. Finally, an evaluation of significance is presented for each of the identified cultural resources that has the potential to be impacted by the proposed Project.

4.1 RESULTS OF BACKGROUND STUDIES

4.1.1 Cultural Resource Literature and Records Search

Results of the records search indicate that seven cultural resource studies have been conducted within 1 mile of the Project area (Table 4-1). Five of these studies included portions of the current Project area. Most of this work involved cultural resource inventories conducted in the early 1980s in support of the Helendale Range Project (Document No. SB-01140) and associated Helendale and Granite Mountain Land Exchange (Document No. SB-01141, SB-01142, and SB-01144). A data recovery program, which involved surface collection and excavation of six archaeological sites, was also completed as part of this project (Norwood et al. 1982)

Table 4-1
Previous Cultural Resource Studies within 1 Mile of the Project Area

Document No.	Author(s)	Date	Report Title
SB-01140*	Hatley, M. Jay and Fran E. Buck	1981	Cultural Resources Inventory and Impact Assessment for the Helendale Range Project, San Bernardino County, California
SB-01141*	Hatley, M. Jay and William T. Eckhardt	1980	Cultural Resource Inventory for a Portion of the Helendale and Granite Mountain Land Exchange
SB-01142*	Bureau of Land Management – Barstow Office	1980	A Cultural Inventory of the Proposed Helendale Land Exchange, Helendale, California
SB-01143	Hatley, M. Jay	1981	Report Supplement: Cultural Resource Inventory for a Portion of the Helendale and Granite Mountain Land Exchange
SB-01144*	Sutton, Mark Q.	1980	A Cultural Resource Inventory of a Portion of the Proposed Helendale Land Exchange (CA-6803), Helendale, California
SB-03027	White, Robert S.	1995	An Archaeological Assessment of a 10 Acre Parcel Located Adjacent to Ranchito Road, Near Helendale, San Bernardino County, CA
N/A*	Norwood, Richard H., Fran E. Buck, and Gary Fink	1982	The Helendale Range Project: Data Recovery at Sites SBr-4152, SBr-4858, SBr-4859, SBr-4860, SBr-4861, and SBr-4862, San Bernardino County, California

* Cultural resource study that included portions of the Project area.

The investigations cited above resulted in the identification of 12 previously recorded cultural resources within 1 mile of the Project area (Table 4-2). These include three prehistoric archaeological sites, two historical archaeological sites, and seven isolated artifacts. Prehistoric archaeological sites include lithic scatters, a quarry, and rock ring features; the two historical archaeological sites both consist of refuse deposits. The six prehistoric isolated artifacts are composed of single or small numbers of flaked stone artifacts. One historical isolated find, a European-style coffee pot, was also recorded in the one-mile buffer area. None of these previously identified cultural resources is located within the current Project area.

Table 4-2
Cultural Resources within 1 Mile of the Project Area

Primary	Trinomial	Description
P-36-000720	CA-SBR-720	Site: Prehistoric lithic scatter and quarry site
P-36-004152	CA-SBR-4152H	Site: Historic refuse deposit dating to the early 1940s; likely associated with the Helendale Auxiliary Army Air Field
P-36-004858	CA-SBR-4858H	Site: Historical domestic refuse deposit
P-36-004859	CA-SBR-4859	Site: Prehistoric site consisting of three rock rings; no associated artifacts
P-36-004862	CA-SBR-4862	Site: Prehistoric sparse lithic scatter
P-36-004863		Isolate: One prehistoric flaked stone artifact
P-36-061757		Isolate: One prehistoric flaked stone artifact
P-36-061758		Isolate: One prehistoric flaked stone artifact
P-36-061763		Isolate: Four prehistoric flaked stone artifacts
P-36-061765		Isolate: Four prehistoric flaked stone artifacts
P-36-061768		Isolate: One prehistoric flaked stone artifact
P-36-061769		Isolate: Historic-period coffee pot

The Helendale Auxiliary Airport and an associated road were the only structures or features of interest noted during the examination of historic maps of the Project area.

4.1.2 Sacred Lands File Search and Native American Coordination Efforts

The search of the SLF by the NAHC failed to indicate the presence of Native American cultural resources within the immediate Project area (see Appendix A). The NAHC cautioned that the absence of specific site information does not indicate the absence of such resources. They recommended that other sources of cultural resources should be contacted for information on Native American cultural resources. The NAHC provided a list of regional Native Americans who may have knowledge of cultural resources within the Project area. Tribal communities listed on the NAHC list include the Morongo Band of Mission Indians, the San Fernando Band of Mission Indians, the San Manuel Band of Mission Indians, and the Serrano Nation of Mission Indians.

Letters requesting information on Native American cultural resources that may be present in the Project area were sent to each of the listed tribes and individuals on June 1, 2015 (Appendix A). As of June 15, 2015, responses were received from Daniel McCarthy, Director the CRM Department of the San Manuel Band of Mission Indians, and Raymond Huaute, Cultural

Resources Specialist for the Morongo Band of Mission Indians. Æ conducted follow-up telephone calls with the remaining Native American groups and individuals on June 15, 2015. A summary of all responses received from the information request is provided in Table 4-3.

4.2 RESULTS OF CULTURAL RESOURCE SURVEY

Æ documented 11 cultural resources within the Project area as a result of the Phase I survey. These include two built-environment resources, five archaeological sites (two prehistoric and three historical), and four isolated artifacts (three prehistoric and one historical). All of the identified resources are located in the northern and central portions of the Project area (Figure 4-1). A description of each identified cultural resource is provided below with DPR 523 forms included in Appendix B.

4.2.1 Built-Environment Resources

P-36-028600. This built-environment resource includes the remains of the Helendale Auxiliary Army Air Field No. 2, which was constructed in 1942 as one of four satellite Army airfields serving the Victorville Army Air Field (Brooks 2012; Freeman 2015). Each of the auxiliary airfields was nearly identical in design, comprising four landing strips in a triangular configuration that allowed for multiple landings and variable wind direction (see Figure 4-2). The triangle configuration was common among U.S. Army Air Fields of WW II (Brooks 2012). According to Freeman (2015), the 1944 US Army/Navy Directory of airfields described the Helendale Auxiliary Army Air Field as having a 5,600-ft-long hard-surface runway.

The airfield operated as an Army auxiliary landing strip until the end of WW II, at which time it was converted to a private civilian airfield. A USGS aerial photograph dated June 1, 1952 depicted the airfield as having four asphalt-paved runways in a triangular configuration (Freeman 2015). Similarly, the USGS topographic quadrangle based on the 1952 aerial photograph depicts the same design and configuration (USGS 1956). By 1962, the air field was listed in the Aircraft Owners and Pilots Association (AOPA) Airport Directory as a 3,600-ft-long paved runway closed to the public (Freeman 2015). The 1967 Sectional Chart lists the air field as having four runways, with the longest being a 4,459-ft-long asphalt-paved strip, but also indicates that pilots should land at their own risk. A USGS map dated 1973 indicates the airfield was relatively unchanged (USGS 1973). However, by the time of the 1993 revision, the airfield was not depicted by USGS, and its location was replaced with the current configuration of the LM Aero facility and single landing strip (USGS 1993). According to Brooks (2012), the four landing strips were originally paved with asphalt and measured 4,911 x 150 ft (N/S strip); 5,600 x 150 ft (ENE/WSW strip); 4,921 x 150 ft (E/W strip); and 5,502 x 150 ft (WNW/ESE strip).

Current satellite imagery reveals that the majority of the former Helendale Auxiliary Army Air Field still exists, although the eastern point of the triangle was obliterated by construction of the LM Aero RCS Test Range Facility in 1982–1983 (Figure 4-3), and the southern runway has been repaved and restriped for use by the RCS Test Range Facility (Figure 4-4). Ground inspection of the former airfield reveals that the other three landing strips are not paved, but covered in compact gravel. Most of their surface is overgrown with brush, weeds, and short desert grasses.

Table 4-3
List of Native American Contacts and Record of Responses

Name	Date & Time of Contact	Responses
Daniel McCarthy Director - Cultural Resources Department San Manuel Band of Mission Indians	June 1, 2015 June 1, 2015	Scoping letter sent via email. Mr. McCarthy responded by email and stated the San Manuel is not aware of any cultural resources at this location. He requested that San Manuel be provided with a copy of the report. He had no further comments at this time.
Lynn Valbuena Chairwoman San Manuel Band of Mission Indians	June 1, 2015 June 1, 2015	Scoping letter sent via United States Postal Service (USPS). See above response from Mr. McCarthy.
John Valenzuela Chairperson San Fernando Band of Mission Indians	June 1, 2015 June 15, 2015	Scoping letter sent via email. Left message on Mr. Valenzuela's cell phone.
Goldie Walker Chairwoman Serrano Nation of Mission Indians	June 1, 2015 June 15, 2015	Scoping letter sent via USPS. Called phone number listed on the NAHC contact list. No answer and no answering machine.
Denisa Torres Cultural Resources Manager Morongo Band of Mission Indians	June 1, 2015 June 3, 2015	Scoping letter sent via email. Raymond Huaute, Cultural Resource Specialist, responded on behalf of the Morongo Band of Mission Indians. In a letter dated June 3, 2015, he stated that the project was outside of the Tribe's current reservation boundaries and is not within an area considered to be a traditional use area or one in which the Tribe has cultural ties. Mr. Huaute recommended that the appropriate tribes who have cultural affiliation to the project area be contacted. Mr. Huaute stated that the Tribe had no further comment at this time.
Robert Martin Chairperson Morongo Band of Mission Indians	June 1, 2015 June 16, 2015	Scoping letter sent via USPS. See above response from Ms. Torres.
Ernest H. Siva Elder Morongo Band of Mission Indians	June 1, 2015 June 15, 2015	Scoping letter sent via USPS. Left message on Mr. Siva's home phone.

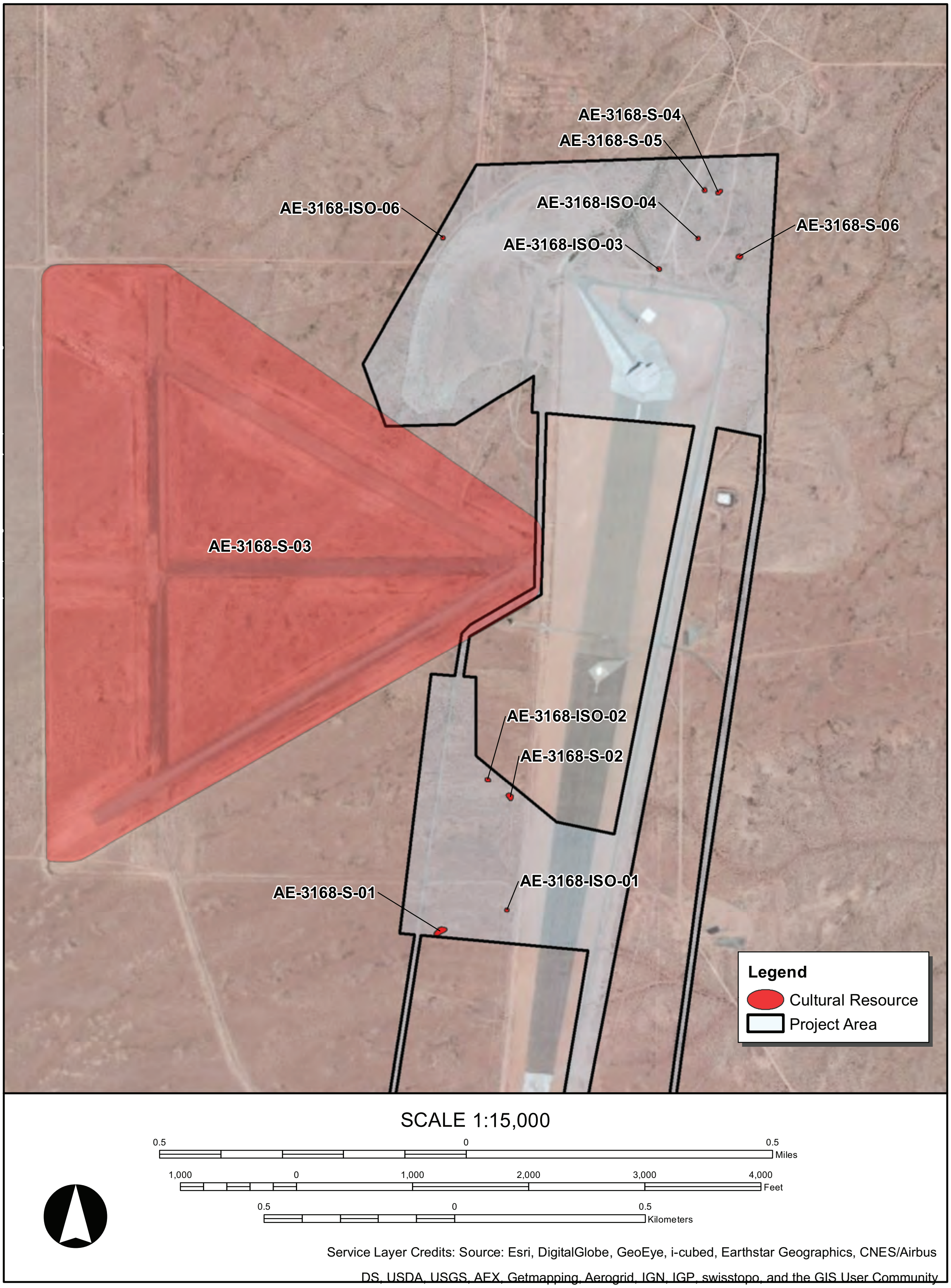

Figure 4-1 Cultural resources documented within the Project area.

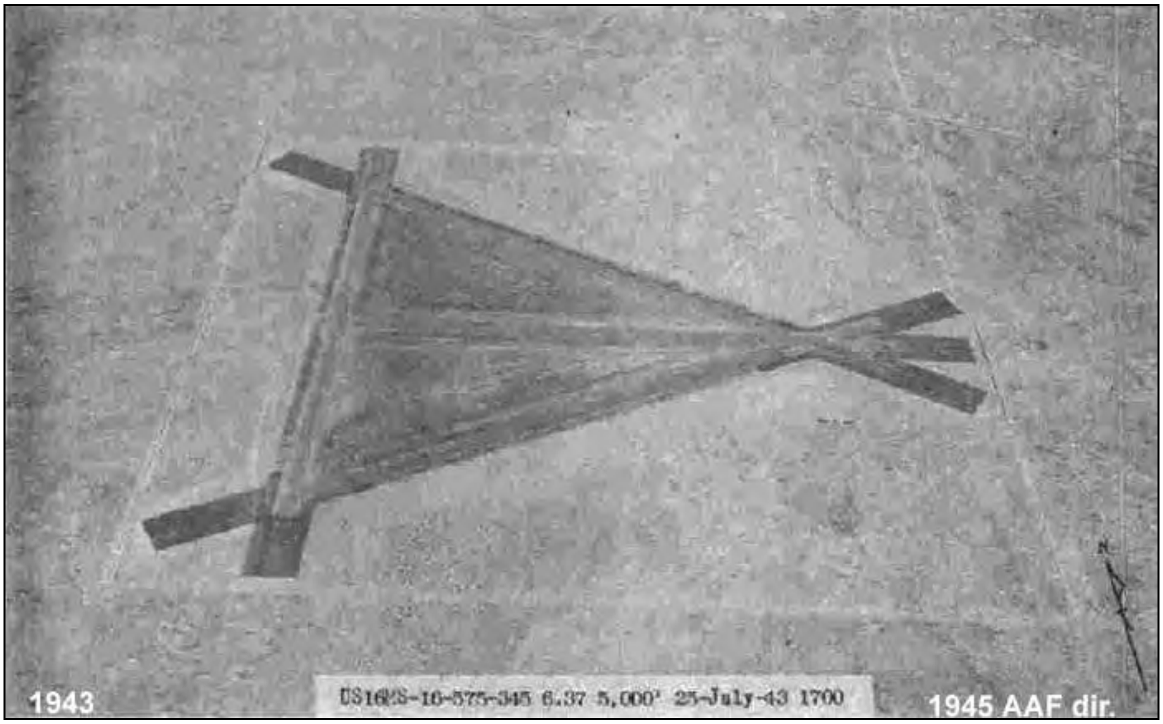

Figure 4-2 A U.S. Army Air Force aerial photograph of the Helendale Auxiliary Army Air Field dated 25 July 1943 (from Brooks 2012).

Figure 4-3 Current aerial imagery showing the remnants of the Helendale Auxiliary Army Air Field.

Figure 4-4 View of P-36-028600 showing in-use southwest-northeast runway, view to the southwest.

The maximum extent of any of these four runways measures 3,800 ft long, with an additional 1,000 ft of graded surface at their far west end, for a total length of 4,800 ft.

P-36-028595. This resource consists of a BLM, U.S. Cadastral Survey marker located in the northern portion of the Project area. The object consists of a brass disk (3¼ in. diameter) that extends 3 in. above the ground surface. The disk reads, "U.S. Cadastral Survey/ Bureau of Reclamation/ Penalty $250 For Removal" and is used to demarcate the corner of Section 27, 28, 33, and 34, Township 9 North, Range 4 West. The disk is stamped with a date of 1959. A 46 in. long metal pipe sticking vertically out of the ground is located next to the survey marker.

4.2.2 Archaeological Sites

CA-SBR-28598/P-36-028598. This site is a sparse, prehistoric lithic scatter located on the slightly sloping alluvial fan composed of coarse silty sand and small gravels in the central portion of the Project area. Vegetation community is composed of scattered creosote and low desert brush. CA-SBR-28598 measures 28 x 10 m in size and consists of three flaked stone artifacts (A-1 to A-3). A-1 is a secondary chalcedony flake that measures 3.1 x 1.5 x 0.8 cm; the distal portion of the flake has been broken off. A-2 is a distal fragment of a black basalt tertiary flake that measures 3.3 x 2.5 x 0.4 cm and shows some evidence of weathering. A-3 is a secondary flake of brown jasper that measures 4.0 x 3.0 x 0.9 cm. There appears to be little to no potential for subsurface deposits at the site.

CA-SBR-28599H/P-36-028599. This historical secondary refuse scatter is located on a relatively flat area of an alluvial fan surrounded by desert pavement in the central portion of the Project area. The site contains a main artifact concentration that measures 10 x 8 ft in area and includes metal cans, metal wire, a metal razor blade, wooden crate fragments, and a plastic comb. The artifact concentration is surrounded by a low density scatter of historical refuse that contains bottle glass fragments and a penny.

An analysis of the artifacts that comprise CA-SBR-28599H indicates that the scatter dates to WW II (1942-1945) and is probably associated with military activities conducted at the nearby Helendale Auxiliary Army Air Field No. 2 (see description of P-36-028600). Many of the artifacts are related to eating and drinking activities (metal cans and glass bottle fragments) or personal hygiene (razor blade and comb). Several open metal cans, each of which measures 3 in. in diameter and 3 8/16 in. in height, were recorded in the scatter. These artifacts are likely part of field military ration kits, known as C-Ration cans, which were used by the U.S. Army between 1938 and 1958 (Koehler 1958). One of the bottoms of the cans is embossed "Packed/1 43," indicating a manufacturer date of 1943 (Figure 4-5). Three low, squat, cylindrical metal coffee cans labeled "Pure/Soluble Coffee" were also identified in the scatter; these artifacts contained an early form of instant coffee that was included in each of the ration kits. A small wire key (Figure 4-6) accompanied the ration kits and would originally have been attached to the bottom of a C-Ration can. Other temporally diagnostic artifacts found at the site include a 1937 penny. A number of artifacts in the scatter appear to have been moved from their original location and placed together to create a collector's pile. There appears to be little to no potential for subsurface deposits at the site.

Figure 4-5 Bottom of C-ration can at CA-SBR-28599H with embossing "Packed/1 43."

Figure 4-6 Close-up of metal turn keys at CA-SBR-28599H that accompanied the C-ration kits.

CA-SBR-28601H/P-36-028601. This historical refuse deposit is located along the eastern roadway alignment on a relatively level area of the alluvial fan. Measuring approximately 37 x 7 ft in size, CA-SBR-28601H consists of a relatively small artifact concentration that measures 6 ft x 8 ft in area and includes bullet cartridges, flint, metal bottle caps and lids, bottle glass, ceramics, metal cans, brick, metal wire, concrete, nails, wood fragments, and tile. The artifact concentration is surrounded by a low density scatter of historical trash debris. One bullet cartridge identified in the scatter contains a St. Louis Ordnance Plant headstamp that dates between 1942 and 1944. Maker's marks found on several of the glass bottle bases indicate that these remains date between 1945 and 1956. There appears to be little to no potential for subsurface deposits at the site.

CA-SBR-28601H likely represents a mixed secondary refuse scatter comprised of several unrelated episodes of trash deposition. The presence of WW II-era bullet cartridges suggests that these remains are associated with military activities conducted at the Helendale Auxiliary Army Air Field. It is not possible to determine the origin (e.g., the original source where the objects were used before they were permanently discarded) of the remaining artifacts. It is possible that refuse dating to the late 1940s and early 1950s was associated with activities undertaken at the civilian Helendale airfield. Historical documents indicate that these artifacts are likely not associated with homesteading activities as much of the Project area, including Section 34, T9N, R4W, was not patented until 1981 (BLM 2015). In addition, a review of the 1973 Wild Crossing 15' USGS topographic map indicates that aside from the airfield and an associated road, there are no other buildings or structures in the immediate area of CA-SBR-28601H.

CA-SBR-28602/P-36-028602. Measuring 5 x 5 m in size, this prehistoric archaeological site consists of a sparse lithic scatter located on desert pavement in the northern portion of the Project area. Artifacts identified at the site include a tested chalcedony cobble (A-1) measuring 5.0 x 3.3 x by 4 cm that was split into two pieces and shows signs of bipolar reduction; a yellow-brown jasper core fragment (A-2) that exhibits multiple flake scars and measures 4.2 x 2.6 x 2.5 cm; and a granite anvil (A-3) that is triangular in shape and measures 4.7 x 4.7 x 3.2 cm. Evidence of off-highway vehicle use has disturbed portions of desert pavement in the immediate area of the site. There appears to be little to no potential for subsurface deposits at the site.

CA-SBR-28603H/P-36-028603. This site is a historical secondary refuse deposit located on a slightly sloping surface of an old dissected alluvial fan in the northern portion of the Project area. The scatter measures 30 x 20 ft in size and consists of metal cans, bricks, wire, glass bottle fragments, automotive parts, a paint brush handle, an electrical box, and milled wood fragments. Artifacts that comprise CA-SBR-28603H likely represent secondary refuse deposit dating to the 1960s. No evidence was found to indicate that subsurface or buried remains might be present at the site.

The origin of the artifacts that comprise CA-SBR-28603H cannot be determined. The Helendale airfield appears to have been closed to the public in the early 1960s (Freeman 2015). As such, it is unlikely that the remains are associated with aviation activities in the area. In addition, a review of historical documents found that the land in the immediate area of CA-SBR-28603H, including Section 27, T9N, R4W, was not patented until 1981 (BLM 2015). A review of the 1973 Wild Crossing 15’ USGS topographic map indicates that aside from the airfield and an associated road, there are no other buildings or structures in the immediate area of CA-SBR-28603H.

4.2.3 Isolated Artifacts

P-36-028593. This prehistoric isolated artifact consists of a primary chalcedony flake that is mottled brown and yellow in color. The flake measures 5.5 X 3.7 X 1.0 cm in size and was identified in the central portion of the survey area.

P-36-028594. This historical isolated find consists of a cluster of 15 ammunition cartridges (45 caliber) found within a 1-ft diameter area in the central portion of the survey area. Each metal cartridge measures 7/8-in. in length and 3/8-in. in width. The cartridges have “E/C/43” headstamp labels denoting that they were produced by the Evansville Ordnance Plant (Evansville, Ohio) in 1943.

P-36-028596. Situated in the northern portion of the Project area, P-36-028596 consists of two prehistoric flaked stone artifacts identified on desert pavement. A-1 consists of a core (5.6 x 4.5 x 2.4 cm) made of a white-yellow cryptocrystalline material that has one edge modified. A-2 is a core (4.3 x 2.8 x 1.9 cm) made of a mottled brown and black chalcedony. The two artifacts were located less than 20 cm from one another.

P-36-028597. This prehistoric isolated artifact consists of a single primary flake of mottled brown chalcedony (6.2 x 4.0 x 1.4 cm). One edge of the flaked has been utilized. The isolated artifact is located on desert pavement in the northern portion of the Project area.

4.3 RESULTS OF EVALUATION OF RESOURCE SIGNIFICANCE

All 11 cultural resources identified within the Project area were evaluated for listing on the CRHR. Detailed evaluations are provided here that assess each property's research potential and criteria for recommended inclusion on the CRHR.

4.3.1 Built-Environment Resources

P-36-028600. The Helendale Auxiliary Army Air Field, No. 2 was one of four auxiliary airfields serving the Victorville Army Air Field. Historical background research found no information to suggest that the Helendale Auxiliary Army Air Field is directly associated with any historical events of importance in local, state, or national history under CRHR Criterion 1. The airfield was constructed by U.S. Army in 1942 as an auxiliary airfield to Victorville Army Air Field. It was converted to a private civilian airfield at the end of WWII. By 1983, all but the southernmost landing strip had been abandoned, and the airfield was incorporated into LM Aero's RCS Test Range Facility. The airfield is associated with U.S. Army airfield development during WW II, but it did not play a pivotal role in any historical events in U.S. Army or WW II history, and it is also not an important part of any pattern of events in local, state, or national history. While the Helendale Auxiliary Army Air Field is associated with the WW II-era history and development of the region, there is no indication that this association is significant. Mere association with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important as well.

In addition, no information has been found to suggest that the Helendale Auxiliary Army Air Field is directly associated with the productive life of an historical person of importance in local, state, or national history under CRHR Criterion 2.

The Helendale Auxiliary Army Air Field does not appear to have been an important example of WW II-era auxiliary airfields. The triangle design of the airfield was of standard design and construction among WW II-era U.S. Army auxiliary air fields (Brooks 2012). The Helendale Auxiliary Army Air Field consists of four hard-surface runways in a triangular configuration. As an auxiliary airfield, there were no apparent permanent buildings of any kind at this location. It served its purpose for 3 years and was abandoned, later being used as a civilian landing strip. As an U.S. Army airfield of standard design and construction, the Helendale Auxiliary Army Air Field does not exhibit any special or unique architectural merits that would stand it apart from other U.S. Army airfields of that era found in the region, state, or the nation. Therefore, the Helendale Auxiliary Army Air Field does not appear to be eligible for CRHR Criterion 3 for any design or construction merits.

The Helendale Auxiliary Army Air Field does not appear to meet CRHR Criterion 4 for any potential to provide information important to the study of WW II-era U.S. Army airfields. The Helendale Auxiliary Army Air Field is unable to yield any information important to the study of U.S. Army airfields of similar vintage in local, state, or national history. The Helendale Auxiliary Army Air Field is not the primary source of information, but rather, the physical manifestation of the knowledge and practice of a construction technique, which has been widely applied to airfields throughout Southern California and the nation. Thus, Helendale Auxiliary

Army Air Field does not provide any important information or data potential that would meet CRHR Criterion 4.

P-36-028595. The BLM, U.S. Cadastral Survey Marker does not meet any of the four criteria for listing on the CRHR. Survey and mapping benchmarks of this type are ubiquitous objects that are found scattered across the Southern California desert regions and were used by surveyors to demarcate the boundaries of sections, townships, and ranges. This particular survey marker is not a principal point of an important land survey; rather, it is just one of numerous similar survey markers used to demarcate topographic section corners throughout the area. In addition, this particular survey marker does not exhibit any architectural or engineering merits that would set it apart from the many similar survey markers in the region. There is no evidence that it is directly associated with any persons or events of recognized historical significance (CRHR Criterion 1 and 2); represents the work of a prominent architect, designer, or builder, or qualifies as an important example of its type, period, region, or method of construction (CRHR Criterion 3); and it does not have the potential to yield any information important to the study of our local, state, or national history (CRHR Criterion 4).

4.3.2 Archaeological Sites

CA-SBR-28598/P-36-028598. This sparse lithic scatter does not meet any of the four criteria for listing on the CRHR. It is not associated with events that have made a significant contribution to the broad patterns of history and therefore is not recommended as eligible for listing under CRHR Criterion 1. It is not associated with the lives of persons significant in the past and therefore is not recommended as eligible for listing on the CRHR under Criterion 2. It also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is not recommended eligible under CRHR Criterion 3. Finally, the prehistoric lithic scatter contains little to no potential for subsurface remains and has limited research potential. Because CA-SBR-28598 does not have the potential to yield information important to prehistory, it is not recommended eligible under CRHR Criterion 4.

CA-SBR-28599H/P-36-028599. This historical secondary refuse scatter dates to WW II and is likely associated with military activities conducted at the Helendale Auxiliary Army Air Field No. 2. While the artifacts that comprise this site may be associated with WW II-era history and development of the region, there is no indication that this association is significant. The airfield did not play a pivotal role in any historical events in U.S. Army or WWII history and it is not an important part of any pattern of events in local, state, or national history. Mere association of the refuse scatter with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important as well. In addition, there is no indication that the remains are directly associated with the productive life of an important historical person (CRHR Criterion 2) or embody distinctive characteristics of a type, period, or method of construction, are an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the historic artifact scatter does not appear to contain subsurface remains and has limited research potential. Because CA-SBR-28599H does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

CA-SBR-28601H/P-36-028601. This historical site consists of a mixed refuse deposit dating between 1942 and 1956. Some of the artifacts that comprise this site may be associated with WW II-era history and development of the region, there is no indication that this association is significant. Mere association with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important, as well. In addition, there is no indication that the remains are directly associated with the productive life of an important historical person (CRHR Criterion 2) or embody distinctive characteristics of a type, period, or method of construction, are an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the historic artifact scatter does not appear to contain subsurface remains and has limited research potential. As CA-SBR-28601H does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

CA-SBR-28602/P-36-028602. This prehistoric lithic scatter does not meet any of the four criteria for listing on the CRHR. It is not associated with events that have made a significant contribution to the broad patterns of history and therefore is not recommended as eligible for listing on the CRHR under Criterion 1. It is not associated with the lives of persons significant in the past and therefore is not recommended as eligible for listing on the CRHR under Criterion 2. Furthermore, it also does not embody the distinctive characteristics of a type, period, or method of construction, and thus is not recommended eligible under CRHR Criterion 3. CA-SBR-28602 contains little to no potential for subsurface remains and has limited research potential. Because the site does not have the potential to yield information important to prehistory, it is not recommended eligible under Criterion 4.

CA-SBR-28603H/P-36-028603. This historical refuse deposit does not appear to meet any of the criteria of the CRHR. It is not directly associated with an important historical event (CRHR Criterion 1), or directly associated with the productive life of an important historical person (CRHR Criterion 2); and it does not embody distinctive characteristics of a type, period, or method of construction, is not an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the historic artifact scatter contains little to no potential for subsurface remains and has limited research potential. As CA-SBR-28603 does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

4.3.3 Isolated Artifacts

None of the four isolated artifacts (P-36-028593, P-36-028594, P-36-028596, or P-36-028597) are unique, unusual, rare, or otherwise exceptional. Thus, they are all considered insignificant resources *a priori* under CRHR criteria because they lack important associations and scientific data potential.

5
MANAGEMENT RECOMMENDATIONS

A total of 11 cultural resources were documented within the proposed Project area including two built-environment resources, five archaeological sites, and four isolated artifacts. None of the resources are recommended as eligible for listing on the CRHR, and therefore, none of them are considered a "historical resource" under CEQA. No further treatment or management of these resources is recommended and construction can proceed as planned.

In the unlikely event that potentially significant archaeological materials are encountered during Project-related ground-disturbing activities, all work must be halted in the vicinity of the discovery until a qualified archaeologist can visit the site and assess the significance of the find. As well, Health and Safety Code 7050.5, CEQA 15064.5(e), and PRC 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Finally, should additional Project-related actions be proposed that have the potential for additional ground disturbance within areas not considered by this cultural resource study, then additional cultural resource investigations and further consultation under CEQA may be required.

6
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APPENDIX A

Native American Coordination

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
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May 28, 2015

Tiffany Clark
Applied Earthworks, Inc.
133 North San Gabriel Blvd, Suite 201
Pasadena, CA 91107

Sent by Fax: (626) 204-5590
Number of Pages: 2

Re: Tetra Tech-Lockheed Martin Project, San Bernardino County.

Dear Ms. Clark,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3712.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

Native American Contact List
San Bernardino County
May 27, 2015

San Manuel Band of Mission Indians
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(909) 862-5152 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed Tetra Tech-Lockheed Martin Project, San Bernardino County.

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd, Suite 201
Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Lynn Valbuena, Chairwoman
San Manuel Band of Mission Indians
26569 Community Center
Highland, CA 92346

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Ms. Valbuena:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

Applied EarthWorks, Inc. (Æ) was contracted to perform an intensive archaeological survey of the proposed areas of potential impact. The survey was completed between May 12 and 15, 2015 and involved transect spacing that ranged from 10 to 15 meters. A total of twelve cultural resources were identified during the survey including two historic built environment resources, five archaeological sites (two prehistoric and three historic), and five isolated occurrences (four prehistoric artifacts and one historic artifact). Both prehistoric sites are surface lithic scatters, each of which is composed of three artifacts; the prehistoric isolates each consist of a single flaked stone artifact. Most of the prehistoric remains were located on desert pavement and exhibit little to no potential for subsurface deposits.

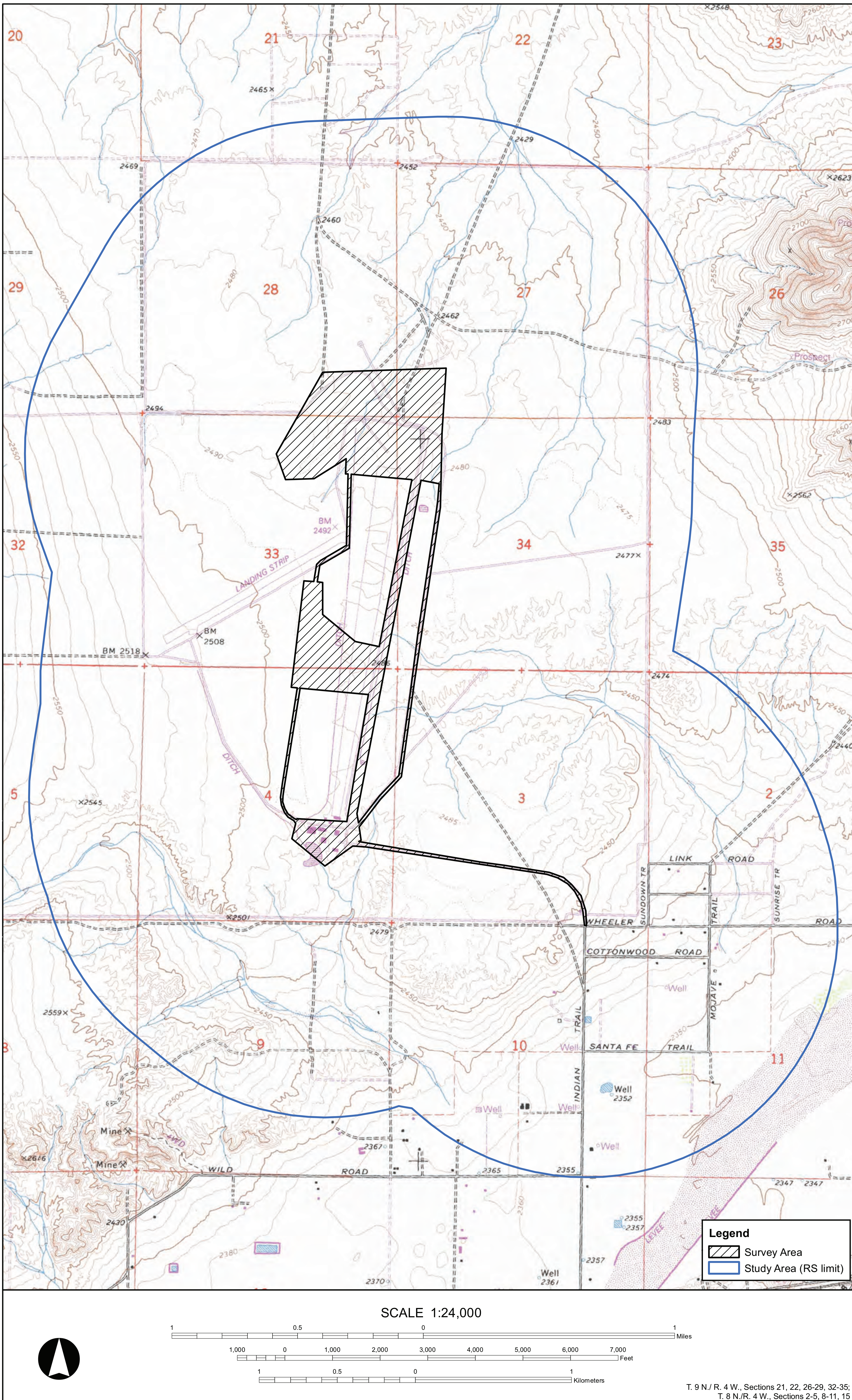
As part of the cultural resources assessment of the Project area, Æ requested a search of the *Sacred Lands File* by the Native American Heritage Commission (NAHC). The NAHC responded on May 31, 2015 stating that the search failed to indicate the presence of Native American cultural resources within the Project area or surrounding one-mile buffer. However, should your records show that sensitive Native American cultural resources exist within or near the Project area, please call me at (626) 578-0119 or e-mail me at tclark@appliedearthworks.com. If I do not hear from you within the next two weeks, I will contact you with a follow-up telephone call.

Please be aware that your comments are very important to us, as well as to the successful completion of this Project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Tiffany Clark

Tiffany Clark, PhD, RPA
Senior Archaeologist
Applied EarthWorks, Inc.



Records Search location map for the *Lockheed Martin Project*.

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd, Suite 201
Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

John Valenzuela, Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, CA 91322

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Mr. Valenzuela:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

Applied EarthWorks, Inc. (Æ) was contracted to perform an intensive archaeological survey of the proposed areas of potential impact. The survey was completed between May 12 and 15, 2015 and involved transect spacing that ranged from 10 to 15 meters. A total of twelve cultural resources were identified during the survey including two historic built environment resources, five archaeological sites (two prehistoric and three historic), and five isolated occurrences (four prehistoric artifacts and one historic artifact). Both prehistoric sites are surface lithic scatters, each of which is composed of three artifacts; the prehistoric isolates each consist of a single flaked stone artifact. Most of the prehistoric remains were located on desert pavement and exhibit little to no potential for subsurface deposits.

As part of the cultural resources assessment of the Project area, Æ requested a search of the *Sacred Lands File* by the Native American Heritage Commission (NAHC). The NAHC responded on May 31, 2015 stating that the search failed to indicate the presence of Native American cultural resources within the Project area or surrounding one-mile buffer. However, should your records show that sensitive Native American cultural resources exist within or near the Project area, please call me at (626) 578-0119 or e-mail me at tclark@appliedearthworks.com. If I do not hear from you within the next two weeks, I will contact you with a follow-up telephone call.

Please be aware that your comments are very important to us, as well as to the successful completion of this Project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Tiffany Clark

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Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd, Suite 201
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O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Denisa Torres, Cultural Resources Manager
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Ms. Torres:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

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Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Daniel McCarthy, Director-CRM Department
San Manuel Band of Mission Indians
26569 Community Center
Highland, CA 92346

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Mr. McCarthy:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

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Respectfully yours,

Tiffany Clark

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Senior Archaeologist
Applied EarthWorks, Inc.

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd, Suite 201
Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Robert Martin, Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Mr. Martin:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

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Respectfully yours,

Tiffany Clark

Tiffany Clark, PhD, RPA
Senior Archaeologist
Applied EarthWorks, Inc.

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd, Suite 201
Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Goldie Walker, Chairwoman
Serrano Nation of Mission Indians
P.O Box 343
Patton, CA 92369

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Ms. Walker:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

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Respectfully yours,

Tiffany Clark

Tiffany Clark, PhD, RPA
Senior Archaeologist
Applied EarthWorks, Inc.

Applied EARTHWORKS Inc.

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Pasadena, CA 91107
O: (626) 578-0119 | F: (626) 204-5590

June 1, 2015

Ernest H. Siva, Elder
Morongo Band of Mission Indians
9570 Mias Canyon Road
Banning, CA 92220

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear Mr. Siva:

On behalf of Tetra Tech, Applied EarthWorks, Inc. (Æ), is conducting a cultural resources study of a portion of the Lockheed Martin Aeronautics Company (Lockheed) Radar Cross Section Facility (Project; see attached map) located northeast of Helendale, San Bernardino County, California. Lockheed proposes improvements to the facility that include the construction of a new warehouse building and large crane or pit structure and the widening of existing roads. The proposed Project is subject to compliance with the California Environmental Quality Act, as amended. The Project area shown on the attached map is located on the Wild Crossing, CA 7.5' USGS quadrangle map within Sections 3 and 4, T8N/R4W, and Sections 33 and 34, T9N/R4W, San Bernardino Baseline and Meridian (S.B.B.M.).

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Please be aware that your comments are very important to us, as well as to the successful completion of this Project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Tiffany Clark

Tiffany Clark, PhD, RPA
Senior Archaeologist
Applied EarthWorks, Inc.

From:	Daniel McCarthy
To:	Tiffany Clark
Subject:	RE: Native American Coordiation for the Tetra Tech Lockheed Martin Helendale Project
Date:	Monday, June 01, 2015 3:35:03 PM

Tiffany,

Thank you for the opportunity to comment. We are not aware of any cultural resources at this location. Given you findings during the survey, please provide a copy of the report. We have no further comments at this time. //daniel

Daniel McCarthy, MS, RPA
Director
Cultural Resources Management Department
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346
Office: 909 864-8933 x 3248
Cell: 909 838-4175
dmccarthy@sanmanuel-nsn.gov

From: Tiffany Clark [mailto:tclark@appliedearthworks.com]
Sent: Monday, June 01, 2015 9:26 AM
To: Daniel McCarthy
Subject: Native American Coordiation for the Tetra Tech Lockheed Martin Helendale Project

Hi Daniel,

Please find attached a copy of a Native American coordination letter for the Lockheed Martin Helendale Project in San Bernardino County. If you have any comments or questions, please don't hesitate to call or email.

Sincerely,

Tiffany

Tiffany Clark | **Applied EarthWorks, Inc.**
Senior Archaeologist/Project Manager

133 N. San Gabriel Blvd., Ste. 201
Pasadena, CA 91107-3414
626.578.0119 ext. 102 office
http://www.appliedearthworks.com

Morongo Band of Mission Indians

Cultural Heritage Program

12700 Pumarra Road, Banning, CA 92220

Phone (951)755-5025

Fax (951)572-6004

Date: June 3, 2015

Re: Cultural Resources Investigation for the Lockheed Martin Helendale Facility, San Bernardino County, California

Dear,
Tiffany Clark, PhD, RPA
Senior Archaeologist
Applied EarthWorks, Inc.

Thank you for contacting the Morongo Band of Mission Indians regarding the above referenced project(s). The tribe greatly appreciates the opportunity to comment on the project. After reviewing our records and consulting with our tribal elders and cultural experts, we would like to respectfully offer the following comments and/or recommendations:

_X_ The project is outside of the Tribe's current reservation boundaries and is not within an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). We recommend contacting the appropriate tribes who have cultural affiliation to the project area. We have no further comments at this time.

___ The project is outside of the Tribe's current reservation boundaries but within in an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). At this time, we are not aware of any cultural resources on the property; however, that is not to say there is nothing present. At this time, we ask that you impose specific conditions regarding all cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications (see Standard Development Conditions attachment).

___ The project is outside of the Tribe's current reservation boundaries but within in an area considered to be a traditional use area or one in which the Tribe has cultural ties (i.e. Cahuilla or Serrano Territory). At this time we ask that you impose specific conditions regarding all cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications (see Standard Development Conditions attachment). Furthermore, we would like to formally request the following:

> ___ A thorough records search be conducted by contacting one of the CHRIS (California Historical Resources Information System) Archaeological Information Centers and have a copy of the search results be provided to the tribe.
>
> ___ A comprehensive cultural survey be conducted of the proposed project property and any APE's (Areas of Potential Effect) within the property. We would also like to request

that a tribal monitor be present during the cultural survey and that a copy of the results be provided to the tribe as soon as it can be made available.

___ Morongo would like to request that our tribal monitors be present during any test excavations or subsequent ground disturbing activities during the construction phase of the project.

___ The project is located with the current boundaries of the Morongo Band of Mission Indians Reservation. Please contact the Morongo Band of Mission Indians planning department for further details.

Once again, the Morongo Band of Mission Indians appreciates the opportunity to comment on this project. Please be aware that receipt of this letter does not constitute "meaningful" tribal consultation nor does it conclude the consultation process. This letter is merely intended to initiate consultation between the tribe and lead agency, which may be followed up with additional emails, phone calls or face-to-face consultation if deemed necessary. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience.

Very truly yours,

Raymond Huaute
Cultural Resource Specialist
Morongo Band of Mission Indians
Email: rhuaute@morongo-nsn.gov
Phone: (951) 755-5025

MORONGO BAND OF MISSION INDIANS

A SOVEREIGN NATION

Standard Development Conditions

The Morongo Band of Mission Indians asks that you impose specific conditions regarding cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications as follows:

1. If human remains are encountered during grading and other construction excavation, work in the immediate vicinity shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5.

2. In the event that Native American cultural resources are discovered during project development/construction, all work in the immediate vicinity of the find shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the overall project may continue during this assessment period.

    a. If significant Native American cultural resources are discovered, for which a Treatment Plan must be prepared, the developer or his archaeologist shall contact the Morongo Band of Mission Indians.

    b. If requested by the Tribe[1], the developer or the project archaeologist shall, in good faith, consult on the discovery and its disposition (e.g. avoidance, preservation, return of artifacts to tribe, etc.).

[1] The Morongo Band of Mission Indians realizes that there may be additional tribes claiming cultural affiliation to the area; however, Morongo can only speak for itself. The Tribe has no objection if the archaeologist wishes to consult with other tribes and if the city wishes to revise the condition to recognize other tribes.

APPENDIX B

Confidential Archaeological Site Records

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028598
HRI #
Trinomial CA-SBR-28598
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** Æ-3168-S-01

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** SE **¼ of Sec** 33; **S.B.B.M.**

Elevation: 2,499 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 472535 **mE/** 3854835 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. CA-SBR-28598 is situated approximately 170 m west of the RCS test range.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring 28 x 10 m (NE-SW x NW-SE), CA-SBR-28598 is a sparse lithic scatter consisting of three flaked stone artifacts located on the slightly sloping alluvial fan. A northeast-to-southwest running dirt access road is located approximately 40 m west of the site.

P3b. Resource Attributes (List all attributes and codes): AP 2: Lithic Scatter.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Photolog P15_Helendale_029. Overview of Æ-3168-S-01, facing west.

P6. Date Constructed/Age and Source: ☒ Prehistoric ☐ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 14, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

 *Resource Name or # Æ-3168-S-01

A1. Dimensions: a. Length: 28 m (NE-SW) **x b. Width:** 10 m (NW-SE)
Method of Measurement: □ Paced □ Taped □ Visual estimate ☒ Other Trimble GPS

Method of Determination (Check any that apply): ☒ Artifacts □ Features □ Soil □ Vegetation □ Topography □ Cut bank □ Animal burrow □ Excavation □ Property boundary □ Other (explain):

Reliability of Determination: ☒ High □ Medium □ Low Explain: Ground visibility is approximately 90%.

Limitations (Check any that apply): ☒ Restricted access □ Paved/built over □ Disturbances □ Site limits incompletely defined □ Other (Explain):

A2. Depth: □ None ☒ Unknown Method of Determination: No indication that there are subsurface remains present.

A3. Human Remains: □ Present ☒ Absent □ Possible □ Unknown (Explain): None noted and presence is unlikely.

A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None noted.

A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): Three flaked stone artifacts were observed on the ground surface. **A-1** is a secondary chalcedony flake that measures 3.1 x 1.5 x 0.8 cm; the distal portion of the flake has been broken off. **A-2** is a distal fragment of a black basalt tertiary flake that measures 3.3 x 2.5 x 0.4 cm and shows some evidence of weathering. **A-3** is a secondary flake of brown jasper that measures 4.0 x 3.0 x 0.9 cm.

A6. Were Specimens Collected? ☒ No □ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

A7. Site Condition: ☒ Good □ Fair □ Poor (Describe disturbances): The area exhibits little ground disturbance.

A8. Nearest Water (Type, distance, and direction): Several small ephemeral drainages transverse the area.

A9. Elevation: 2,499 ft amsl.

A10. Environmental Setting (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-28598 is located on the slightly sloping surface of an old dissected alluvial fan. Sediments consist of a coarse silty sand and granules with common subrounded to subangular gravels up to 8 cm in diameter. Vegetation community is composed of scattered creosote and low desert brush.

A11. Historical Information (Note sources and provide full citations in Field A15 below): N/A

A12. Age: ☒ Prehistoric □ Pre-Colonial (1500–1769) □ Spanish/Mexican (1769–1848) □ Early American (1848–1880) □ Turn of century (1880–1914) □ Early 20th century (1914–1945) □ Post WWII (1945+) □ Undetermined Factual or estimated dates of occupation (explain):

A13. Interpretations (Discuss scientific, interpretive, ethnic, and other values of site, if known): Artifacts appear indicative of lithic production and/or use activities. CA-SBR-28598 does not meet any of the criteria of the CRHR. It is not directly associated with an important historical event (CRHR Criterion 1), or directly associated with the productive life of an important historical person (CRHR Criterion 2); and it does not embody distinctive characteristics of a type, period, or method of construction, it is not an important work of a master architect, or possess high artistic value (CRHR Criterion 3). The site contains little to no potential for subsurface remains and little data potential. Therefore, CA-SBR-28598 does not have the potential to yield important information and is not recommended eligible under CRHR Criterion 4.

***Resource Name or #** Æ-3168-S-01

A14. Remarks: None.

A15. References (Give full citations including the names and addresses of persons interviewed, if possible):
None.

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
See Photograph Record attached.

A17. Form Prepared by: T. Clark **Date:** June 3, 2015
Affiliation and Address: Applied EarthWorks, Inc., 133 N. San Gabriel Blvd., Suite 201, Pasadena, CA 91107

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-36-028598
Trinomial **CA-SBR-28598**

 ***Resource Name or #** Æ-3168-S-01

Temporary Number/Resource Name: Æ-3168-S-01

Project Name: Tetra Tech Lockheed Martin Helendale Facility Survey **Photographer:** Tetra Tech

Image Type: □ (bw) 35mm B&W film □ (cp) 35mm Color Print film □ (cs) 35mm Color Slide film
□ (df) Digital-Floppy disk ☒ (dm) Digital-Memory flash card

Camera Type and Model: Nikon Coolpix
Film Type and Speed: SD card **Roll Number:** P15_Helendale
Year: 2015

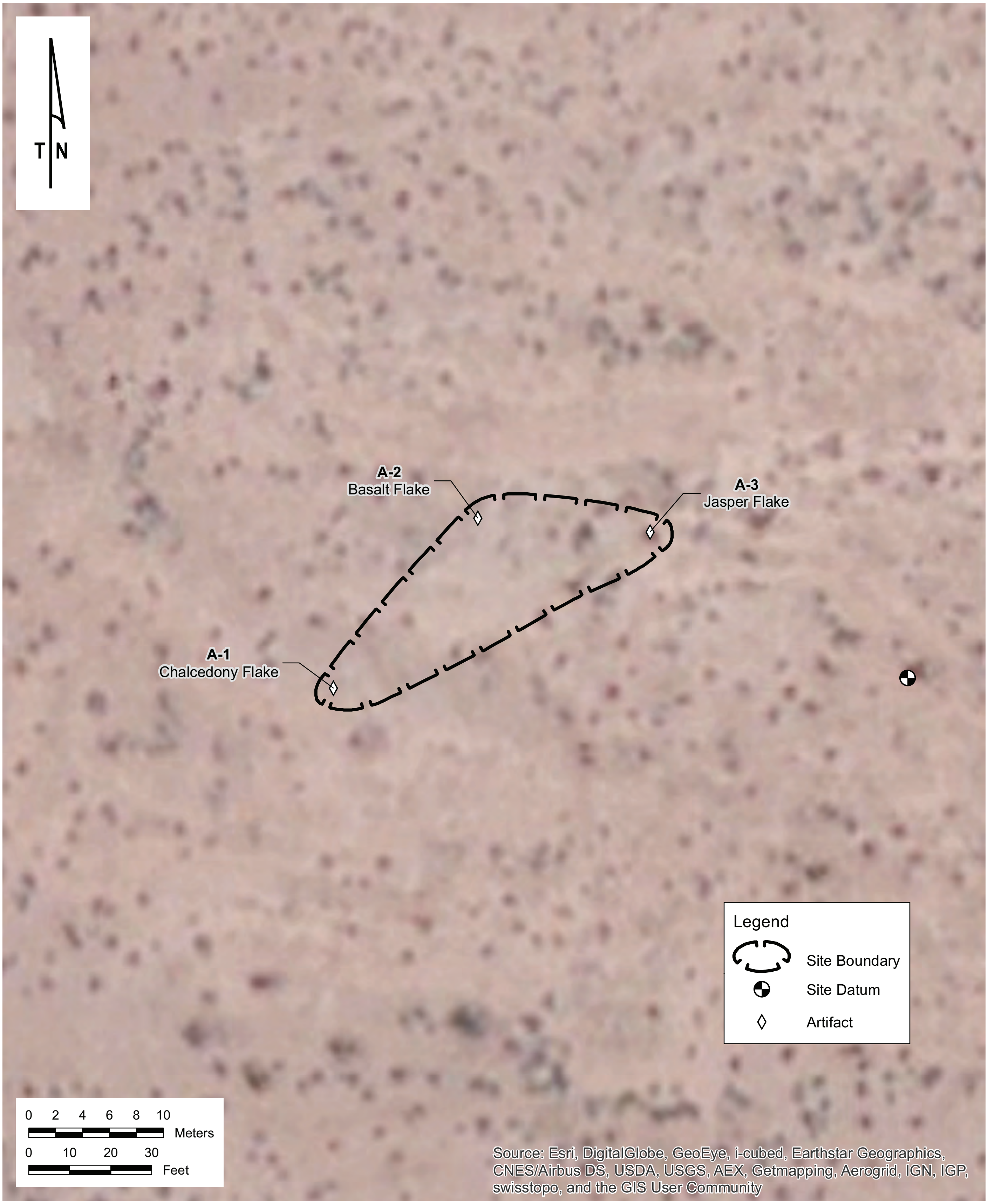
Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	14		025	Æ-3168-S-01; A-3, jasper flake (close-up).	Side
5	14		026	Æ-3168-S-01; A-3, jasper flake (close-up).	Side
5	14		027	Æ-3168-S-01; A-3, jasper flake (close-up).	Down
5	14		028	Æ-3168-S-01; A-3, jasper flake (close-up).	Down
5	14		029	Æ-3168-S-01; site overview.	W
5	14		030	Æ-3168-S-01; site overview from A-3.	W
5	14		031	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		032	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		033	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		034	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		035	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		036	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		037	Æ-3168-S-01; A-2, basalt flake (close-up).	Down
5	14		038	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		039	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		040	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		041	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		042	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		043	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down
5	14		044	Æ-3168-S-01; A-1, chalcedony flake (close-up).	Down

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-028598
HRI#
Trinomial CA-SBR-28598

Page 5 **of** 6 ***Resource Name or #:** (Assigned by recorder) AE-3168-S-01

***Drawn by:** J. Smallwood ***Scale:** 1 inch equals 10 meters ***Date of map:** May 2015

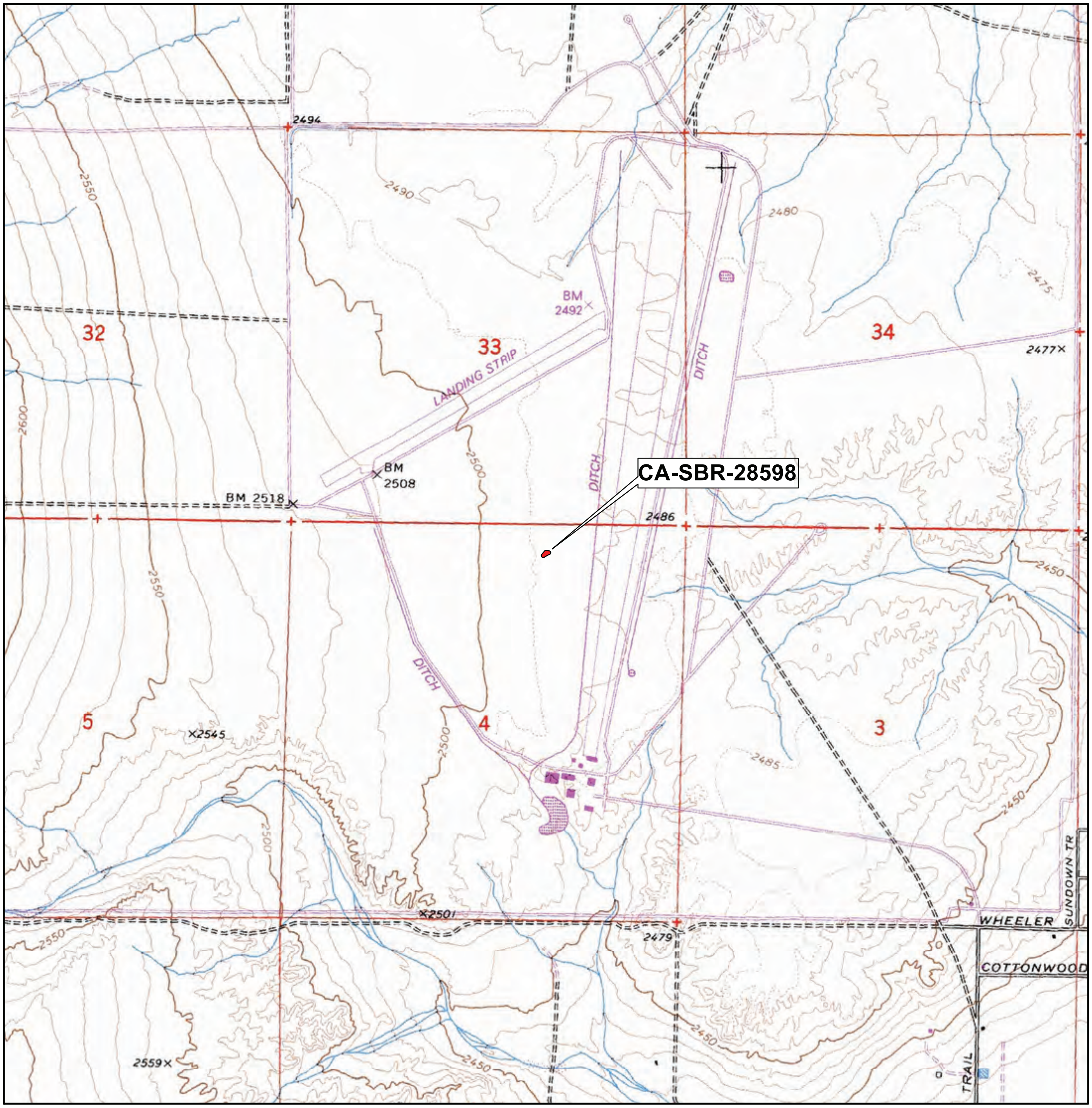


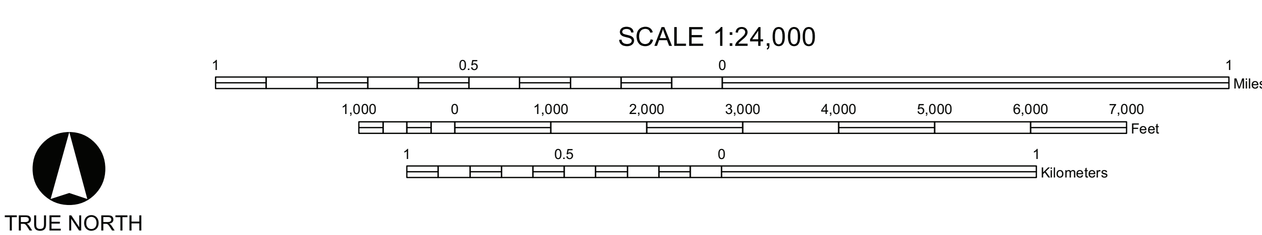
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-028598
HRI#
Trinomial CA-SBR-28598

 Resource Name or #: AE-3168-S-01 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015





State of California — The Resources Agency | **Primary #** P-36-028599
DEPARTMENT OF PARKS AND RECREATION | **HRI #**
PRIMARY RECORD
Trinomial CA-SBR-28599H
NRHP Status Code
Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #:** Æ-3168-S-02

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SE **¼ of** SE **¼ of Sec** 33; **S.B.B.M.**

Elevation: 2,496 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 472710 **mE/** 3853369 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. CA-SBR-28599H is situated 0.1 miles east of an access road and approximately 50 meters east of the RCS test range.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring approximately 40 x 20 feet, CA-SBR-28599H is a small historical refuse scatter dating to World War II. The site contains a main artifact concentration that measures 8 x 10 feet in area that contains metal cans, a razor shaving blade, metal wire, wooden crate fragments, and a plastic comb. The artifact concentration is surrounded by a low density scatter of historical refuse that contains bottle glass fragments, metal wire, and a penny.

P3b. Resource Attributes (List all attributes and codes): AH 4: Trash Scatter.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Photolog P15_Helendale_081. Overview of main artifact concentration at Æ-3168-S-02, facing east.

P6. Date Constructed/Age and Source: ☐ Prehistoric ☒ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 14, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Smallwood, Josh (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

A1. Dimensions: a. Length: 40 feet **x b. Width:** 20 feet
Method of Measurement: □ Paced □ Taped □ Visual estimate ☒ Other Trimble GPS

Method of Determination (Check any that apply): ☒ Artifacts □ Features □ Soil □ Vegetation □ Topography □ Cut bank □ Animal burrow □ Excavation □ Property boundary □ Other (explain):

Reliability of Determination: ☒ High □ Medium □ Low Explain: Ground visibility is approximately 95%.

Limitations (Check any that apply): ☒ Restricted access □ Paved/built over □ Disturbances □ Site limits incompletely defined □ Other (Explain):

A2. Depth: □ None ☒ Unknown Method of Determination: No indication was found to suggest subsurface remains are present at the site.

A3. Human Remains: □ Present ☒ Absent □ Possible □ Unknown (Explain): None noted and presence is unlikely.

A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None noted.

A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): see Continuation Sheet

A6. Were Specimens Collected? ☒ No □ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

A7. Site Condition: □ Good ☒ Fair □ Poor (Describe disturbances): A number of artifacts in the scatter appear to have been moved from their original location and placed together to create a collector's pile.

A8. Nearest Water (Type, distance, and direction): A manmade ditch is located approximately 5 m east of the site.

A9. Elevation: 2,496 ft amsl.

A10. Environmental Setting (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-28599H is located on the relatively flat area of an alluvial fan surrounded by desert pavement. Vegetation community is composed of scattered creosote and low desert brush.

A11. Historical Information (Note sources and provide full citations in Field A15 below): N/A

A12. Age: □ Prehistoric □ Pre-Colonial (1500–1769) □ Spanish/Mexican (1769–1848) □ Early American (1848–1880) □ Turn of century (1880–1914) ☒ Early 20th century (1914–1945) □ Post WWII (1945+) □ Undetermined Factual or estimated dates of occupation (explain): Temporally diagnostic artifacts indicate that the site dates to World War II (1942 to 1945).

A13. Interpretations (Discuss scientific, interpretive, ethnic, and other values of site, if known): CA-SBR-28599H is a secondary refuse scatter that dates to World War II (1942-1945). The site is likely associated with military activities conducted at the Helendale Auxiliary Army Air Field No. 2, which was constructed in 1942. Many of the artifacts appear to be associated with eating and drinking activities (metal cans and glass bottle fragments) or personal hygiene (razor blade and comb). The larger metal containers recorded in the scatter are likely "M-Unit" (meat) or "B-Unit" (bread/desert) cans that represent the remains of military field rations. Known as C-Ration cans, these containers measure 3" in diameter and 3 8/16" in height and were used by the military between 1938 and 1958 (Koehler 1958). One of the bottoms of the cans is embossed "Packed/1 43", indicating a manufacturer date of 1943 (see Figure 1 on Continuation Sheet). The low, squat, cylindrical metal coffee cans labeled "Pure/Soluble Coffee" would have contained an early form of instant coffee, which was included in each ration kit (Figure 2). A small wire key accompanied the ration kits and would have originally been attached to the bottom of a C-Ration can (Figure 3). Other temporally diagnostic artifacts found at the site include a 1937 penny (Figure 4).

CA-SBR-28599H does not appear to meet any of the criteria of the CRHR. While these artifacts may be associated with WWII era history and development of the region, there is no indication that this association is significant. The air field did not play a pivotal role in any historical events in U.S. Army or WWII history and it is also not an important part of any pattern of events in local, state, or national history. Mere association of the site with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important as well. In addition, there is no indication that the remains are directly associated with the productive life of an important historical person (CRHR Criterion 2) or embody distinctive characteristics of a type, period, or method of construction, are an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the site exhibits little data potential and appears to lack subsurface remains. Because CA-SBR-28599H does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

A14. Remarks: None.

A15. References (Give full citations including the names and addresses of persons interviewed, if possible):

Koehler, Franz. A. (1958). *Special Rations for the Armed Forces: Army Operational Rations – A Historical Background.* QMC Historical Studies, Historical Branch, Office of the Quartermaster General, Washington, D.C.

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
See Photograph Record attached.

A17. Form Prepared by: T. Clark **Date:** June 3, 2015
Affiliation and Address: Applied EarthWorks, Inc., 133 N. San Gabriel Blvd., Suite 201, Pasadena, CA 91107

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-36-028599
Trinomial CA-SBR-28599H

 ***Resource Name or #** Æ-3168-S-02

Temporary Number/Resource Name: Æ-3168-S-02
Project Name: Tetra Tech Lockheed Martin Helendale Facility Survey **Photographer:** Tetra Tech
Image Type: □ (bw) 35mm B&W film □ (cp) 35mm Color Print film □ (cs) 35mm Color Slide film
□ (df) Digital-Floppy disk ☒ (dm) Digital-Memory flash card
Camera Type and Model: Nikon Coolpix
Film Type and Speed: SD card **Roll Number:** P15_Helendale
Year: 2015

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	14		60	Æ-3168-S-02; close-up of metal coffee tin	Down
5	14		61	Æ-3168-S-02; close-up of metal coffee tin	Down
5	14		62	Æ-3168-S-02; close-up of metal coffee tin	Down
5	14		63	Æ-3168-S-02; close-up of metal can	Down
5	14		64	Æ-3168-S-02; close-up of metal can	Down
5	14		65	Æ-3168-S-02; close-up of metal can	Down
5	14		66	Æ-3168-S-02; close-up of metal can	Down
5	14		67	Æ-3168-S-02; close-up of metal can	Down
5	14		68	Æ-3168-S-02; close-up of metal can	Down
5	14		69	Æ-3168-S-02; close-up of metal can	Down
5	14		70	Æ-3168-S-02; close-up of metal can	Down
5	14		71	Æ-3168-S-02; close-up of plastic comb handle (missing teeth)	Down
5	14		72	Æ-3168-S-02; close-up of plastic comb handle (missing teeth)	Down
5	14		73	Æ-3168-S-02; close-up of plastic comb handle and 1937 penny	Down
5	14		74	Æ-3168-S-02; close-up of plastic comb handle and 1937 penny	Down
5	14		75	Æ-3168-S-02; close-up of plastic comb handle, 1937 penny, and razor blade	Down
5	14		76	Æ-3168-S-02; close-up of metal razor blade	Down
5	14		77	Æ-3168-S-02; close-up of metal razor blade	Down
5	14		78	Æ-3168-S-02; close-up of plastic comb handle and 1937 penny	Down
5	14		79	Æ-3168-S-02; main artifact scatter	Down
5	14		80	Æ-3168-S-02; overview of artifact concentration	East
5	14		81	Æ-3168-S-02; overview of artifact concentration	East
5	14		82	Æ-3168-S-02; close-up of metal can tops	Down
5	14		83	Æ-3168-S-02; close-up of metal turn keys	Down

PHOTOGRAPH RECORD

 *Resource Name or # Æ-3168-S-02

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	14		84	Æ-3168-S-02; close-up of metal turn keys	Down
5	14		85	Æ-3168-S-02; close-up of buried metal can	Down
5	14		86	Æ-3168-S-02; close-up of metal cans	Down
5	14		87	Æ-3168-S-02; overview of artifact concentration	North
5	14		88	Æ-3168-S-02; close-up of metal can	Down
5	14		89	Æ-3168-S-02; close-up of metal can	Down
5	14		90	Æ-3168-S-02; close-up of metal can	Down
5	14		91	Æ-3168-S-02; close-up of metal can	Down
5	14		92	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		93	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		94	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		95	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		96	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		97	Æ-3168-S-02; close-up of amber bottle glass with maker's marks	Down
5	14		98	Æ-3168-S-02; close-up of metal can	Down
5	14		99	Æ-3168-S-02; close-up of metal can	Down
5	14		100	Æ-3168-S-02; close-up of artifact scatter	Down
5	14		101	Æ-3168-S-02; close-up of metal cans	Down
5	14		102	Æ-3168-S-02; close-up of metal can	Down
5	14		103	Æ-3168-S-02; close-up of metal can	Down
5	14		104	Æ-3168-S-02; close-up of metal can	Down
5	14		105	Æ-3168-S-02; close-up of metal can	Down
5	14		106	Æ-3168-S-02; close-up of artifact scatter	South
5	14		107	Æ-3168-S-02; overview of artifact concentration	East
5	14		108	Æ-3168-S-02; overview of artifact concentration	East
5	14		109	Æ-3168-S-02; overview of artifact concentration	East
5	14		110	Æ-3168-S-02; overview of artifact concentration	East
5	14		111	Æ-3168-S-02; overview of artifact concentration	East
5	14		112	Æ-3168-S-02; overview of artifact concentration	East
5	14		113	Æ-3168-S-02; overview of artifact concentration	East
5	14		114	Æ-3168-S-02; overview of artifact concentration	East
5	14		115	Æ-3168-S-02; overview of artifact concentration	East

In-field Analysis of Historical Refuse Deposit Artifacts

Artifact Type	Count	Notes
Metal can turn key	5	Turn keys removed from metal can lids
Metal can lid with attached turn key	4	
Metal coffee tin	3	Rotary opened tin with internal friction top (top missing); Embossed "PURE/SOLUBLE COFFEE"; measures 3/4" height with a diameter of 2"
Metal can top	15	Opened with a twist key can opener
Metal crimped sanitary can body	7	Embossed "PACKED 1 43"; 3 8/16" tall and 3" in diameter
Metal razor blade	1	
Plastic comb	1	Yellow comb broken in three places; 4" in length
Penny	6	Date 1937
Wooden crate fragments	5	Wooden fragments that contain several round crate nails
Metal wire	5	Wire of various lengths
Bottle glass fragments	19	Fragments of an amber glass base made by the Owens Illinois Company

Recorded by: Josh Smallwood **Date** May 15, 2015 ☒ **Continuation** ☐ **Update**

Figure 1. Bottom of C-Ration Metal Can.

Figure 2. Top of Can Embossed "Pure/Soluble Coffee"

Figure 3. Metal Can Turn Keys.

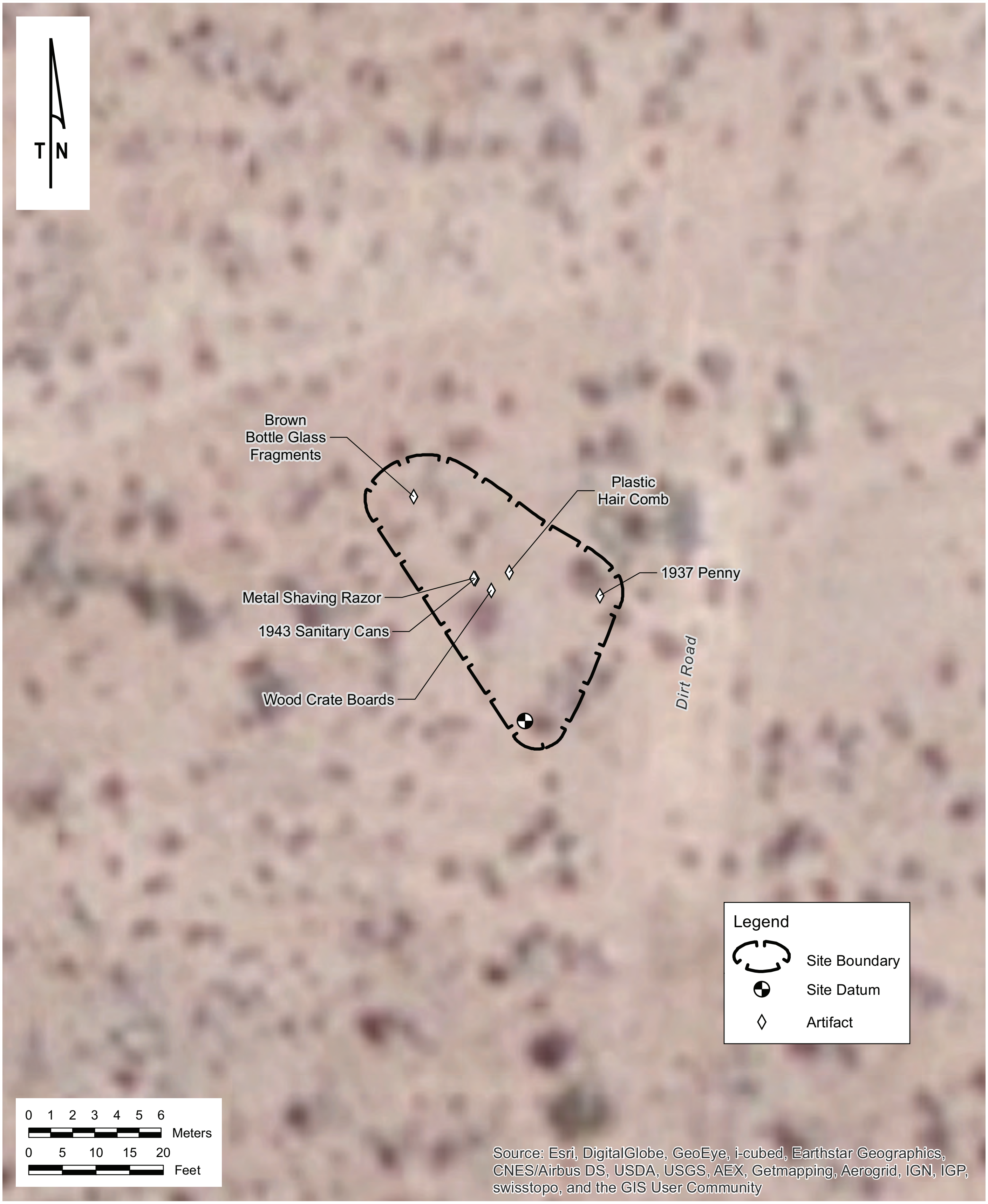
Figure 4. Plastic Comb and 1937 Penny.

SKETCH MAP

Primary # P-36-028599
HRI#
Trinomial CA-SBR-28599H

***Resource Name or #:** (Assigned by recorder) AE-3168-S-02

***Drawn by:** J. Smallwood ***Scale:** 1 inch equals 20 feet ***Date of map:** May 2015



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

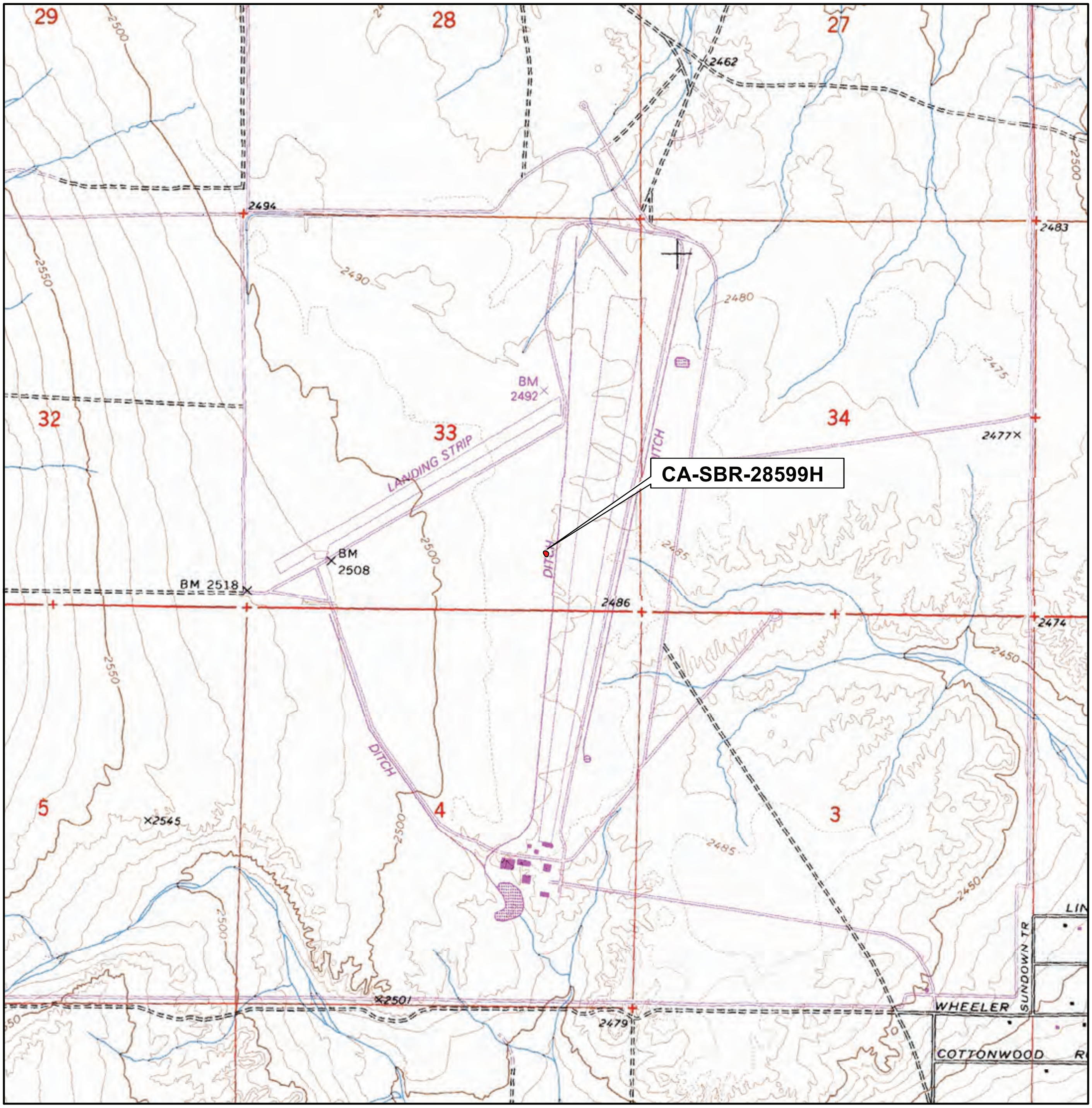
Primary # P-36-028599
HRI#
Trinomial CA-SBR-28599H

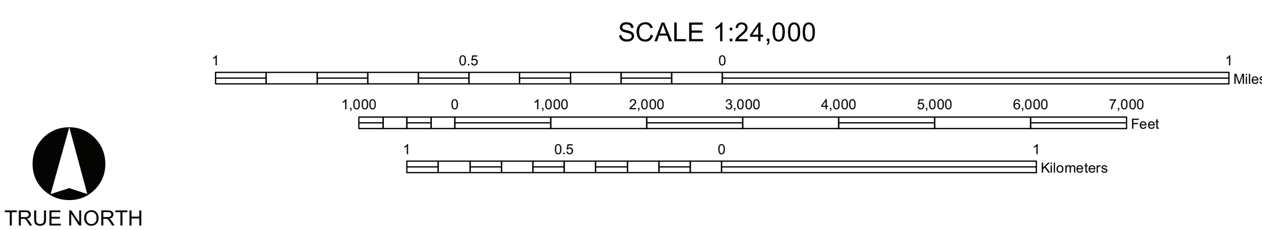
Resource Name or #: AE-3168-S-02

Scale: 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle

Date: 2015





State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028601
HRI #
Trinomial CA-SBR-28601H
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #:** Æ-3168-S-04

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** NW **¼ of Sec** 34; **S.B.B.M.**

Elevation: 2,492 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 473256 **mE/** 3854951 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. CA-SBR-28601H is situated approximately 80 m east of the RCS test range.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring approximately 37 x 7 ft, CA-SBR-28601H is a historical refuse scatter consisting of mixed trash that dates between 1942 and 1956. The site contains a relatively small artifact concentration that measures 6 ft x 8 ft in area and includes bullet cartridges, flint, metal bottle caps and lids, bottle glass, ceramics, metal cans, brick, metal wire, concrete, nails, wood fragments, and tile. The artifact concentration is surrounded by a low density scatter of historical trash debris.

P3b. Resource Attributes (List all attributes and codes): AH 4: Trash Scatter.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Photolog P15_Helendale_136. Overview of main artifact concentration at Æ-3168-S-04, facing north.

P6. Date Constructed/Age and Source: ☐ Prehistoric ☒ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

A1. Dimensions: a. Length: 37 ft (NE-SW) **x b. Width:** 7 ft (NW-SE)
Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☒ Other Trimble GPS

Method of Determination (Check any that apply): ☒ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (explain):

Reliability of Determination: ☒ High ☐ Medium ☐ Low Explain: Ground visibility is approximately 95%.

Limitations (Check any that apply): ☒ Restricted access ☐ Paved/built over ☐ Disturbances ☐ Site limits incompletely defined ☐ Other (Explain): None.

A2. Depth: ☐ None ☒ Unknown Method of Determination: No indication was found to suggest subsurface remains may be present at the site.

A3. Human Remains: ☐ Present ☒ Absent ☐ Possible ☐ Unknown (Explain): None noted and presence is unlikely.

A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None noted.

A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): see Continuation Sheet

A6. Were Specimens Collected? ☒ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

A7. Site Condition: ☒ Good ☐ Fair ☐ Poor (Describe disturbances): Site shows minimal signs of disturbance.

A8. Nearest Water (Type, distance, and direction): A manmade ditch is located approximately 5 m west of the site.

A9. Elevation: 2,492 ft amsl.

A10. Environmental Setting (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-28601H is located on the relatively flat area of an alluvial fan. Vegetation community is composed of scattered creosote and low desert brush.

A11. Historical Information (Note sources and provide full citations in Field A15 below): N/A

A12. Age: ☐ Prehistoric ☐ Pre-Colonial (1500–1769) ☐ Spanish/Mexican (1769–1848) ☐ Early American (1848–1880) ☐ Turn of century (1880–1914) ☒ Early 20th century (1914–1945) ☒ Post WWII (1945+) ☐ Undetermined Factual or estimated dates of occupation (explain): Temporally diagnostic artifacts indicate a mixed deposit with a date range of 1943 to 1956.

A13. Interpretations (Discuss scientific, interpretive, ethnic, and other values of site, if known): Æ-3168-S-04 likely represents a mixed secondary refuse scatter comprising several unrelated episodes of trash deposition. Several bullet casings were identified in the scatter indicating that the area was used for target shooting. One of the bullet cartridges contains a St. Louis Ordnance Plant headstamp that dates between 1942 and 1944. This finding suggests that the cartridges may be associated with military activities conducted at the Helendale Auxiliary Army Air Field during World War II (WWII).

Other artifacts in the scatter appear to be associated with construction-related activities (brick, concrete, wood, and tile fragments) or eating and drinking (glass bottle fragments, metal bottle caps and lids, metal cans, and ceramic whiteware). Maker's marks found on several of the glass bottle bases indicate that these remains date between 1945 and 1956. The origin (e.g., the original source where the objects were used before they were permanently discarded) of the artifacts that post-date WWII cannot be determined. It is possible that the remains may be associated with activities conducted at the civilian Helendale air field in the late 1940s and early 1950s. A review of historical documents indicates that the refuse is likely not associated with homesteading activities as much of the area, including Section 34, T9N, R4W, was not patented until 1981 (Bureau of Land Management 2015). In addition, a review of the 1973 Wild Crossing 15' USGS topographic map indicates that aside from the airfield and an associated building and road, there are no other buildings or structures in the immediate area of CA-SBR-28601H.

CA-SBR-28601H does not appear to meet any of the criteria of the CRHR. Although some of the artifacts that comprise the site may be associated with U.S. Army air field development during WWII, the air field did not play a pivotal role in any historical events in U.S. Army or WWII history, and it is also not an important part of any pattern of events in local, state, or national history. While these artifacts may be associated with WWII era history and development of the region, there is no indication that this association is significant. Mere association with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important as well. In addition, there is no indication that the remains are directly associated with the productive life of an important historical person (CRHR Criterion 2) or embody distinctive characteristics of a type, period, or method of construction, are an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the data potential of the site is limited and the site appears to lack subsurface deposits. Because CA-SBR-28601H does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

A14. Remarks: None.

A15. References (Give full citations including the names and addresses of persons interviewed, if possible):

Bureau of Land Management
2015 General land Office Records (Electronic database). Found at: https://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=2.

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
See Photograph Record attached.

A17. Form Prepared by: T. Clark **Date:** June 3, 2015
Affiliation and Address: Applied EarthWorks, Inc., 133 N. San Gabriel Blvd., Suite 201, Pasadena, CA 91107

PHOTOGRAPH RECORD

 ***Resource Name or #** Æ-3168-S-04

Temporary Number/Resource Name: Æ-3168-S-04

Project Name: Tetra Tech Lockheed Martin Helendale Facility Survey **Photographer:** Tetra Tech

Image Type: □ (bw) 35mm B&W film □ (cp) 35mm Color Print film □ (cs) 35mm Color Slide film
□ (df) Digital-Floppy disk ☒ (dm) Digital-Memory flash card

Camera Type and Model: Nikon Coolpix

Film Type and Speed: SD card **Roll Number:** P15_Helendale

Year: 2015

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	15		128	Æ-3168-S-04; close-up of bullet cartridges	Down
5	15		129	Æ-3168-S-04; close-up of bullet and bullet cartridge	Down
5	15		130	Æ-3168-S-04; close-up of glass bottle base	Down
5	15		131	Æ-3168-S-04; close-up of Pepsi Bottle base	Side
5	15		132	Æ-3168-S-04; close-up of glass bottle base	Down
5	15		133	Æ-3168-S-04; close-up of amber bottle base.	Down
5	15		134	Æ-3168-S-04; close-up of metal peanut butter jar top.	Down
5	15		135	Æ-3168-S-04; close-up of bullet cartridge	Down
5	15		136	Æ-3168-S-04; overview of site.	N/NW

In-field Analysis of Historical Refuse Deposit Artifacts

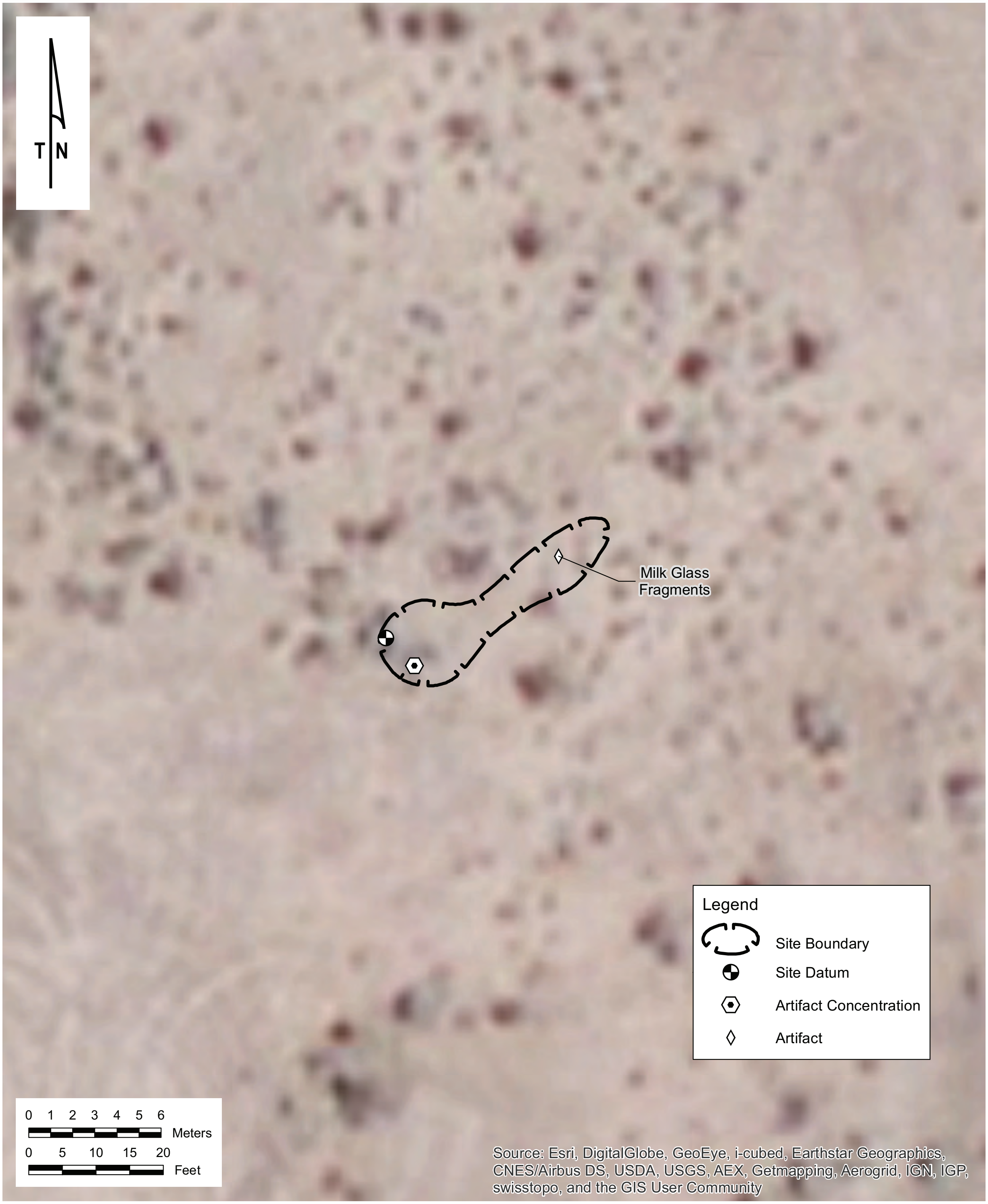
Artifact Type	Count	Notes
Bullet cartridges	7	One bullet cartridge is unspent
Flint	2	
Bottle glass - Amber	2	Bottle base
Bottle glass – Colorless Pepsi bottle	6	Fragment with applied color label
Bottle glass – Aqua Coke bottle	2	Bottle base
Milk colored fragments	17	
Metal bottle cap	4	
Metal lid	1	Labeled “Oz Peanut Butter”
Unidentified metal can	5	Crushed
Ceramic whiteware	3	
Plastic fragments	5	
Miscellaneous metal fragments	8	Barrel hoops, metal scraps, automotive pieces, window screen
Metal wire	8	
Round head metal nails	27	Range in size from 1½” to 4” inches in length; U-shaped also present
Brick fragment	10	
Concrete fragments	~20	Mixed with gravel
Wood fragments	~20	Fragments of wooden stakes with barbed wire
Tile fragments	1	“Ramona Tile” yellow in color

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-028601
HRI#
Trinomial CA-SBR-28601H

***Resource Name or #:** (Assigned by recorder) AE-3168-S-04

***Drawn by:** J. Smallwood ***Scale:** 1 inch equals 20 feet ***Date of map:** May 2015



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

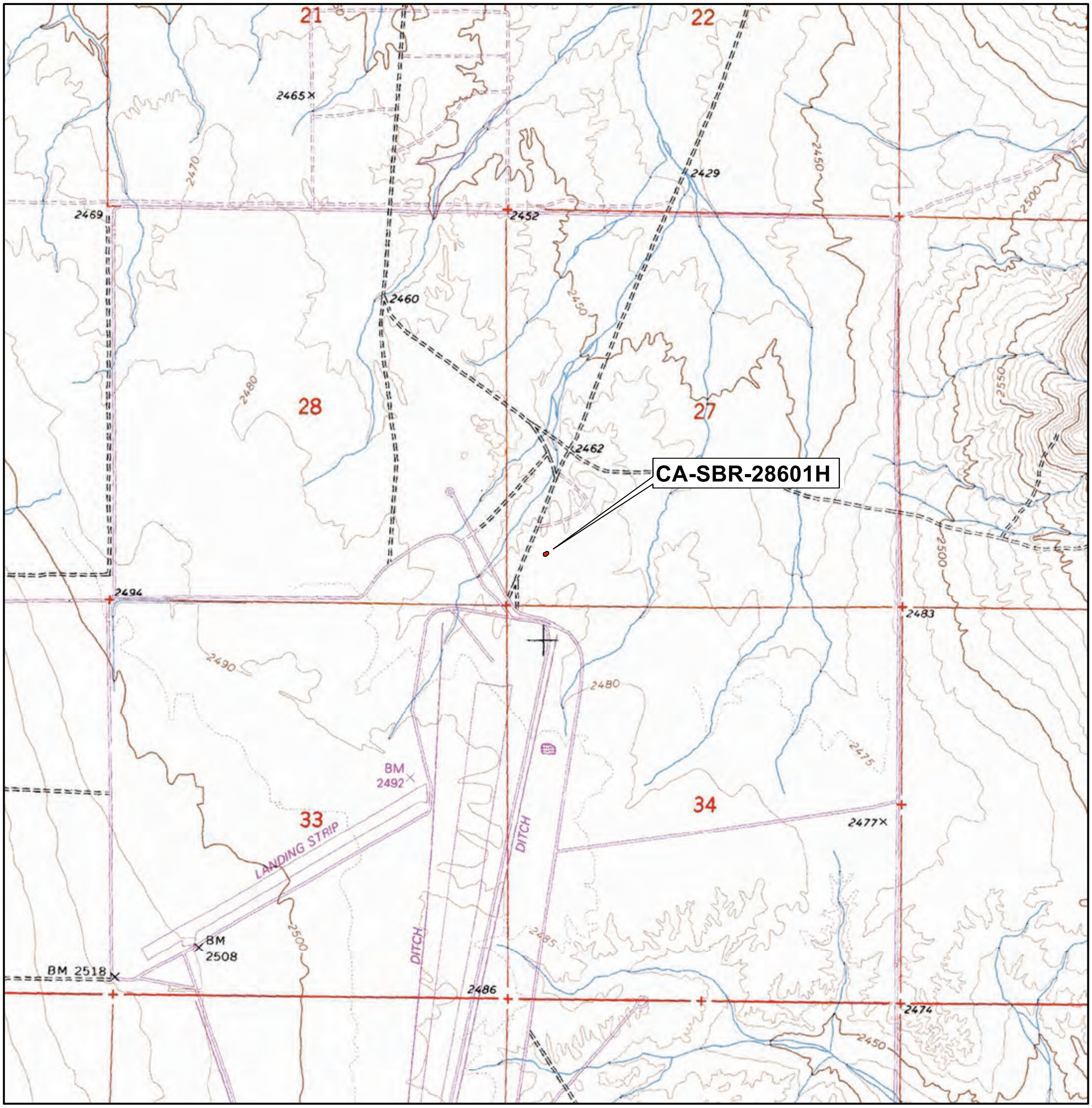
Primary # P-36-028601
HRI#
Trinomial CA-SBR-28601H

Resource Name or #: AE-3168-S-04

Scale: 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle

Date: 2015



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028602
HRI #
Trinomial **CA-SBR-28602**
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** Æ-3168-S-05

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** SW **¼ of Sec** 27; **S.B.B.M.**

Elevation: 2,479 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 473222 **mE/** 3854960 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. CA-SBR-28602 is situated approximately 286 m north of the RCS test range.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring 5 x 5 m, CA-SBR-28602 is a sparse lithic scatter consisting of two flaked stone artifacts (tested cobble and core fragment) and a granite anvil that is located on a patch of desert pavement that slopes down in the northwesterly direction. A northeast-to-southwest running dirt access road is located approximately 30 m west of the site.

P3b. Resource Attributes (List all attributes and codes): AP 2: Lithic Scatter.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Photolog P15_Helendale_149. Overview of Æ-3168-S-05, facing northwest.

P6. Date Constructed/Age and Source: ☒ Prehistoric ☐ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

A1. Dimensions: a. Length: 5 m **x b. Width:** 5 m
Method of Measurement: □ Paced □ Taped □ Visual estimate ☒ Other Trimble GPS

Method of Determination (Check any that apply): ☒ Artifacts □ Features □ Soil □ Vegetation □ Topography □ Cut bank □ Animal burrow □ Excavation □ Property boundary □ Other (explain):

Reliability of Determination: ☒ High □ Medium □ Low Explain: Ground visibility is approximately 95%.

Limitations (Check any that apply): ☒ Restricted access □ Paved/built over □ Disturbances □ Site limits incompletely defined □ Other (Explain): None.

A2. Depth: ☒ None □ Unknown Method of Determination: Site is located on desert pavement and as such, it is unlikely that there are subsurface deposits associated with the site.

A3. Human Remains: □ Present ☒ Absent □ Possible □ Unknown (Explain): None noted and presence is unlikely.

A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None noted.

A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): Two flaked stone artifacts and an anvil were observed on the ground surface. **A-1** is a tested chalcedony cobble that was split into two pieces and shows signs of bipolar reduction. The refitted cobble measures 5.0 x 3.3 x by 4 cm. **A-2** is a yellow-brown jasper core fragment that exhibits multiple flake scars and measures 4.2 x 2.6 x 2.5 cm. **A-3** is a granite anvil that is triangular in shape with a notched seat; the artifact measures 4.7 x 4.7 x 3.2 cm. It is likely that the anvil was used to split A-1.

A6. Were Specimens Collected? ☒ No □ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

A7. Site Condition: □ Good ☒ Fair □ Poor (Describe disturbances): Evidence of off-highway vehicle use in the immediate area has disturbed portions of the desert pavement.

A8. Nearest Water (Type, distance, and direction): A small blue-lined drainage is located approximately 122 meters to the northeast of the lithic scatter.

A9. Elevation: 2,479 ft amsl.

A10. Environmental Setting (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-28602 is located on the slightly sloping surface of an old dissected alluvial fan. The site is situated on a patch of desert pavement. Vegetation community is composed of scattered creosote and low desert brush.

A11. Historical Information (Note sources and provide full citations in Field A15 below): N/A

A12. Age: ☒ Prehistoric □ Pre-Colonial (1500–1769) □ Spanish/Mexican (1769–1848) □ Early American (1848–1880) □ Turn of century (1880–1914) □ Early 20th century (1914–1945) □ Post WWII (1945+) □ Undetermined Factual or estimated dates of occupation (explain):

A13. Interpretations (Discuss scientific, interpretive, ethnic, and other values of site, if known): Artifacts appear indicative of lithic production and/or use activities. CA-SBR-28602 does not meet any of the criteria of the CRHR. It is not directly associated with an important historical event (CRHR Criterion 1), or directly associated with the productive life of an important historical person (CRHR Criterion 2); and it does not embody distinctive characteristics of a type, period, or method of construction, it is not an important work of a master architect, or possess high artistic value (CRHR Criterion 3). The site contains little to no potential for subsurface remains and lacks data potential. Therefore, CA-SBR-28602 does not have the potential to yield important information and is not recommended eligible under CRHR Criterion 4.

A14. Remarks: None.

A15. References (Give full citations including the names and addresses of persons interviewed, if possible):
None.

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
See Photograph Record attached.

A17. Form Prepared by: T. Clark **Date:** June 3, 2015
Affiliation and Address: Applied EarthWorks, Inc., 133 N. San Gabriel Blvd., Suite 201, Pasadena, CA 91107

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # P-36-028602
Trinomial CA-SBR-28602

 ***Resource Name or #** Æ-3168-S-05

Temporary Number/Resource Name: Æ-3168-S-05

Project Name: Tetra Tech Lockheed Martin Helendale Facility Survey **Photographer:** Tetra Tech

Image Type: □ (bw) 35mm B&W film □ (cp) 35mm Color Print film □ (cs) 35mm Color Slide film
□ (df) Digital-Floppy disk ☒ (dm) Digital-Memory flash card

Camera Type and Model: Nikon Coolpix

Film Type and Speed: SD card **Roll Number:** P15_Helendale

Year: 2015

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	14		137	Æ-3168-S-05; A-1, tested chalcedony cobble (close-up).	Down
5	14		138	Æ-3168-S-05; A-1, tested chalcedony cobble (close-up).	Down
5	14		139	Æ-3168-S-05; A-1, tested chalcedony cobble (close-up of cortex).	Down
5	14		140	Æ-3168-S-05; A-1, tested chalcedony cobble (close-up of cortex).	Down
5	14		141	Æ-3168-S-05; A-2, jasper core fragment (close-up).	Down
5	14		142	Æ-3168-S-05; A-2, jasper core fragment (close-up).	Down
5	14		143	Æ-3168-S-05; A-2, jasper core fragment (close-up of cortex).	Down
5	14		144	Æ-3168-S-05; A-2, jasper core fragment (close-up).	Down
5	14		145	Æ-3168-S-05; A-3, granite anvil (close-up).	Down
5	14		146	Æ-3168-S-05; A-3, granite anvil (close-up).	Down
5	14		147	Æ-3168-S-01; A-1, tested chalcedony cobble refitted (close-up).	Down
5	14		148	Æ-3168-S-01; A-1, tested chalcedony cobble refitted (close-up).	Down
5	14		149	Æ-3168-S-05; site overview	NW

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-028602
HRI#
Trinomial CA-SBR-28602

 ***Resource Name or #:** (Assigned by recorder) AE-3168-S-05

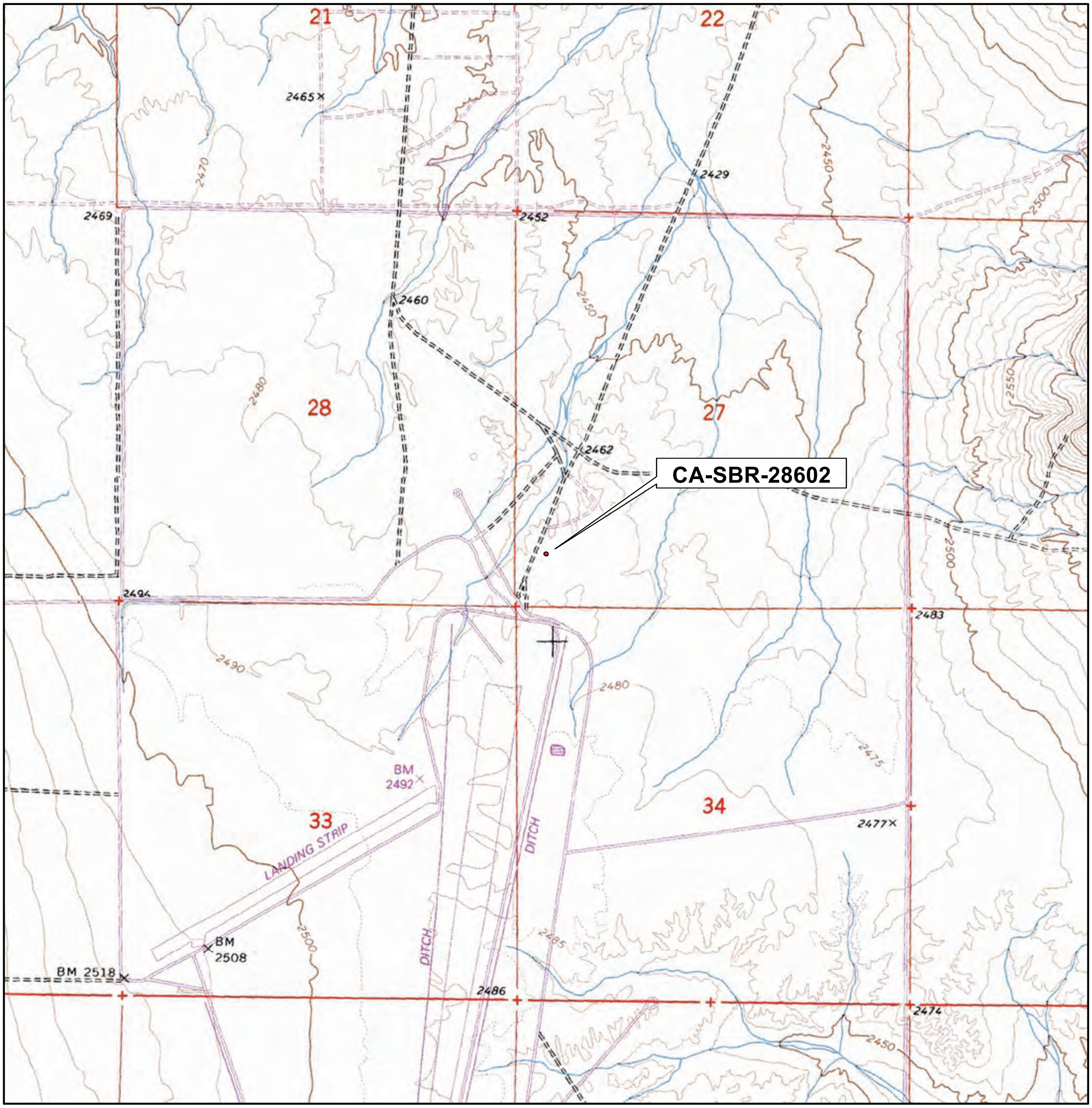
***Drawn by:** J. Smallwood ***Scale:** 1 inch equals 6 meters ***Date of map:** May 2015

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-028602
HRI#
Trinomial CA-SBR-28602

 Resource Name or #: AE-3168-S-05 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028603
HRI #
Trinomial CA-SBR-28603H
NRHP Status Code

Other Listings
Review Code Reviewer Date

***Resource Name or #:** Æ-3168-S-06

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** SW **¼ of Sec** 27; **S.B.B.M.**

Elevation: 2,479 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 473333 **mE/** 3854787 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. CA-SBR-28603H is situated approximately 150 m north of the RCS test range.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring approximately 30 ft x 20 ft, CA-SBR-28603H is a historical refuse scatter consisting of metal cans, bricks, wire, glass bottle fragments, automotive parts, a paint brush handle, an electrical box, and milled wood fragments that dates to the 1960s. The scatter is located within a disturbed area characterized by excavated pits and spoils piles of redeposited native sediment and desert pavement.

P3b. Resource Attributes (List all attributes and codes): AH 4: Trash Scatter.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.) Photolog P15_Helendale_163. Overview of main artifact concentration at Æ-3168-S-06, facing south.

P6. Date Constructed/Age and Source: ☐ Prehistoric ☒ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

A1. Dimensions: a. Length: 30 ft (E-W) **x b. Width:** 20 ft (N-S)
Method of Measurement: □ Paced □ Taped □ Visual estimate ☒ Other Trimble GPS

Method of Determination (Check any that apply): ☒ Artifacts □ Features □ Soil □ Vegetation □ Topography □ Cut bank □ Animal burrow □ Excavation □ Property boundary □ Other (explain):

Reliability of Determination: ☒ High □ Medium □ Low Explain: Ground visibility is approximately 90%.

Limitations (Check any that apply): ☒ Restricted access □ Paved/built over □ Disturbances □ Site limits incompletely defined □ Other (Explain): None.

A2. Depth: □ None ☒ Unknown Method of Determination: No indication was found to suggest subsurface remains may be present at the site.

A3. Human Remains: □ Present ☒ Absent □ Possible □ Unknown (Explain): None noted and presence is unlikely.

A4. Features (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None noted.

A5. Cultural Constituents (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): see Continuation Sheet

A6. Were Specimens Collected? ☒ No □ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

A7. Site Condition: □ Good ☒ Fair □ Poor (Describe disturbances): Site is located within a disturbed area characterized by excavated pits and associated spoils pile consisting of redeposited native sediments and desert pavements. The placement of historical artifacts on top of the spoils piles suggests that the deposition of the refuse post-dates the ground disturbing activities.

A8. Nearest Water (Type, distance, and direction): A small ephemeral drainage is located approximately 70 feet to the east of the historical trash deposit.

A9. Elevation: 2,486 ft amsl.

A10. Environmental Setting (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-28603H is located on the slightly sloping surface of an old dissected alluvial fan. Vegetation community is composed of scattered creosote and low desert brush.

A11. Historical Information (Note sources and provide full citations in Field A15 below): N/A

A12. Age: □ Prehistoric □ Pre-Colonial (1500–1769) □ Spanish/Mexican (1769–1848) □ Early American (1848–1880) □ Turn of century (1880–1914) □ Early 20th century (1914–1945) ☒ Post WWII (1945+) □ Undetermined Factual or estimated dates of occupation (explain): 1960-1968 based on the presence of bimetal pop top can with keyhole pull tabs (1963-1965) and a Hatcher Glass Manufacturing Company glass bottle base with a 1968 date.

A13. Interpretations (Discuss scientific, interpretive, ethnic, and other values of site, if known): Artifacts that comprise CA-SBR-28603H likely represent secondary refuse deposit dating to the 1960s. The majority of the remains (metal food cans and glass bottle fragments) are associated with eating or drinking activities. Construction-related debris was also fairly common with numerous brick fragments, milled wood, an electrical box, and a paint brush handle. The origin of the artifacts (e.g., the original source where the objects were used before they were permanently discarded) that comprise CA-SBR-28603H cannot be determined. The Helendale airfield appears to have been closed to the public in the early 1960s (Freeman 2015). As such, it is unlikely that the remains are associated with aviation activities in the area. In addition, a review of historical documents found that the area was not subject to homesteading activities. Specifically, the Bureau of Land Management's (BLM) General Land Office patent records indicate that much of the land in the immediate area of CA-SBR-28603H was not patented until 1981, when Sections 27, 28, 32, 34, 35, T9N, R4W and Sections 3 and 4, T8N, T4W were granted to the Southern Pacific Land Company as part of a land exchange with the BLM (2015). A review of the 1973 Wild Crossing 15' USGS topographic map indicates that aside from the airfield and an associated building and road, there are no other buildings or structures in the immediate area of CA-SBR-28603H. Taken together, these findings suggest that the CA-SBR-28603H represents an isolated secondary refuse deposit of unknown association.

CA-SBR-28603H does not appear to meet any of the criteria of the CRHR. It is not directly associated with an important historical event (CRHR Criterion 1), or directly associated with the productive life of an important historical person (CRHR Criterion 2); and it does not embody distinctive characteristics of a type, period, or method of construction, is not an important work of a master architect, or possess high artistic value (CRHR Criterion 3). Finally, the data potential of the site is limited and the site appears to lack subsurface deposits. Because CA-SBR-28603H does not have the potential to yield important historical information, it is not recommended eligible under CRHR Criterion 4.

A14. Remarks: None.

A15. References (Give full citations including the names and addresses of persons interviewed, if possible):

Bureau of Land Management
2015 General land Office Records (Electronic database). Found at: https://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=2.

Freeman, Paul
2015 Helendale Auxiliary Air Field No. 2. Found at: http://www.airfields-freeman.com/CA/Airfields_CA_PalmdaleN.htm.

A16. Photographs (List subjects, direction of view, and accession numbers or attach a Photograph Record):
See Photograph Record attached.

A17. Form Prepared by: T. Clark **Date:** June 3, 2015
Affiliation and Address: Applied EarthWorks, Inc., 133 N. San Gabriel Blvd., Suite 201, Pasadena, CA 91107

PHOTOGRAPH RECORD

 *Resource Name or # Æ-3168-S-06

Temporary Number/Resource Name: Æ-3168-S-06

Project Name: Tetra Tech Lockheed Martin Helendale Facility Survey **Photographer:** Tetra Tech

Image Type: □ (bw) 35mm B&W film □ (cp) 35mm Color Print film □ (cs) 35mm Color Slide film
□ (df) Digital-Floppy disk ☒ (dm) Digital-Memory flash card

Camera Type and Model: Nikon Coolpix

Film Type and Speed: SD card **Roll Number:** P15_Helendale

Year: 2015

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
5	15		160	Æ-3168-S-06; overview of artifact concentration showing nearby spoils piles.	N
5	15		161	Æ-3168-S-06; close-up of artifact concentration.	Down
5	15		162	Æ-3168-S-06; overview of artifact concentration showing nearby spoils piles.	N
5	15		163	Æ-3168-S-06; overview of artifact concentration	S

In-field Analysis of Historical Refuse Deposit Artifacts

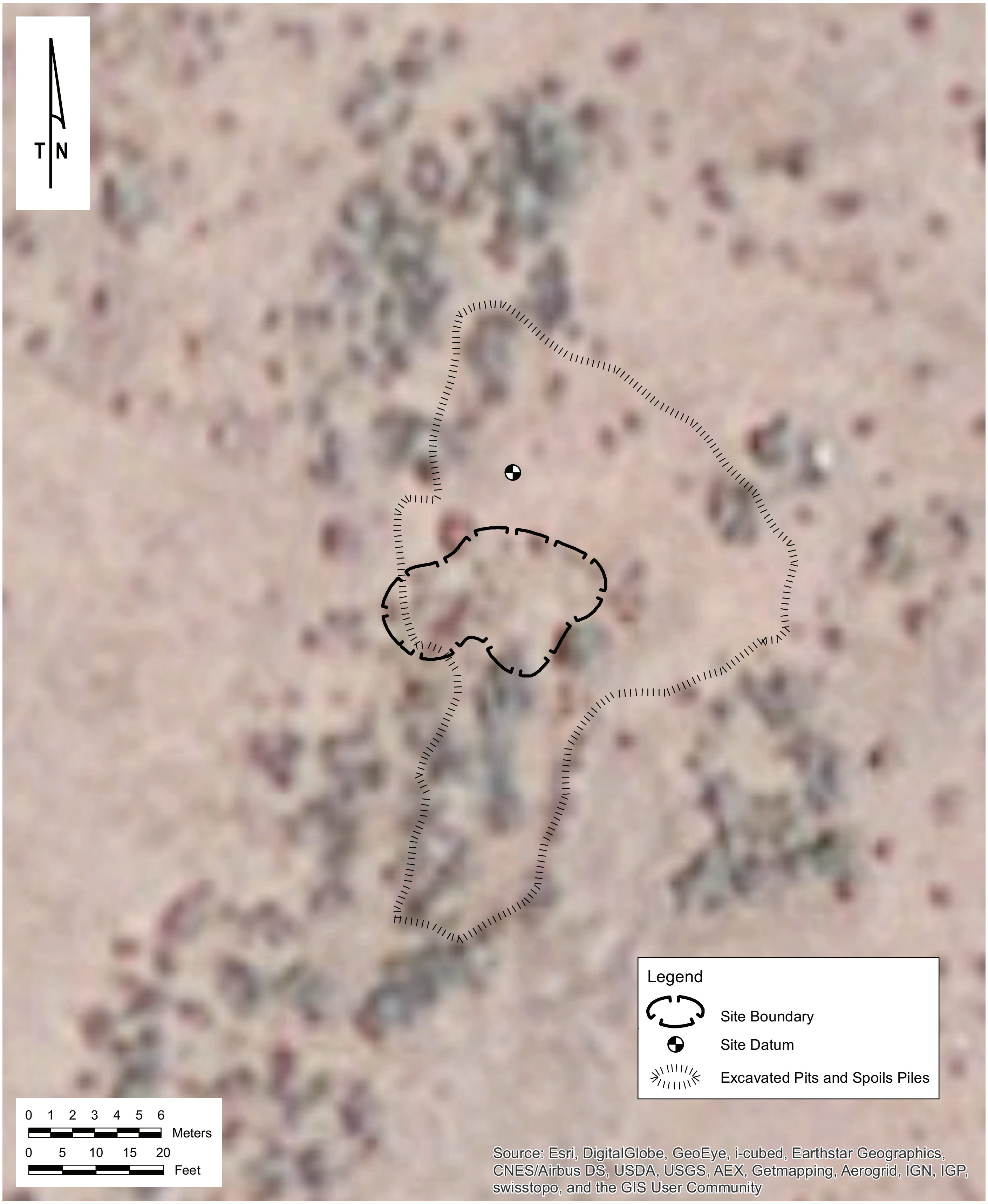
Artifact Type	Count	Notes
Pop-top bimetal can	17	Pull tab beverage cans
Sanitary ribbed metal can	~24	Rotary opened; various sizes
Sardine metal can	1	
Hole-in-top can	1	Ice-picked opened; 4" tall, 2 15/16" diameter
Metal oil can	2	1 quart in size
Metal milk can	2	knife-opened; 2 3/8" tall, 2 1/2 " in diameter
Metal food cans	3	one "Grapefruit juice" label
Unidentified metal can	5	Crushed
Bottle glass - Colorless	2	Condiment jar base "2783-B/15 RF 78/8 B"; bottle base "Merrell/2340/16/Cepacol"
Bottle glass - Amber	2	Beer bottle base "69"; pint bottle base with the Thatcher Glass Manufacturing Company Maker's Mark "5/25/12" "68"
Bottle glass - Blue & Colorless	10	
Brick Fragment	114	wall fragments
Paint brush handle	1	3" in length
Milled wood fragments	~15	
Metal electrical box	1	
Miscellaneous metal wire	>20 pieces	Bailing wire; barbed wire; clothes hanger
Automotive parts (miscellaneous)	4	1 part labeled "Colder →"
Brick Fragment	114	wall fragments

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-028603
HRI#
Trinomial CA-SBR-28603H

***Resource Name or #:** (Assigned by recorder) AE-3168-S-06

***Drawn by:** J. Smallwood ***Scale:** 1 inch equals 20 feet ***Date of map:** May 2015



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

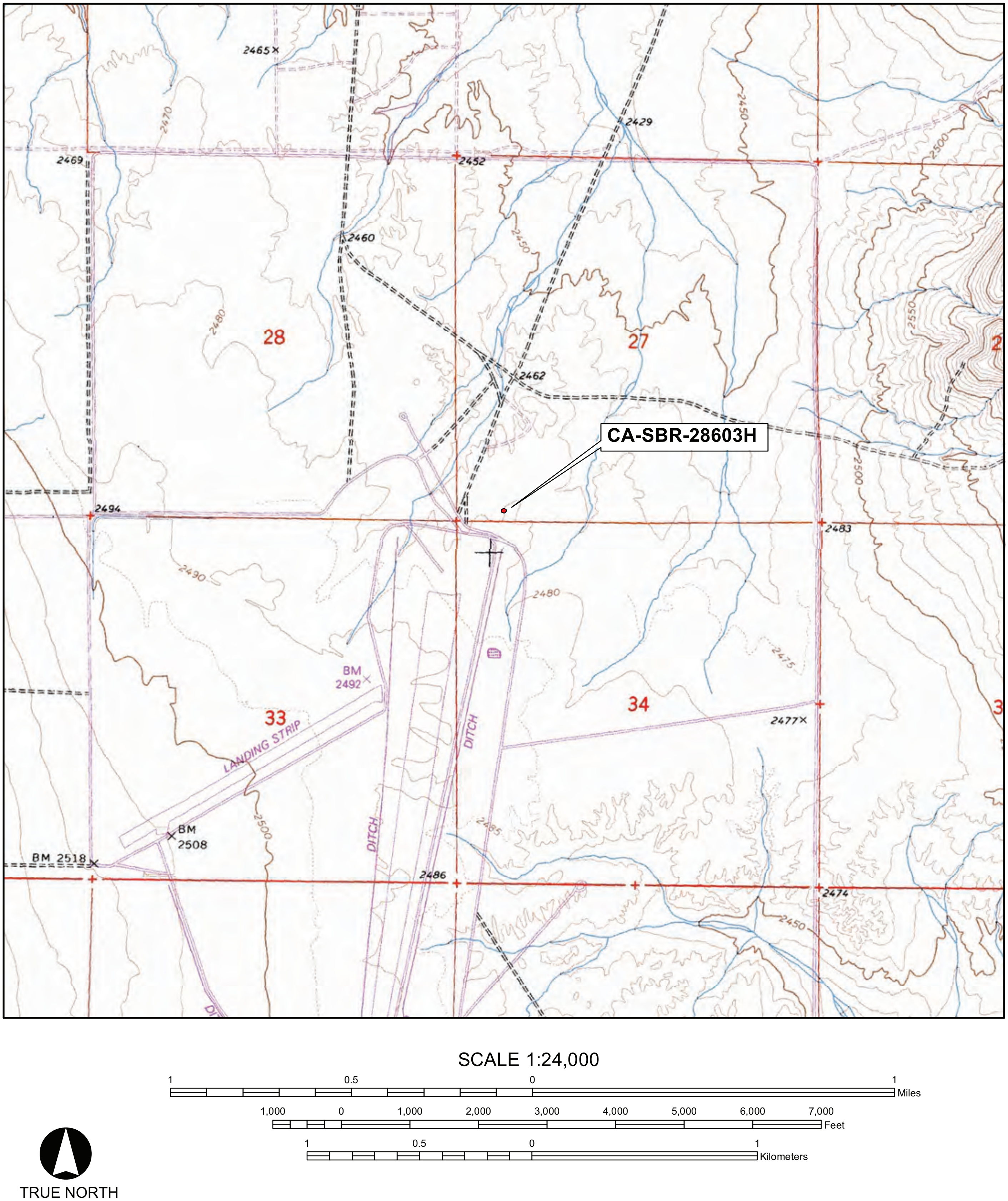
Primary # P-36-028603
HRI#
Trinomial CA-SBR-28603H

Resource Name or #: AE-3168-S-06

Scale: 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle

Date: 2015



State of California — The Resources Agency **DEPARTMENT OF PARKS AND RECREATION**	**Primary #** P-36-028595 **HRI #**	
PRIMARY RECORD	**Trinomial** **NRHP Status Code** 6Z	
Other Listings **Review Code**	**Reviewer**	**Date**

Resource Name or #: Æ-3168-ISO-03

P1. Other Identifier: Bureau of Land Management, U.S. Cadastral Survey Marker

P2. Location: a. County San Bernardino ☐ **Not for Publication** ☒ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N**; R** 4 W; NE **¼ of** NE **¼ of Sec** 33; San Bernardino **B.M.**

Elevation: 2,480 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 473103 **mE/** 3854752 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. P-36-028595 is situated 200 ft north of the RCS test range.

P3a. Description: This Bureau of Land Management, U.S. Cadastral Survey marker consists of a brass disk (3¼ inch in diameter) that extends three inches about the ground surface. The disk reads, "U.S. Cadastral Survey/ Bureau of Reclamation/ Penalty $250 For Removal" and is used to demarcate the corner of Section 27, 28, 33, and 34, Township 9 North, Range 4 West. The disk is stamped with a date of 1959. A 46 inch long metal pipe sticking vertically out of the ground is located next to the survey marker.

P3b. Resource Attributes: HP 39: Other; survey marker

P4. Resources Present: ☐ Building ☐ Structure ☒ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: See Continuation Sheet.

P6. Date Constructed/Age and Source: ☐ Prehistoric ☒ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other

Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

BUILDING, STRUCTURE, AND OBJECT RECORD

NRHP Status Code 6Z
Resource Name or # Æ-3168-ISO-03

B1. Historic Name: Bureau of Land Management, U.S. Cadastral Survey Marker B2. Common Name: same
B3. Original Use: survey marker
B4. Present Use: same
B5. Architectural Style: brass disk with an associated 46 inch-long metal pipe sticking vertical out of ground
B6. Construction History: This survey marker was placed at this location in 1959 as indicated by the date stamp on its brass disk.

B7. Moved? ☒ No Yes Unknown **Date:** **Original Location:**
B8. Related Features: None
B9a. Architect: Bureau of Land Management b. Builder: Same
B10. Significance: Theme Twentieth century survey markers
Area Victor Valley **Period of Significance** None
Property Type Survey marker **Applicable Criteria** None

This Bureau of Land Management, U.S. Cadastral Survey Marker does not appear to be eligible for inclusion in the CRHR. Survey and mapping benchmarks of this type are ubiquitous objects that are found scattered across the southern California desert regions and were used by surveyors to demarcate the boundaries of sections, townships, and ranges. This particular survey marker is not a principal point of an important land survey; rather, it is just one of numerous similar survey markers located throughout the area. In addition, this particular survey marker does not exhibit any architectural or engineering merits that would set it apart from the many similar survey markers in the region. There is no evidence that it is directly associated with any persons or events of recognized historical significance (CRHR Criterion 1 and 2); represents the work of a prominent architect, designer, or builder, or qualifies as an important example of its type, period, region, or method of construction (CRHR Criterion 3); and it does not have the potential to yield any information important to the study of our local, state, or national history (CRHR Criterion 4).

B11. Additional Resource Attributes:

B12. References:

B13. Remarks:
B14. Evaluator: Josh Smallwood
Date of Evaluation: June 15, 2015

Resource Name or # Æ-3168-ISO-03

Recorded by: Josh Smallwood **Date** June 15, 2015 ☒ **Continuation** ☐ **Update**

Figure 1. Top view of the Brass Disk of the U.S. Cadastral Survey marker.

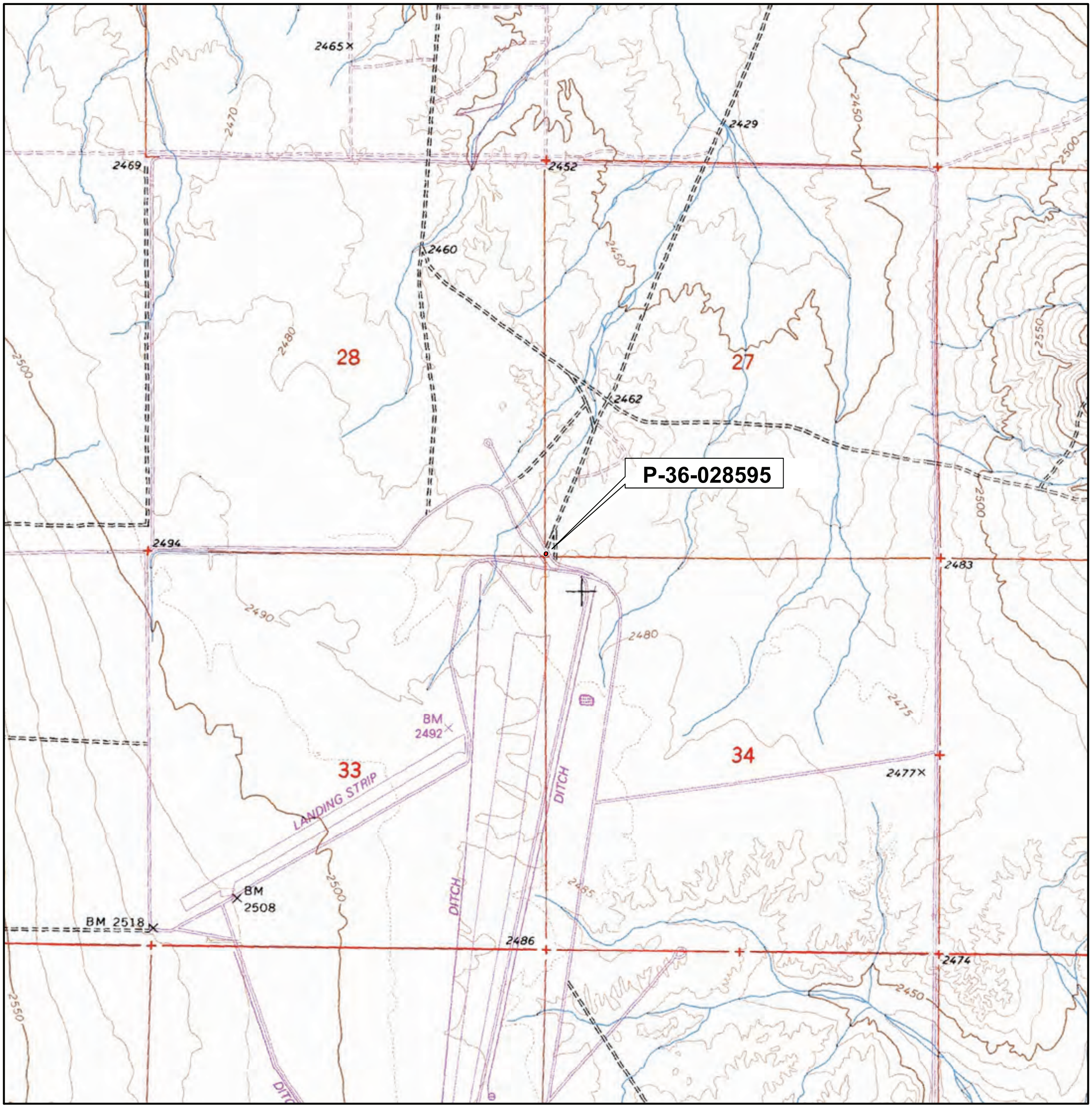
Figure 2. U.S. Cadastral Survey marker with associated metal pipe, facing north.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

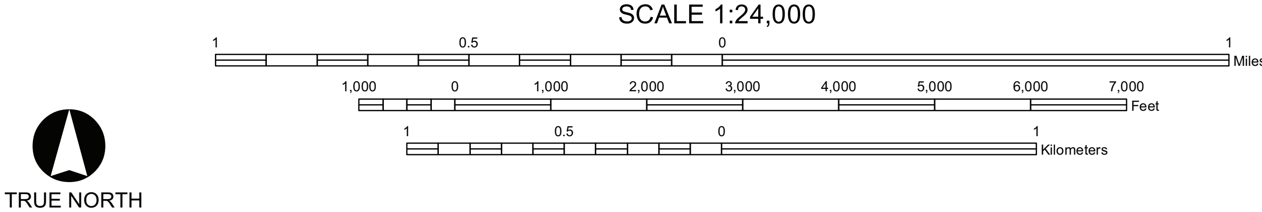
Primary # P-36-028595
HRI#
Trinomial

Page 4 **of** 4 **Resource Name or #:** AE-3168-ISO-03 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000



State of California--The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # P-36-028600 HRI # Trinomial NRHP Status Code 6Z Other Listings
Review Code	Reviewer Date

 Resource Name or # Helendale Auxiliary Army Air Field

P1. Other Identifier:

P2. Location: **a. County** San Bernardino ☐ **Not for Publication** ☒ **Unrestricted**

b. USGS 7.5' Quad Wild Crossing, Calif. (1973 photo-revised 1993)
Section 33, **T**9N, **R**4W, **S.B.B.M.**
Elevation: 2,500 feet above mean sea level

c. Address none **City** near Helendale **Zip** 92342

d. UTM: Zone 11; **East point of triangle:** 472,794 **mE** / 3,853,998 **mN**
Northwest point of triangle: 471,789 **mE** / 3,854,707 **mN**
Southwest point of triangle: 471,780 **mE** / 3,853,345 **mN**
UTM Derivation: ☐ USGS Quad ☒ GPS; Google Earth NAD 1983

e. Other Locational Data: The former Helendale Auxiliary Army Air Field No. 2, also known as Helendale Auxiliary Airport, is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. The Helendale Auxiliary Army Air Field No. 2 is situated immediately adjacent to the northwest edge of the RCS test range.

P3a. Description: The Helendale Auxiliary Army Air Field No. 2 was constructed in 1942 as Number 2 of four satellite Army air fields serving the Victorville Army Air Field (Brooks 2012; Freeman 2015). The other three auxiliary air fields were Hawes Auxiliary Air Field (No. 1; 23 miles north of Adelanto), Mirage Auxiliary Air Field (No. 3; 3 miles west of El Mirage), and Grey Butte Auxiliary Air Field (No. 4; 25 miles east of Palmdale). Each of these auxiliary air fields was nearly identical in design, comprising four landing strips in a triangular configuration which allowed for multiple landings and variable wind direction (see Figure 1 on the Continuation Sheet). The triangle configuration was common among U.S. Army Air Fields of World War Two (WWII) (Brooks 2012). Victorville Army Air Field (VAAF), located 8 miles northwest of central Victorville, was established in July 1941 as part of the build-up of Army air fields across the nation in preparation for WWII. VAAF provided Primary, Basic and Advanced (both single and multi-engine) pilot training under the Army Air Force Flying Training Command. The VAAF was closed at the end of WWII but was activated again as a training base for the United States Air Force in 1950 and renamed George Air Force Base.

According to Freeman (2015), the 1944 US Army/Navy Directory of air fields described the Helendale Auxiliary Army Air Field as having a 5,600-ft-long hard-surface runway. The air field continued to operate as an Army auxiliary landing strip until the end of WWII, at which time it was converted to a private civilian air field. A USGS aerial photograph dated June 1, 1952 depicted the air field as having four asphalt-paved runways in a triangular configuration (Freeman 2015). Similarly, the USGS topographic quadrangle based on the 1952 aerial photograph depicts the same design and configuration (USGS 1956) (see Figure 2 on continuation sheet). By 1962 it was listed in the AOPA (Aircraft Owners and Pilots Association) Airport Directory as a 3,600-ft-long paved runway closed to the public (Freeman 2015). The 1967 Sectional Chart lists the air field as having four runways, with the longest being a 4,459-ft-long asphalt-paved strip, but also indicates that pilots should land at their own risk. A USGS map dated 1973 indicates the air field was relatively unchanged (USGS 1973). However, by the time of the 1993 revision the air field was not depicted by USGS and its location was replaced with the current configuration of the Lockheed Martin RCS facility and single landing strip (USGS 1993). According to Brooks (2012), the four landing strips originally measured 4,911x150 ft (N/S strip), 5,600 x 150 ft (ENE/WSW strip), 4,921x150 ft (E/W strip), and 5,502x150 ft (WNW/ESE strip), and bituminous (paved with asphalt). Current satellite imagery reveals that the majority of the former Helendale Auxiliary Army Air Field still exists, although the eastern point of the triangle was obliterated by construction of the Lockheed Martin RCS test facility in 1982–1983, and the southern runway has been repaved and restriped for use by the RCS test facility. Ground-inspection of the former air field reveals that the other three landing strips are not paved, but covered in compact gravel. Most of their surface is overgrown with brush, weeds, and short desert grasses. The maximum extent of any of these four runways measures 3,800 ft long, with an additional 1,000 ft of graded surface at their far west end, for a total length of 4,800 ft. Photographs of the current condition of the runways were taken on May 14, 2015 to document their appearance, design, and construction (see Figures 3 through 5 on the attached Continuation Sheets). Satellite imagery was used to create a Sketch Map of the air field.

P3b. Resource Attributes: HP11. Engineering structure; HP34. Military property

P4. Resources Present: □ Building ☒ Structure □ Object □ Site □ District □ Element of District □ Other:

P5a. Photograph or Drawing See attached Continuation sheets for photographs

P5b. Description of Photo: Photographs taken on May 14, 2015.

P6. Date Constructed/Age of Sources: □ Prehistoric ☒ Historic □ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Avenue, Suite H, Hemet, CA 92544

P9. Date Recorded: May 14, 2015

P10. Survey Type: Intensive level survey for CEQA compliance

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: □ None ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record □ Archaeological Record □ District Record □ Linear Feature Record □ Milling Station Record □ Rock Art Record □ Artifact Record □ Photograph Record Other:

B1. Historic Name: Helendale Auxiliary Army Air Field (Victorville AAF Auxiliary No. 2)
B2. Common Name: Helendale Airport
B3. Original Use: landing strip
B4. Present Use: landing strip (private)

B5. Architectural Style: four hard-surface runways in a triangular configuration

B6. Construction History: Constructed by U.S. Army in 1942 as an auxiliary air field to Victorville Army Air Field. It was converted to a private civilian air field at the end of WWII. By 1983, all but the southernmost landing strip had been abandoned, and the air field was incorporated into the Lockheed Martin RCS test range.

B7. Moved? ☒ No ☐ Yes ☐ Unknown **Date:** **Original Location:**

B8. Related Features: None

B9a. Architect: Unknown b. Builder: U.S. Army Air Force

B10. Significance: Theme WWII-era U.S. Army Air Fields
Area Victorville, Mohave Desert, San Bernardino County
Period of Significance 1942–1945
Property Type U.S. Army air field **Applicable Criteria** None

The Helendale Auxiliary Army Air Field was No. 2 of four auxiliary air fields serving the Victorville Army Air Field. Historical background research has indicated that the Helendale Auxiliary Army Air Field never achieved any prominence as a U.S. Army air field, nor as a civilian air field throughout the historic period. As such, it does not appear to meet any of the criteria of the CRHR. It is not directly associated with an important historical event (CRHR Criterion 1), or directly associated with the productive life of an important historical person (CRHR Criterion 2); it does not embody distinctive characteristics of a type, period, or method of construction, is not an important work of a master architect, or possess high artistic value (CRHR Criterion 3); and it does not possess data potential important to the study of our local, state, or national history (CRHR Criterion 4), as explained in further detail below.

CRHR Criterion 1: No information has been found to suggest that the Helendale Auxiliary Army Air Field is directly associated with any historical events of importance in local, state, or national history under CRHR Criterion 1. The air field was constructed by U.S. Army in 1942 as an auxiliary air field to Victorville Army Air Field. It was converted to a private civilian air field at the end of WWII. By 1983, all but the southernmost landing strip had been abandoned, and the air field was incorporated into the Lockheed Martin RCS test range. The air field is associated with U.S. Army air field development during WWII, but it did not play a pivotal role in any historical events in U.S. Army or WWII history, and it is also not an important part of any pattern of events in local, state, or national history. While the Helendale Auxiliary Army Air Field is associated with the WWII era history and development of the region, there is no indication that association is significant. Mere association with historic events is not enough to meet CRHR Criterion 1, in and of itself; the property's specific association must be considered important as well.

CRHR Criterion 2: No information has been found to suggest that the Helendale Auxiliary Army Air Field is directly associated with the productive life of an historical person of importance in local, state, or national history under CRHR Criterion 2.

CRHR Criterion 3: No information has been found to suggest that the Helendale Auxiliary Army Air Field is an important example of WWII era auxiliary air fields. The triangle design of the air field was of standard design and construction among WWII era U.S. Army auxiliary air fields; with two, three, or four runways routinely paved, with lengths spanning from 3,500 ft to over 5,000 ft (Brooks 2012). The Helendale Auxiliary Army Air Field consists of four hard-surface runways in a triangular configuration. As an auxiliary air field, there were no apparent permanent buildings of any kind at this location. It served its purpose for three years and then was abandoned, later being used as a civilian landing strip.

B10. Significance (continued):

As a U.S. Army air field of standard design and construction, the Helendale Auxiliary Army Air Field does not exhibit any special or unique architectural merits that would stand it apart from other U.S. Army air fields of that era found in the region, state, or the nation. Therefore, the Helendale Auxiliary Army Air Field does not appear to be eligible for CRHR Criterion 3 for any design or construction merits.

CRHR Criterion 4: The Helendale Auxiliary Army Air Field does not appear to meet CRHR Criterion 4 for any potential to provide information important to the study of WWII era U.S. Army air fields. This criteria is typically reserved for archaeological resources, ruins, or rare built environment resources of which little is already known, and that are considered to be the sole source of historical data. The Helendale Auxiliary Army Air Field is unable to yield any information important to the study of U.S. Army air fields of similar vintage in local, state, or national history. The Helendale Auxiliary Army Air Field is not the primary source of information, but rather, the physical manifestation of the knowledge and practice of a construction technique, which has been widely applied to air fields throughout southern California and the nation. Thus, Helendale Auxiliary Army Air Field does not provide any important information or data potential that would meet CRHR Criterion 4.

B11. Additional Resource Attributes: (List attributes and codes)

B12. References:

Brooks, David
2012 Military Air Fields in WW2, 1941-1945.
Found at: http://www.airfieldsdatabase.com/WW2/WW2.htm.

Freeman, Paul
2015 Helendale Auxiliary Air Field No. 2.
Found at: http://www.airfields-freeman.com/CA/Airfields_CA_PalmdaleN.htm.

USGS (U.S. Geological Survey)
1956 Hawes, Calif. 15-minute topographic quadrangle (1:62,500), aerial photographs taken 1952.
1973 Wild Crossing, Calif. 7.5-minute topographic quadrangle (1:24,000), aerial photographs taken 1972; field-checked 1973.

B13. Remarks:

B14. Evaluator: Josh Smallwood, M.A., RPA
Applied EarthWorks, Inc.
3550 E. Florida Avenue, Suite I,
Hemet, CA 92544

Date of Evaluation: May 22, 2015

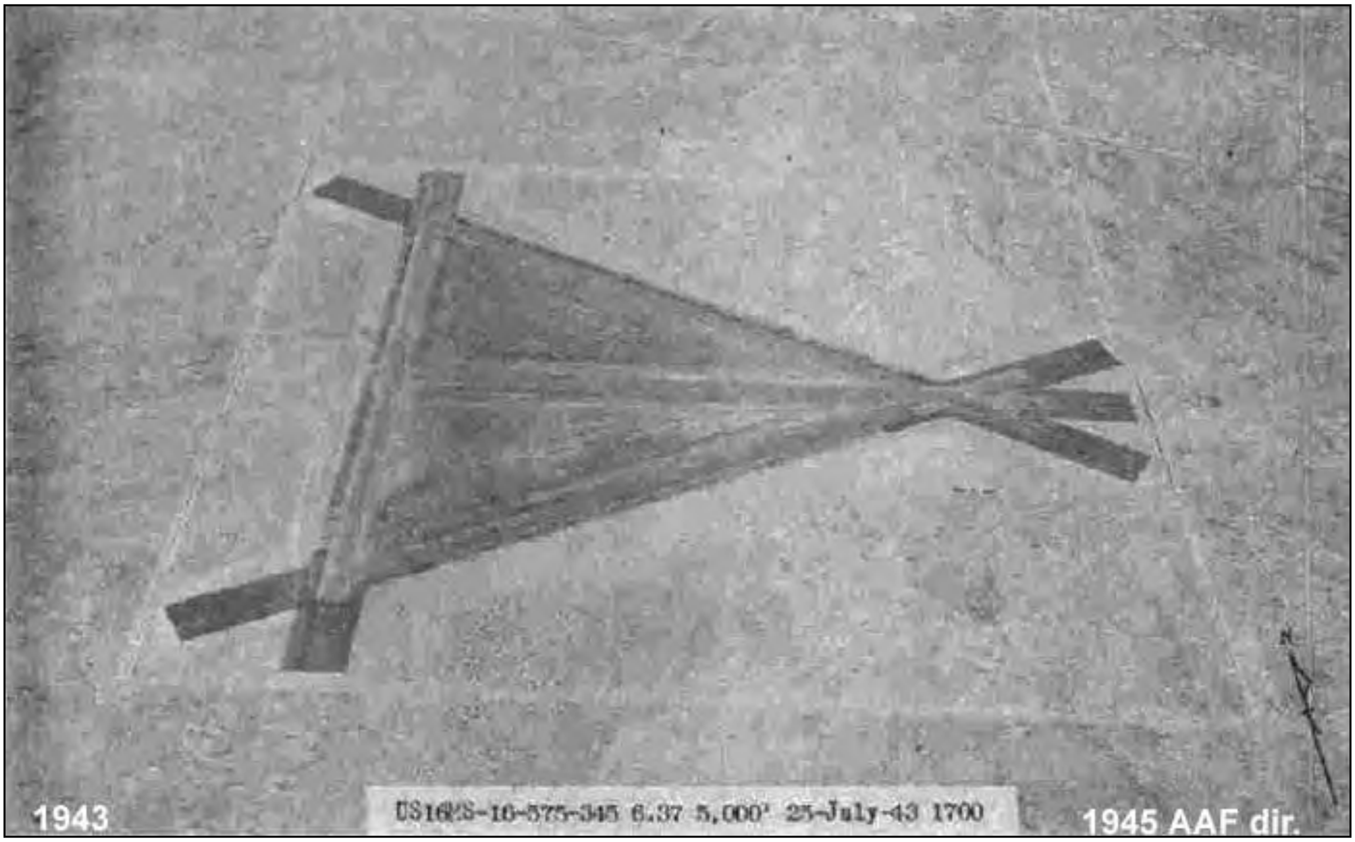


Figure 1. A U.S. Army Air Force aerial photograph of the Helendale Auxiliary Army Air Field dated 25 July 1943 (from Brooks 2012).

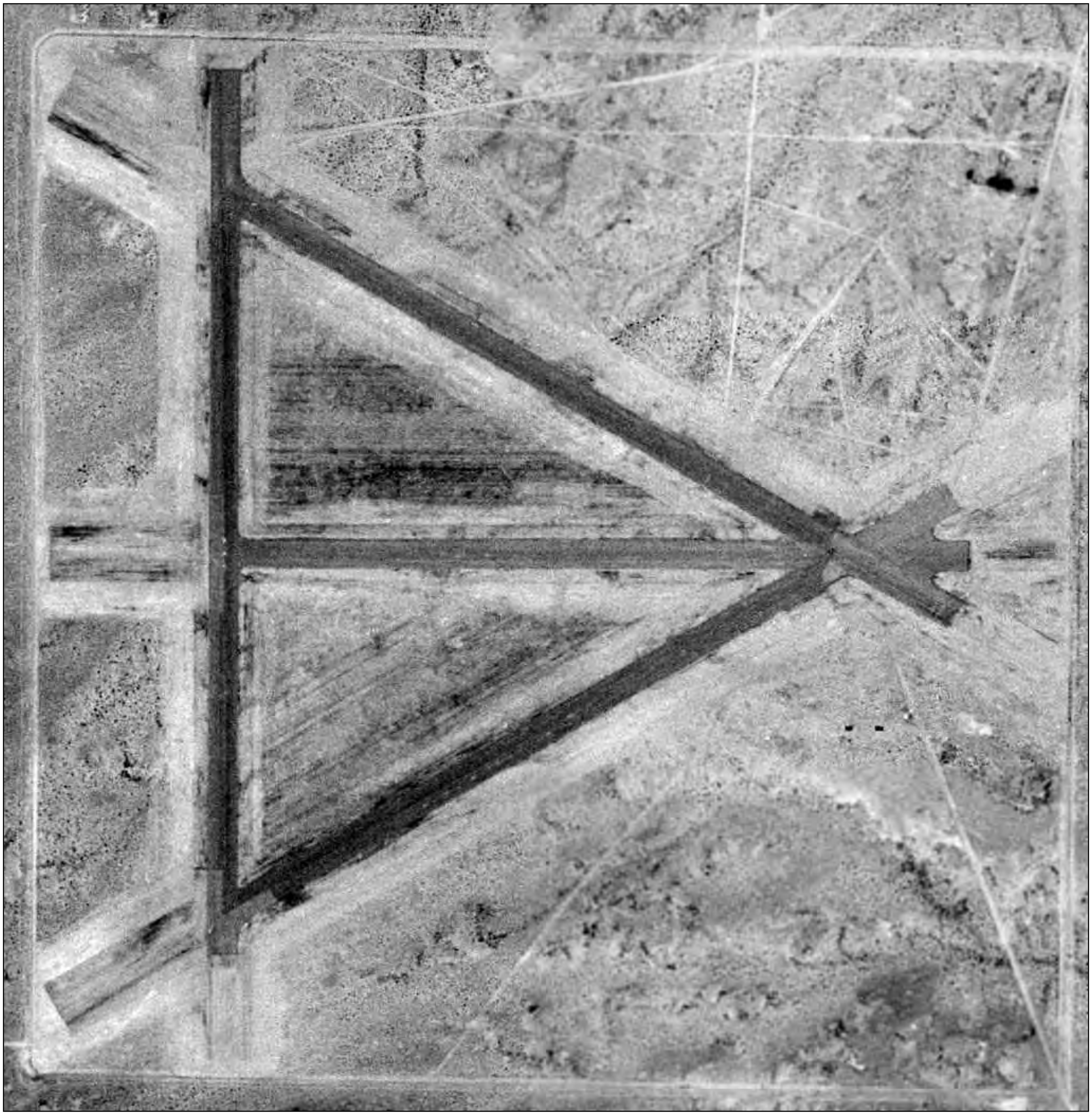


Figure 2. A USGS aerial photograph of the Helendale Auxiliary Army Air Field dated June 1, 1952 (Freeman 2015).

Figure 3. View along stretch of the southwest-northeast runway (view to the southwest; photograph taken May 14, 2015).

State of California--The Resources Agency	**Primary #** P-36-028600
DEPARTMENT OF PARKS AND RECREATION	**HRI #**
CONTINUATION SHEET	**Trinomial**

Page 8 **of** 11 **Resource Name or #** Helendale Auxiliary Army Air Field

Recorded by: Josh Smallwood **Date** May 14, 2015 ☒ **Continuation** ☐ **Update**

Figure 4. View along stretch of the east-west runway (view to the west; photograph taken May 14, 2015).

Recorded by: Josh Smallwood **Date** May 14, 2015 ☒ **Continuation** □ **Update**

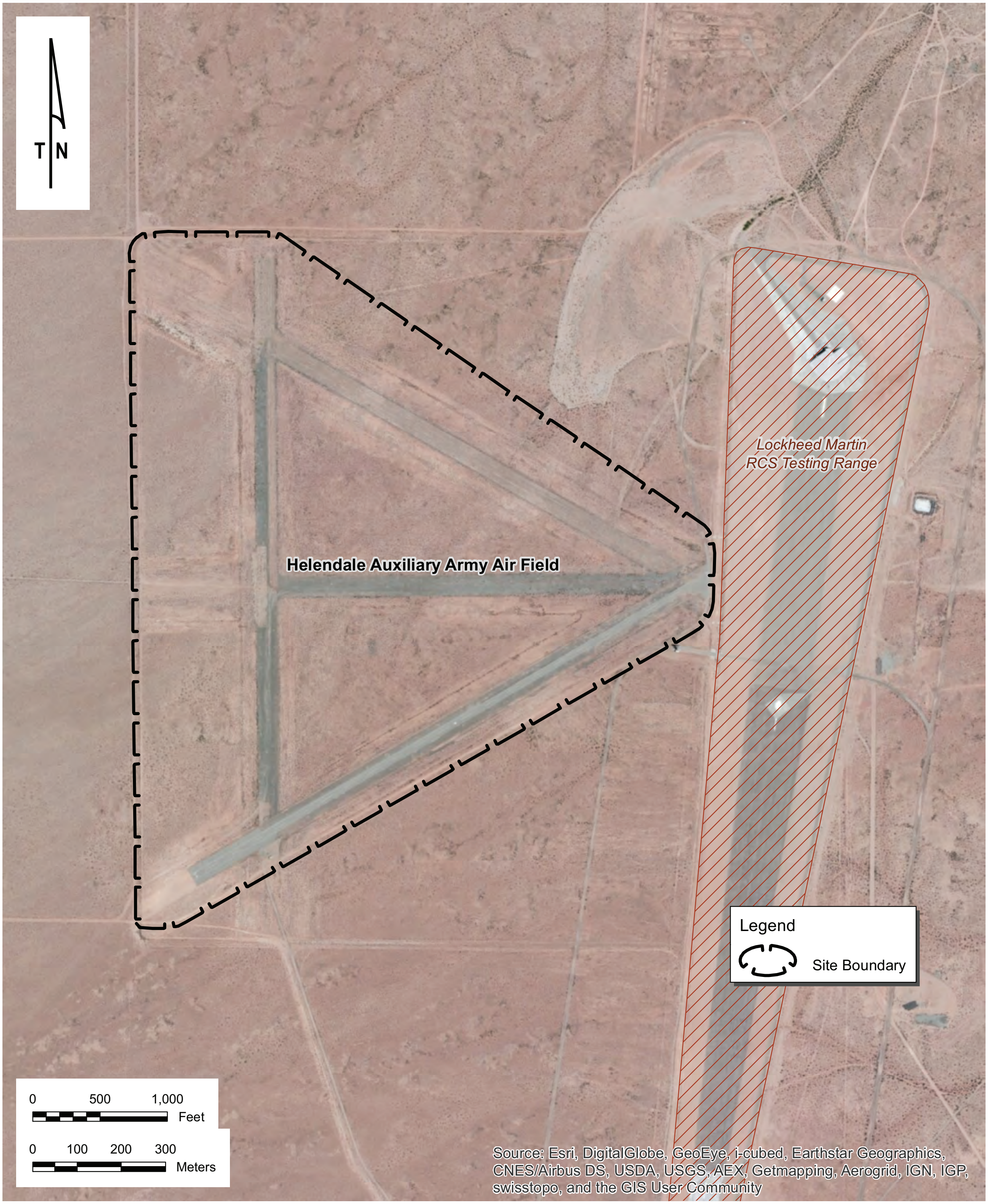
Figure 5. View along stretch of the northwest-southeast runway (view to the northwest; photograph taken May 14, 2015).

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # P-36-028600
HRI#
Trinomial

Page 10 **of** 11 **Resource Name or #:** (Assigned by recorder) Helendale Auxiliary Army Air Field

Drawn by: J. Smallwood **Scale:** 1 inch equals 1,000 feet **Date of map:** May 2015

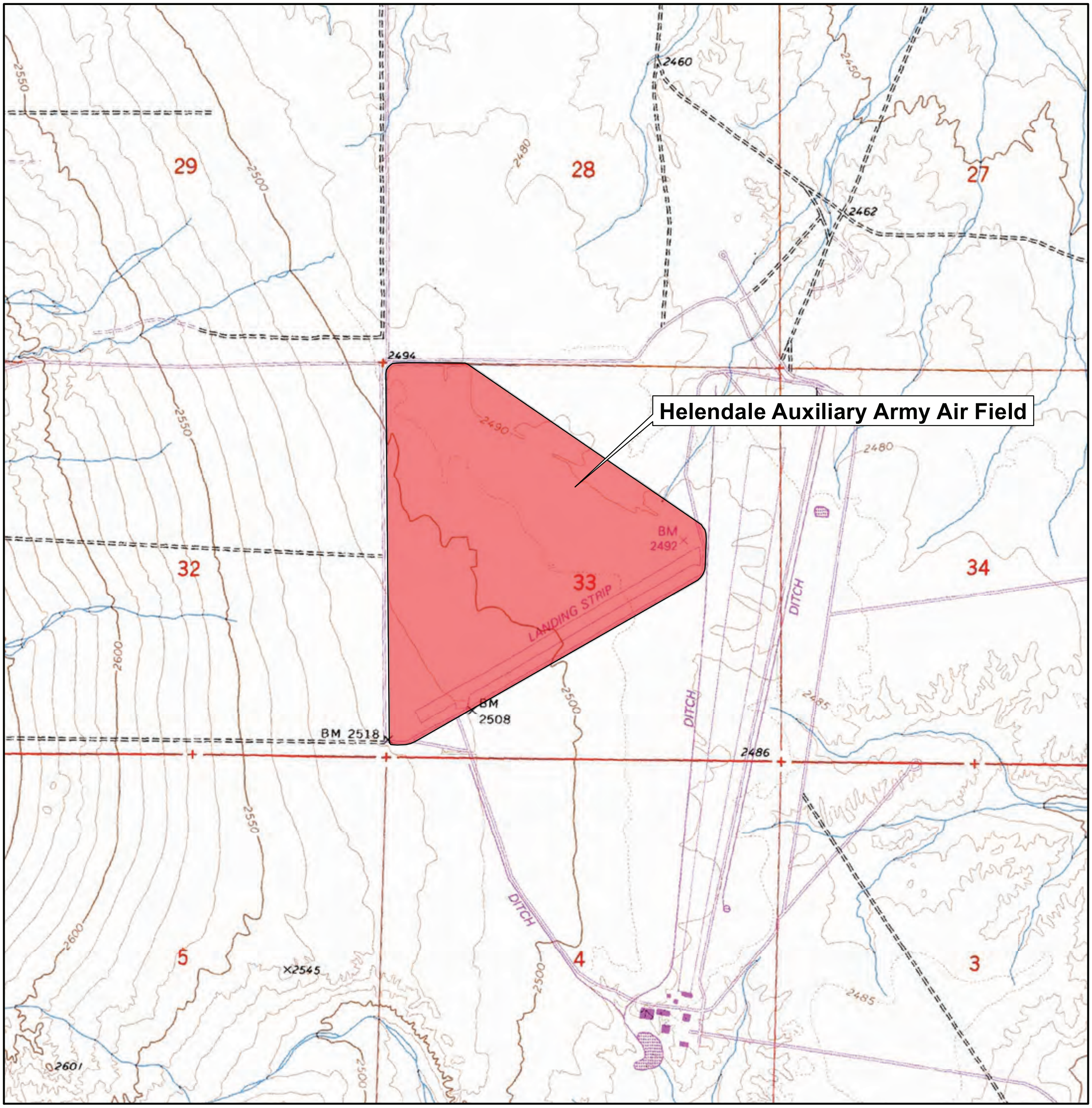


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

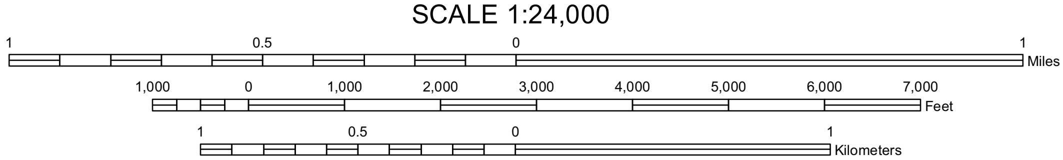
Primary # P-36-028600
HRI#
Trinomial

Page 11 **of** 11 **Resource Name or #:** Helendale Auxiliary Army Air Field **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000



TRUE NORTH

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028593
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code Reviewer Date

Resource Name or #: Æ-3168-ISO-01

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 8 N; **R** 4 W; NE **¼ of** NE **¼ of Sec** 4; **S.B.B.M.**

Elevation: 2,496 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 472703 **mE/** 3853072 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. P-36-028593 is situated approximately 70m west of the RCS test range.

P3a. Description: P-36-028593 consists of a single primary chalcedony (mottled brown and yellow) flake measuring 5.5 X 3.7 X 1.0 cm. The isolated artifact is not unique, unusual, rare, or otherwise exceptional. It lacks important associations and scientific data potential. As such, the isolated occurrence is recommended as ineligible for listing on the CRHR.

P3b. Resource Attributes: AP 16: Isolated Artifact

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolated artifact (primary flake)

P5. Photograph or Drawing: Photolog P15_Helendale_018. Dorsal view of primary flake showing cortex.

P6. Date Constructed/Age and Source: ☒ Prehistoric ☐ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

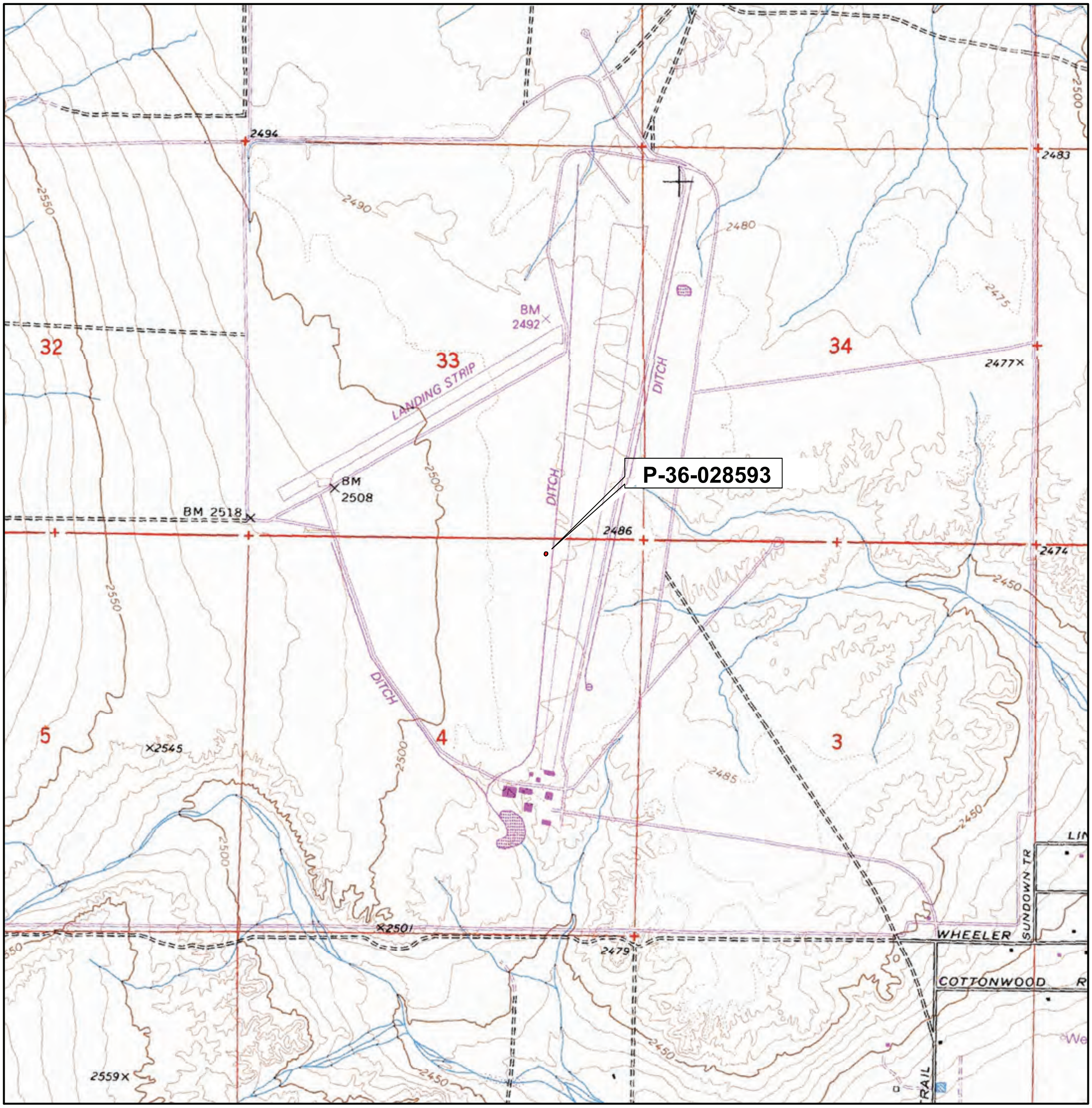
Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

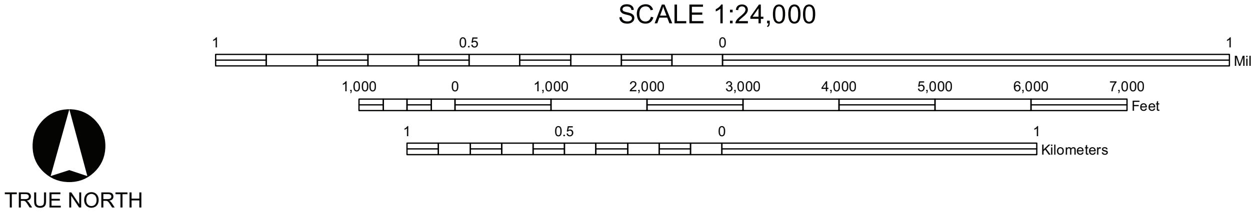
Primary # P-36-028593
HRI#
Trinomial

Page 2 **of** 2 **Resource Name or #:** AE-3168-ISO-01 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028594
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code Reviewer Date

Resource Name or #: Æ-3168-ISO-02

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SE **¼ of** SE **¼ of Sec** 33; **S.B.B.M.**

Elevation: 2,483 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 472654 **mE/** 3853412 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. P-36-028594 is situated approximately 111 m west of the RCS test range.

P3a. Description: -36-028594 consists of a cluster of 15 military ammunition cartridges from a 45 automatic pistol, each of which measures 7/8-inch in length and 3/8-inch in width. Each of the casings is labeled "E/C/43" denoting that the cartridges were produced by Evansville Ordnance Plant (Evansville, Ohio) in 1943. The isolated artifacts are not unique, unusual, rare, or otherwise exceptional. They lack important associations and scientific data potential. As such, the isolated occurrence is recommended as ineligible for listing on the CRHR.

P3b. Resource Attributes: AP 16: Isolated Artifact

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolated historic artifact.

P5. Photograph or Drawing: Photolog P15_Helendale_045. Close-up of military ammunition casings (Æ-3168-ISO-02).

P6. Date Constructed/Age and Source:
☐ Prehistoric ☒ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

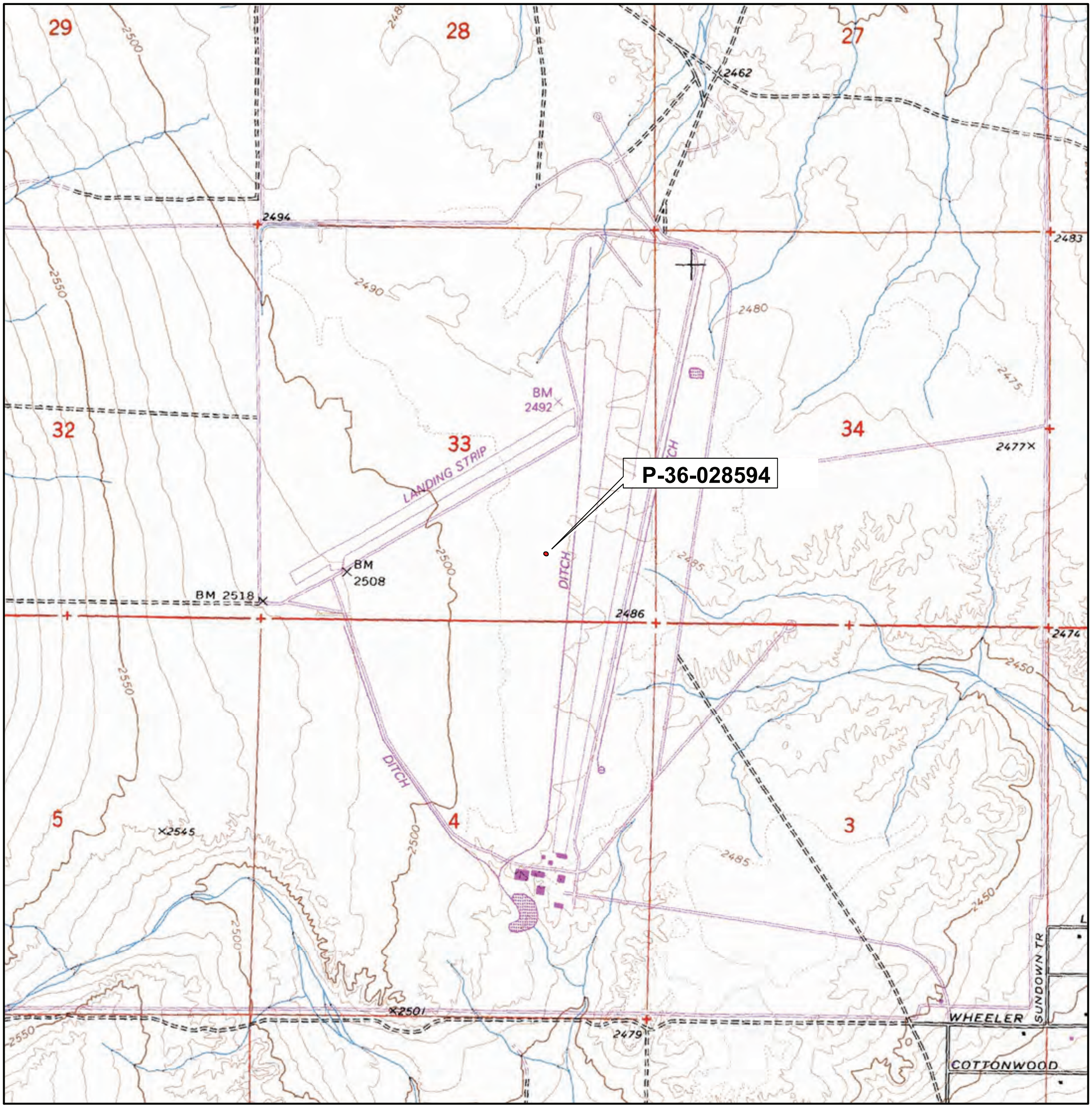
Primary # P-36-028594
HRI#
Trinomial

Resource Name or #: AE-3168-ISO-02

Scale: 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle

Date: 2015



SCALE 1:24,000

Miles, Feet, Kilometers

TRUE NORTH

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**		Primary # P-36-028596 HRI # Trinomial NRHP Status Code
Other Listings Review Code	Reviewer	Date

Resource Name or #: Æ-3168-ISO-04

P1. Other Identifier:

P2. Location: a. County San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** SW **¼ of Sec** 27; **S.B.B.M.**

Elevation: 2,482 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 473205 **mE/** 3854833 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. P-36-028596 is situated approximately 170 m west of the RCS test range.

P3a. Description: P-36-028596 consists of two flaked stone artifacts located on desert pavement. **A1** consists of a core (5.6 x 4.5 x 2.4 cm) made of a white-yellow cryptocrystalline material that has one edge modified. **A2** is a core (4.3 x 2.8 x 1.9 cm) made of a mottled brown and black chalcedony. The two artifacts were located less than 20 cm from one another. The isolated artifacts are not unique, unusual, rare, or otherwise exceptional. They lack important associations and scientific data potential. As such, the isolated occurrence is recommended as ineligible for listing on the CRHR.

P3b. Resource Attributes: AP 16: Isolated Artifact

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolated artifact (two flaked stone artifacts).

P5. Photograph or Drawing: Photolog P15_Helendale_0159. Location of Æ-3168-ISO-4 (denoted with red flagging tape), facing north.

P6. Date Constructed/Age and Source:
☒ Prehistoric ☐ Historic ☐ Both

P7. Owner and Address: Lockheed Martin Helendale RCS Test Facility

P8. Recorded by: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. Date Recorded: May 15, 2015

P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Intensive-level built-environment survey for CEQA compliance purposes

P11. Report Citation: Tiffany Clark and Josh Smallwood (2015) *Cultural Resource Assessment for Lockheed Martin Corporation's Proposed Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California.* Applied Earthworks, Inc., Pasadena, CA.

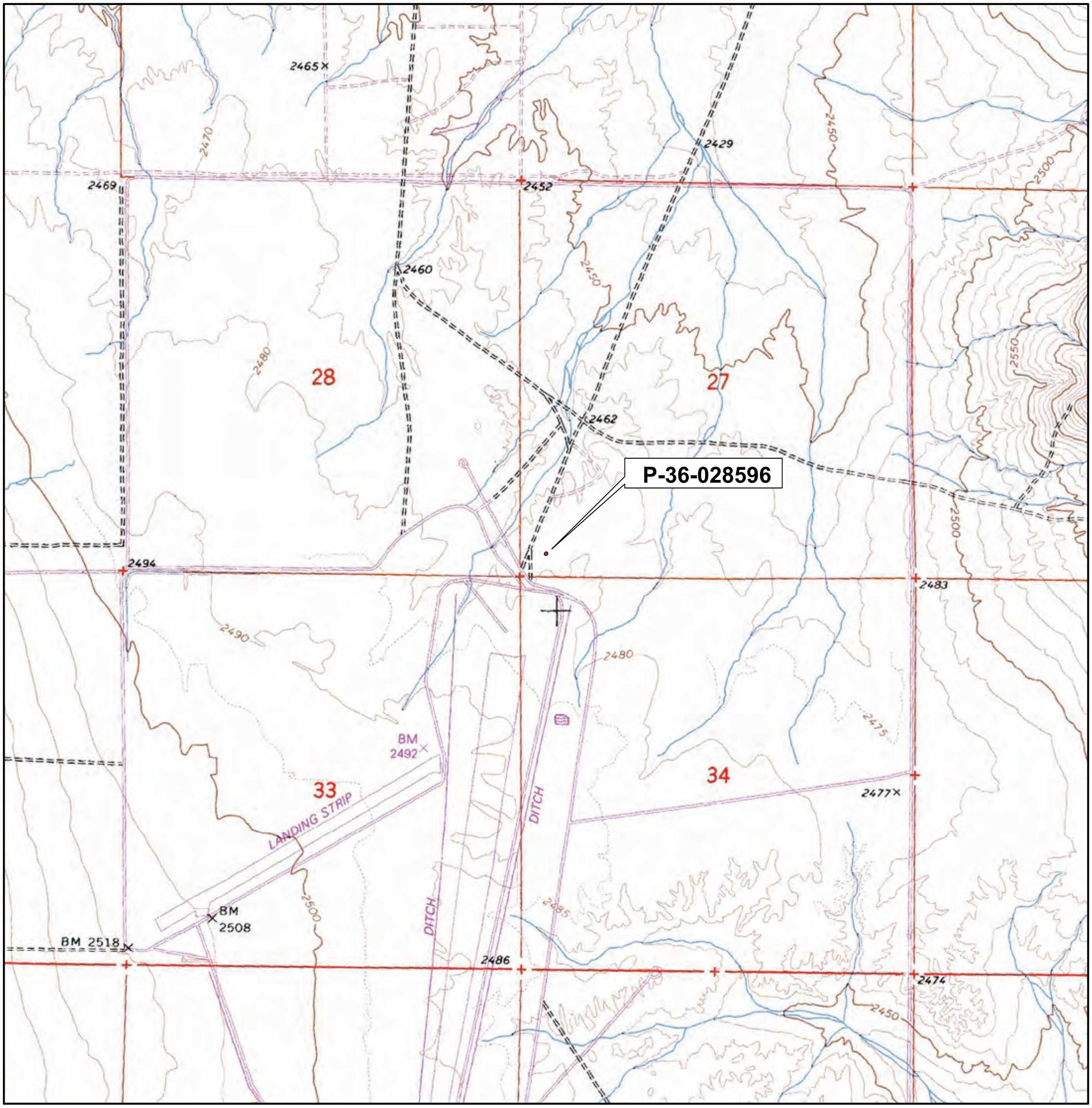
Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

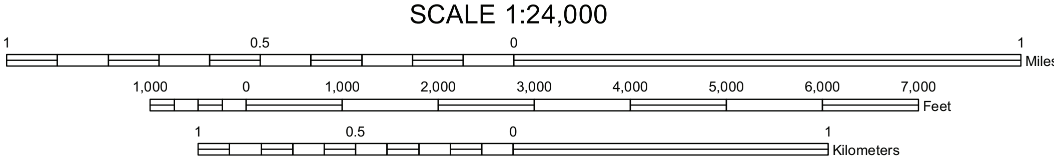
Primary # P-36-028596
HRI#
Trinomial

Page 2 **of** 2 **Resource Name or #:** AE-3168-ISO-04 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000



TRUE NORTH

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-36-028597
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

Resource Name or #: Æ-3168-ISO-06

Page 1 **of** 2

P1. **Other Identifier:**

P2. **Location: a. County** San Bernardino ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad Wild Crossing, CA **Date** 1973, photorevised 1993

T 9 N; **R** 4 W; SW **¼ of** SE **¼ of Sec** 28; **S.B.B.M.**

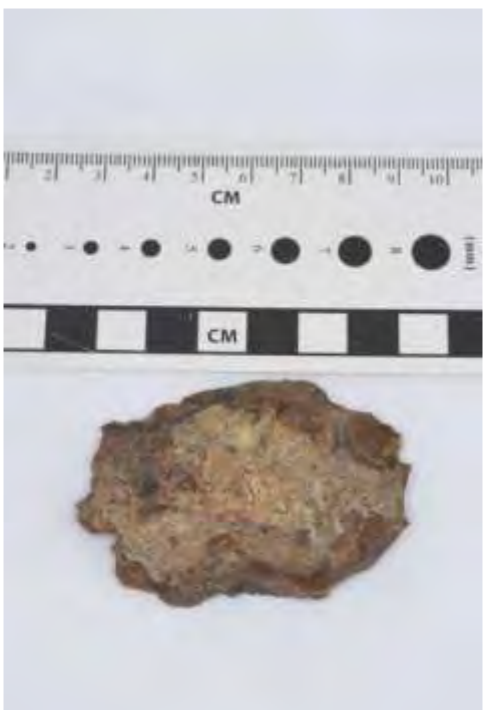
Elevation: 2,489 feet above mean sea level

c. Address: None **City** **Zip**

d. Zone 11; NAD83 472535 **mE/** 3854835 **mN**

e. Other Locational Data: The cultural resource is located six miles northeast of Helendale on Lockheed Martin's Helendale Radar Cross Section (RCS) testing range. The RCS is a high-security facility and pre-registration is required for access. From Helendale, travel northeast on National Trails Highway for 4.57 miles then turn left on Indian Trail. Take Indian Trail 2.7 miles to the gate at Lockheed Martin RCS facility. P-36-028597 is situated approximately 330 m northeast of the RCS test range.

P3a. **Description**: P-36-028597 consists of a single primary flake of mottled brown chalcedony (6.2 x 4.0 x 1.4 cm). One edge of the flaked has been utilized. The isolated artifact is located on desert pavement. The isolated artifact is not unique, unusual, rare, or otherwise exceptional. It lacks important associations and scientific data potential. As such, the isolated occurrence is recommended as ineligible for listing on the CRHR.



P3b. **Resource Attributes**: AP 16: Isolated Artifact

P4. **Resources Present:** ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolated artifact (one primary flake).

P5. **Photograph or Drawing:** Photolog P15_Helendale_0172. Close-up of chalcedony primary flake (Æ-3168-ISO-06).

P6. **Date Constructed/Age and Source:**
☒ Prehistoric ☐ Historic ☐ Both

P7. **Owner and Address:** Lockheed Martin Helendale RCS Test Facility

P8. **Recorded by**: Josh Smallwood, Applied EarthWorks, Inc., 3550 E. Florida Ave., Suite H, Hemet, CA 92544.

P9. **Date Recorded:** May 15, 2015

P10. **Type of Survey:** ☒ Intensive ☐ Reconnaissance ☐ Other
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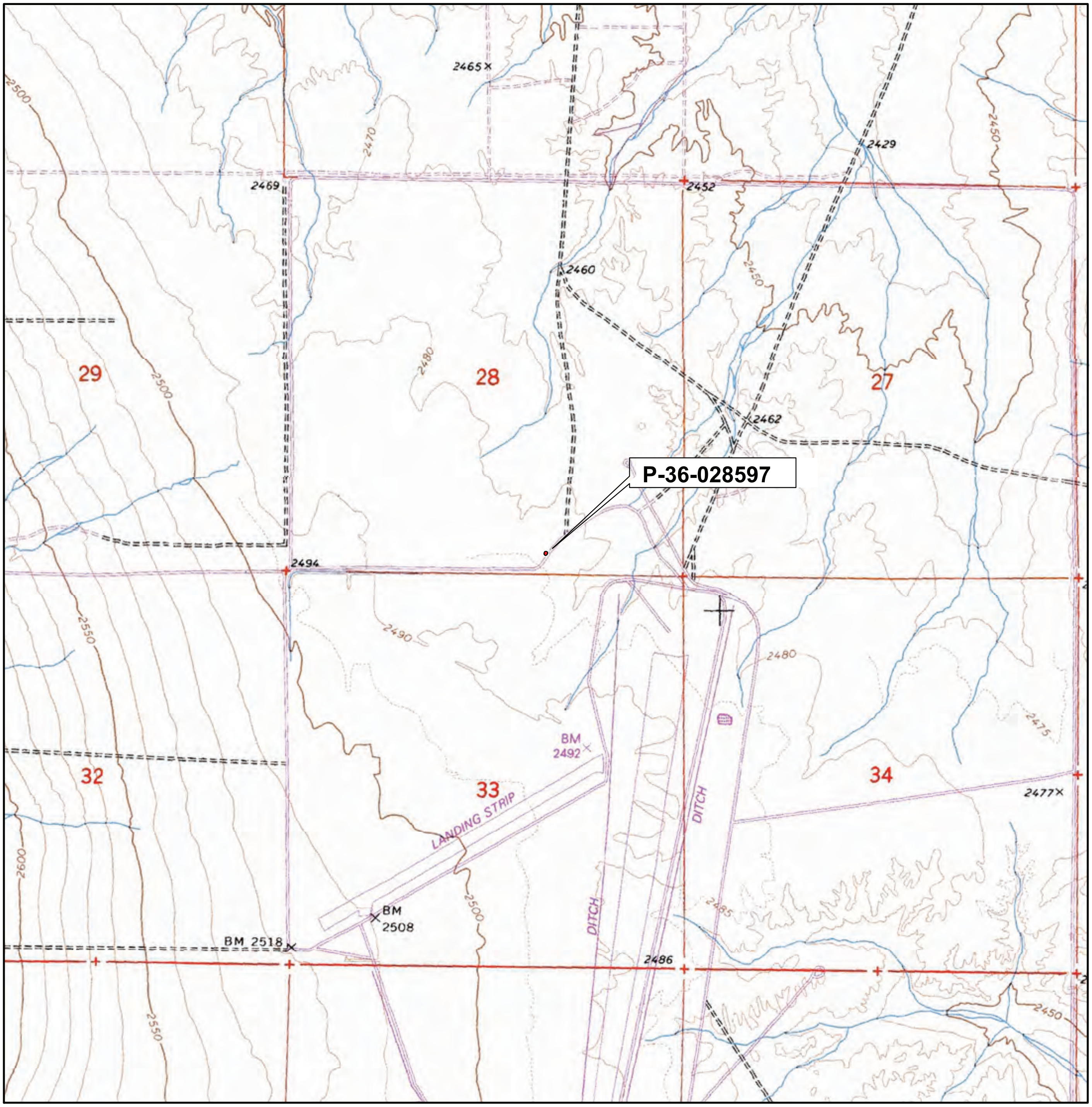
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # P-36-028597
HRI#
Trinomial

Page 2 **of** 2 **Resource Name or #:** AE-3168-ISO-06 **Scale:** 1:24,000

Map Name: Wild Crossing (1973, revised 1993), CA, USGS 7.5' quadrangle **Date:** 2015



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

APPENDIX E GEOTECHNICAL REPORT AND INFILTRATION STUDY

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED WAREHOUSE BUILDING
INDIAN TRAIL NEAR WHEELER ROAD
HELENDALE, CALIFORNIA

PROJECT NO. 112-15020
APRIL 29, 2015

Prepared for:

MR. JOE HODGE
FINE WOOD WORKING BY JOE HODGE
44131 80TH STREET WEST
LANCASTER, CALIFORNIA 93536

Prepared by:

KRAZAN & ASSOCIATES, INC.
GEOTECHNICAL ENGINEERING DIVISION
1100 OLYMPIC DRIVE #103
CORONA, CALIFORNIA 92881
(951) 273-1011

Krazan & ASSOCIATES, INC.
SITE DEVELOPMENT ENGINEERS

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

April 29, 2015

KA No. 112-15020

Mr. Joe Hodge
Fine Wood Working by Joe Hodge
44131 80th Street West
Lancaster, California 93536

RE: Geotechnical Engineering Investigation
Proposed Warehouse Building
Indian Trail near Wheeler Road
Helendale, San Bernardino County, California

Dear Mr. Hodge:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ II
NO. 2698
Expires June 30, 2016
GEOTECHNICAL
STATE OF CALIFORNIA

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

David R. Jarosz, II
Managing Engineer
RCE No. 60185/RGE No. 2698

DRJ:ht

Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

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April 29, 2015

KA Project No. 112-15020

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED WAREHOUSE BUILDING
INDIAN TRAIL NEAR WHEELER ROAD
HELENDALE, SAN BERNARDINO COUNTY, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Warehouse Building to be located at Indian Trail near Wheeler Road in Helendale, San Bernardino County, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, soil cement reactivity, and pavement design.

A site plan showing the approximate boring locations is presented following the text of this report. A description of the field investigation, boring logs and the boring log legend are presented in Appendix A. Appendix A contains a description of laboratory testing phase of this study; along with laboratory test results. Appendices B and C contain guides to earthwork and pavement specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the site, to make geotechnical engineering recommendations for use in design of specific construction elements and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated April 14, 2015 (KA Proposal No. P153-15) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling 3 borings to depths ranging from approximately 10 to 20 feet for evaluation of the subsurface conditions at the project site.
- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.

- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. On a preliminary basis, it is understood the proposed development will include the construction of an approximately 20,000 square foot warehouse building. It is anticipated the building will be a single- or two-story structure utilizing conventional foundations and concrete slab-on-grade construction. Footing loads are anticipated to be light to moderately heavy. The warehouse will be equipped with a 30 ton crane. The site will be raised 10 to 12 feet from existing site grade.

In the event these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION AND SITE DESCRIPTION

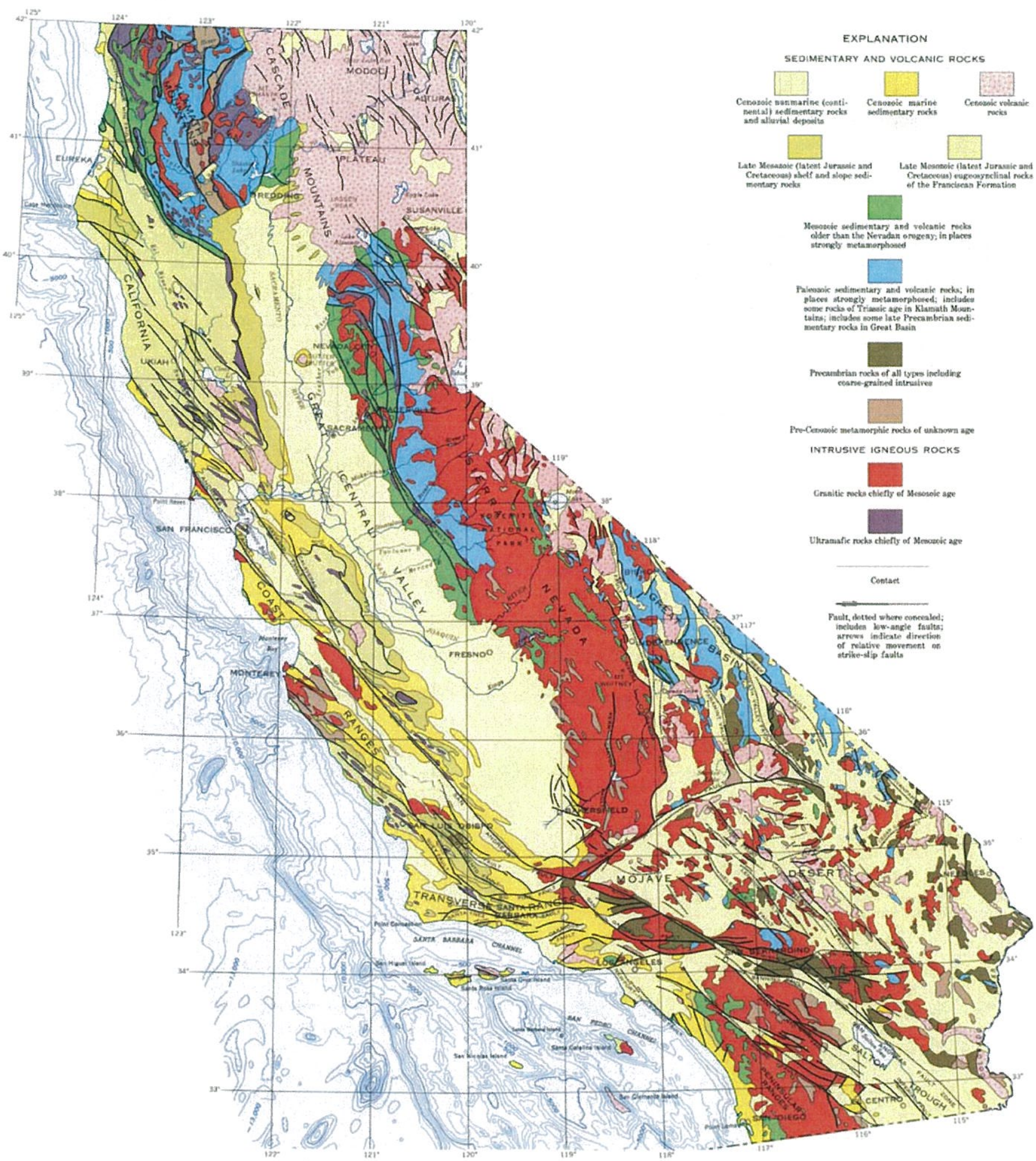
The site is rectangular in shape and encompasses approximately 1 acre. The site is located approximately 0.7 miles north of Wheeler Road and 1.8 miles west of Indian Trail in Helendale, San Bernardino County, California. Existing buildings are located north and west of the site. The remainder of the site is predominately surrounded by access roads and vacant land.

Presently, the site is predominately vacant. The site is covered by a sparse weed and brush growth and the surface soils have a loose consistency. The site is relatively level with gentle slopes toward the north, south, and west.

GEOLOGIC SETTING

The subject site is located near the community of Helendale, which is situated in the southwestern portion of the Mojave Desert Geomorphic Province. The Mojave Desert is bound by the Tehachapi Mountains of the Sierra Nevada Geomorphic Province to the northwest and the San Gabriel and San Bernardino Mountains of the Transverse Range Geomorphic Province to the south and southwest. A major portion of the Mojave Desert is underlain by Mesozoic granitic rocks. Quaternary alluvium and Pleistocene nonmarine sediments cover a majority of the Helendale area.

Both the Tehachapi and the San Gabriel mountain ranges are geologically young mountain ranges and possess active and potentially active fault zones. Numerous moderate to large earthquakes have affected the area of the subject site within historic time. Based on the proximity of several dominant active faults and seismogenic structures, as well as the historic seismic record, the area of the subject site is considered subject to relatively high seismicity. The site under consideration is located in a seismically active area of Southern California. The nearest significant active faults are the Helendale-



GEOLOGIC MAP OF CALIFORNIA

0 50 100 MILES

CALIFORNIA GEOLOGICAL SURVEY

CALIFORNIA CONSERVATION

South Lockhart, Lenwood-Lockhart-Old Woman Springs, Gravel Hills-Harper Lake, Blackwater, and Landers Faults located approximately 2.4, 9.9, 18, 20, and 22 miles from the site. The San Andreas Fault is located about 37 miles southwest of the site.

Geologic Hazards – Fault Rupture Hazard Zones

The Alquist-Priolo Geologic Hazards Zones Act went into affect in March, 1973. Since that time, the act has been amended 10 times (Hart, 1994). The purpose of the Act, as provided in DMG Special Publication 42 (SP 42), is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." The act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones."

A Fault-Rupture Hazard Zone map of the area in consideration has not been prepared to date. No evidence of surface faulting was observed on the property during our reconnaissance.

Geologic Hazards – Seismic Hazard Zones

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers. The area of the subject site is not included on any of the maps released to date. It is not known whether the subject site will be within a seismic hazard zone on a future map.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 3 borings to depths ranging from approximately 10 to 20 feet below existing site grade, using a truck-mounted drill. The approximate boring locations are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency, obtain information regarding the engineering properties of the subsoils and to retain soil samples for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, shear strength, consolidation potential, and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the corrosivity of the soils to buried concrete and metal. Details of the laboratory test program and the results of laboratory test are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the upper soils consisted of approximately 6 to 12 inches of very loose silty sand or silty sand with trace clay. These soils are disturbed, have low strength characteristics, and are highly compressible when saturated.

Beneath the loose surface soils, approximately 3 to 4 feet of loose to dense silty sand, silty sand with clay, or clayey sand were encountered. Field and laboratory tests suggest that these soils are moderately strong and moderately compressible. Penetration resistance ranged from 18 to 46 blows per foot. Dry densities ranged from 122 to 128 pcf. A representative soil sample consolidated approximately 4½ percent under a 2 ksf load when saturated. A representative soil sample had an angle of internal friction of 33 degrees.

Below 4 to 5 feet, predominately very dense silty sand, clayey sand, or silty sand/sand with gravel were encountered. Field and laboratory tests suggest these soils are moderately strong and slightly compressible. Penetration resistance was generally greater than 50 blows per foot. Dry densities ranged from 113 to 124 pcf. These soils had slightly stronger strength characteristics than the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was not encountered. Groundwater within the project site and vicinity is typically encountered at depths greater than 50 feet.

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use and climatic conditions as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

Administrative Summary

In brief, the subject site and soil conditions, with the exception of the moisture-sensitive upper native soils and existing development appear to be conducive to the development of the project. Of primary importance in the development of this site is the removal of the upper moisture sensitive soils from several areas of the proposed development. These soils are moderately to highly compressible and/or collapsible under saturated conditions. Structures within the general vicinity have experienced excessive post-construction settlement when the foundation soils become near-saturated. Accordingly, mitigation measures are recommended to reduce the potential of excessive soil settlement. It is recommended that the upper 4 feet of native soils within the proposed building areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that proposed structural elements within the proposed building areas be supported by a minimum of 2 feet of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond proposed footing lines. Prior to backfilling, the exposed subgrade soils should be scarified to a depth of 6 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted prior to placement of Engineered Fill.

Any buried structures encountered during construction should be properly removed and/or relocated. The resulting excavations should be cleaned to firm native ground and backfilled with Engineered Fill. It is suspected that demolition activities of the existing structures will disturb the upper soils. After demolition activities, it is recommended that these disturbed soils be removed and/or recompacted. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

Sandy and gravelly soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

After completion of the recommended site preparation, the site should be suitable for shallow footing support. The proposed structure footings may be designed utilizing an allowable bearing pressure of 3,500 psf for dead-plus-live loads. Footings should have a minimum embedment of 18 inches.

Groundwater Influence on Structures/Construction

Based on our findings and historical records, it is not anticipated that groundwater will rise within the zone of structural influence or affect the construction of foundations and pavements for the project. However, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, pump, or not respond to densification techniques. Typical remedial measures include discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of vegetation; existing utilities; concrete structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed.

Deeper stripping may be required in localized areas. These materials will not be suitable for use as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Any buried structures encountered during construction should be properly removed and/or relocated. The resulting excavations should be backfilled with Engineered Fill. Excavations, depressions, or soft and pliant areas extending below planned finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

The upper on-site native soils are moderately to highly compressible and/or collapsible under saturated conditions. Accordingly, mitigation measures are recommended to reduce the potential of excessive soil settlement. It is recommended that following stripping operations and demolition activities, the upper 4 feet of native soils within the proposed building areas be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. In addition, it is recommended that proposed structural elements within the proposed building areas be supported by a minimum of 24 inches of Engineered Fill. Over-excavation should extend to a minimum of 5 feet beyond proposed footing lines. The exposed subgrade soils should be scarified to a depth of 6 inches, moisture-conditioned to a minimum of 2 percent above optimum moisture-content, and recompacted prior to placement of Engineered Fill.

Within proposed pavement and exterior flatwork areas following stripping operations, it is recommended that at a minimum, the upper 12 inches of exposed subgrade soil be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture-content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service as acceptance of earthwork construction is dependent upon compaction of the material and the stability of the material. The Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

Engineered Fill

The organic-free, on-site, upper soils are predominately silty sand, silty sand with clay and clayey sand. The clayey soils will not be suitable for reuse for fill placement within the upper 18 inches of slab-on-grade and exterior flatwork areas. These clayey soils will be suitable for reuse as General Engineered Fill, within pavement areas and below 18 inches from finished pad grade in building areas, provided they are cleansed of excessive organics and debris and are moisture-conditioned to at least 2 percent above optimum moisture. The on-site silty sand and sandy silt soils that do not contain clay will be suitable for reuse as Engineered Fill, provided they are cleansed of excessive organics and debris.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported non-expansive Fill should consist of a well-graded, slightly cohesive, fine silty sand or sandy silt, with relatively impervious characteristics when compacted. This material should be approved by the Soils Engineer prior to use and should typically possess the following characteristics.

Percent Passing No. 200 Sieve	20 to 50
Plasticity Index	10 maximum
UBC Standard 29-2 Expansion Index	15 maximum

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned as necessary, and compacted to achieve at least 90 percent of maximum density based on ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable

Drainage and Landscaping

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804 of the 2013 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 1 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practice following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be minimized and cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

Sandy soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavations. Shoring or sloping back trench sidewalls may be required within these sandy soils.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Utility trench backfill placed in pavement areas should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

The Contractor is responsible for removing all water sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Foundations

After completion of the recommended site preparation, the site should be suitable for shallow footing support. The proposed structures may be supported on a shallow foundation system bearing on a minimum of 24 inches of Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	2,625 psf
Dead-Plus-Live Load	3,500 psf
Total Load, including wind or seismic loads	4,650 psf

The footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches, regardless of load.

The footing excavations should not be allowed to dry out any time prior to pouring concrete. It is recommended that footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom.

The total settlement is not expected to exceed 1 inch. Differential settlement should be less than ½ inch. Most of the settlement is expected to occur during construction as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.35 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 300 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the above value may be used for short duration, wind, or seismic loads.

Floor Slabs and Exterior Flatwork

In areas that will utilize moisture-sensitive floor coverings, concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with accepted engineering practice. The water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 3 inches of compacted, clean, gravel of ¾-inch maximum size. To aid in concrete curing an optional 2 to 4 inches of granular fill may be placed on top of the vapor retarder. The granular fill should consist of damp clean sand with at least 10 to 30 percent of the sand passing the 100 sieve. The sand should be free of clay, silt, or organic material. Rock dust which is manufactured sand from rock crushing operations is typically suitable for the granular fill. This granular fill material should be compacted.

It is recommended that the concrete slabs be reinforced at a minimum with #3 bars at 18 inches on center to reduce crack separation and possible vertical offset at the cracks. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. All fills required to bring the building pads to grade should be Engineered Fills.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To reduce moisture vapor intrusion, it is recommended that a vapor retarder be installed. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to minimize the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 40 pounds per square foot per foot of depth. Walls incapable of this deflection or are fully constrained walls against deflection may be designed for an equivalent fluid at-rest pressure of 60 pounds per square foot per foot of depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1, horizontal to vertical, or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers", vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

Seismic Parameters – 2013 California Building Code

The Site Class per Section 1613 of the 2013 California Building Code (2013 CBC) and Table 20.3-1 of ASCE 7-10 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2013 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.3.2
Site Coefficient F_a	1.019	Table 1613.3.3 (1)
S_s	1.203	Section 1613.3.1
S_{MS}	1.226	Section 1613.3.3
S_{DS}	0.817	Section 1613.3.4
Site Coefficient F_v	1.518	Table 1613.3.3 (2)
S_1	0.482	Section 1613.3.1
S_{M1}	0.732	Section 1613.3.3
S_{D1}	0.488	Section 1613.3.4

Soil Cement Reactivity

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. HUD/FHA and UBC have developed criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

Soil samples were obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentrations detected in these soil samples were greater than 150 ppm and are above the maximum allowable values established by HUD/FHA and UBC. Therefore, it is recommended that a Type II cement be utilized to compensate for sulfate reactivity with the cement.

Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

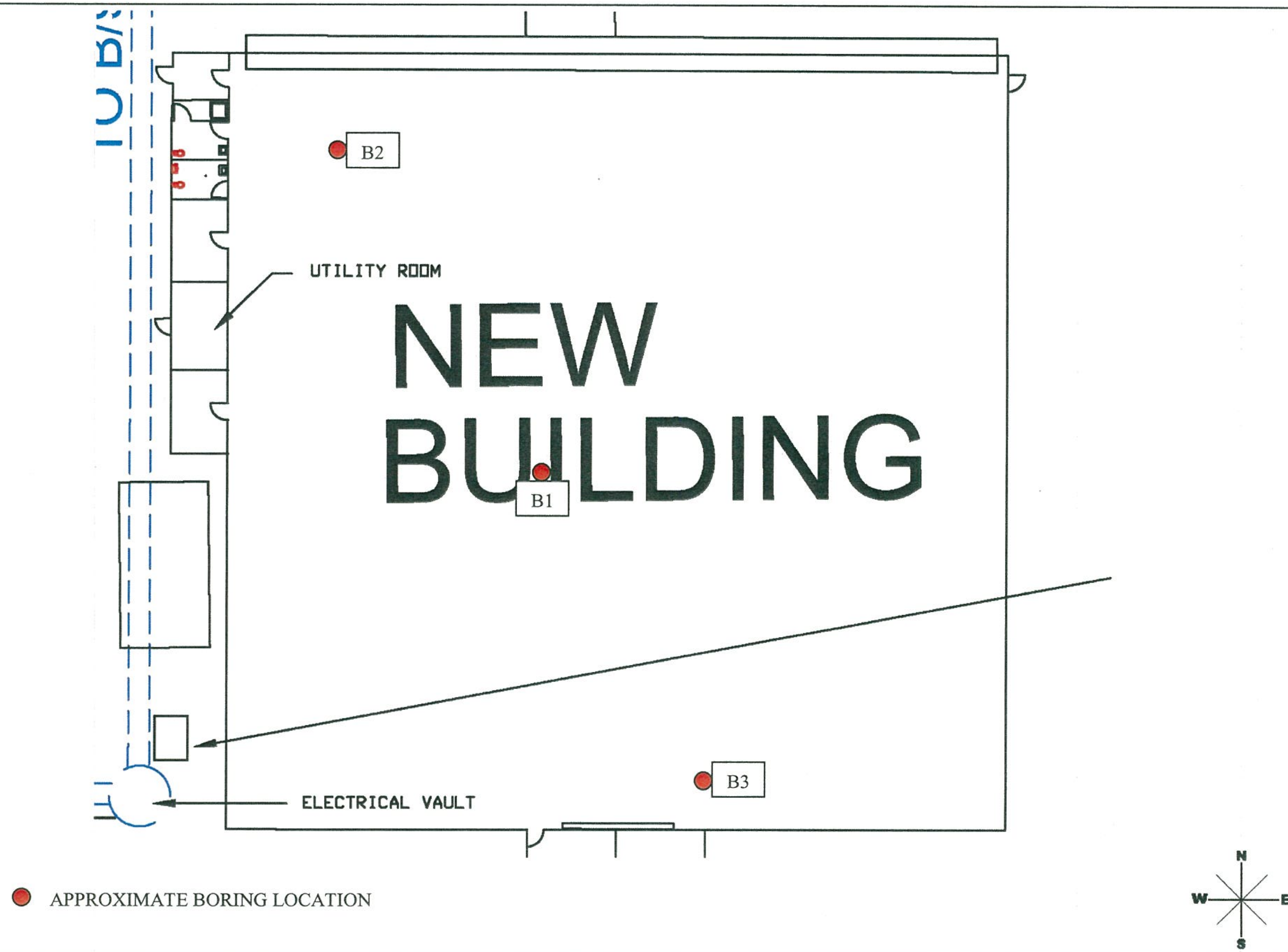
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Steve Nelson
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
DAVID R. JAROSZ II
NO. 2698
Expires June 30, 2016
GEOTECHNICAL
STATE OF CALIFORNIA

David R. Jarosz II
Managing Engineer
RCE No. 60185/RGE No. 2698

SN/DRJ:ht



SITE MAP	Scale: NTS	Date: April 2015	Krazan GEOTECHNICAL ENGINEERING
Warehouse Building Indian Trail Palmdale, California	Drawn by: HT	Approved by: DJ	
	Project No. 112-15020	Figure No. 1	

Log of Borings
&
Laboratory Testing

Appendix A

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Three 4½-inch exploratory borings were advanced. The boring locations are shown on the site plan.

The soils encountered were logged in the field during the exploration and, with supplementary laboratory test data, are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests and standard penetration tests were performed at selected depths. This test represents the resistance to driving a 2½-inch and 1½-inch diameter core barrel, respectively. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. The modified standard penetration tests are identified in the sample type on the boring logs with a full shaded in block. The standard penetration tests are identified in the sample type on the boring logs with the central portion of the block shaded. All samples were returned to our Clovis laboratory for evaluation.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In-situ moisture content, dry density, consolidation, direct shear, and sieve analysis tests were completed for the undisturbed samples representative of the subsurface material. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

The logs of the exploratory borings and laboratory determinations are presented in this Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
	Clean Gravels (Less than 5% fines)	
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
	Clean Sands (Less than 5% fines)	
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

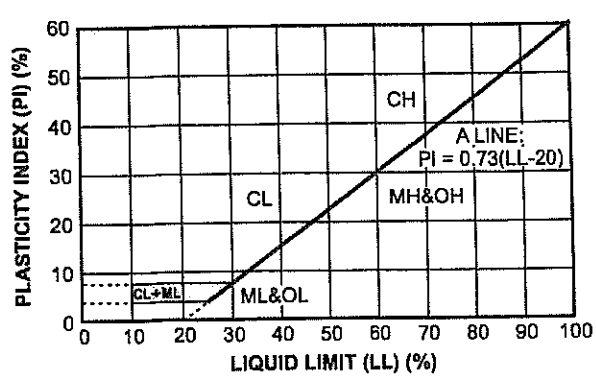
CONSISTENCY CLASSIFICATION

Description	Blows per Foot
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.042
Fine-grained	No. 40 to No. 200	0.042 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART

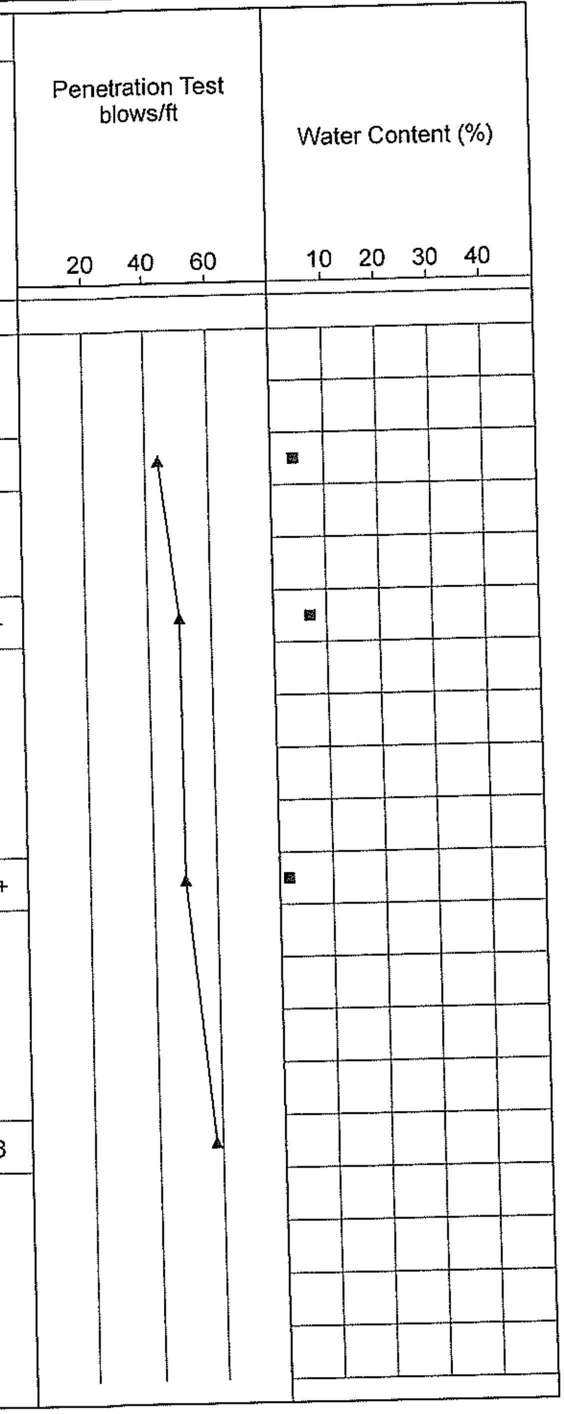


Log of Boring B1

Project: Warehouse Building
Client: Fine Wood Working by Joe Hodge
Location: Indian Trail, Palmdale, CA
Depth to Water> **Initial:** None

Project No: 112-15020
Figure No.: A-1
Logged By: Dave Adams
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0–3.5		***SILTY SAND (SM)*** Very loose, fine- to medium-grained with trace CLAY; brown, damp, drills easily. Dense with interbeds of CLAYEY SAND below 2 feet	128.5	4.3		44
3.5–8.5		***CLAYEY SAND (SC)*** Very dense, fine- to medium-grained; brown, damp, drills easily	113.8	7.0		50+
8.5–20		***SILTY SAND/SAND (SM/SP)*** Very dense, fine- to coarse-grained with trace GRAVEL; gray, damp, drills easily	124.9	1.9		50+
15		Dense below 15 feet				58
20						



Drill Method: Solid Flight
Drill Rig: CME 45C-3
Driller: Jim Watts

Krazan and Associates

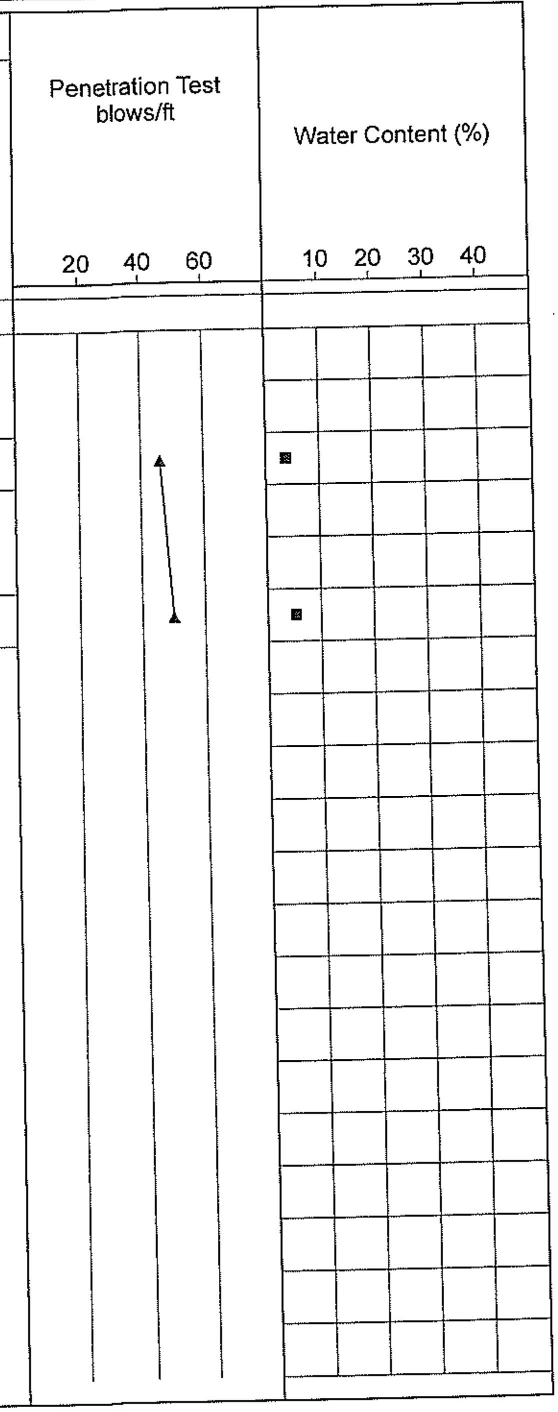
Drill Date: 4-15-15
Hole Size: 4½ Inches
Elevation: 20 Feet
Sheet: 1 of 1

Log of Boring B2

Project: Warehouse Building
Client: Fine Wood Working by Joe Hodge
Location: Indian Trail, Palmdale, CA
Depth to Water> **Initial:** None

Project No: 112-15020
Figure No.: A-2
Logged By: Dave Adams
At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0–1.5		***SILTY SAND (SM)*** Very loose, fine- to medium-grained with trace CLAY; brown, damp, drills easily. Loose below 12 inches				
1.5–4.5		***CLAYEY SAND (SC)*** Dense, fine- to medium-grained; reddish-brown, damp, drills easily		3.9		46
4.5–10		***SILTY SAND (SM)*** Very dense, fine- to medium-grained; brown, damp, drills easily		5.3		50+
10		End of Borehole				



Drill Method: Solid Flight
Drill Rig: CME 45C-3
Driller: Jim Watts

Krazan and Associates

Drill Date: 4-15-15
Hole Size: 4½ Inches
Elevation: 10 Feet
Sheet: 1 of 1

Log of Boring B3

Project: Warehouse Building

Client: Fine Wood Working by Joe Hodge

Location: Indian Trail, Palmdale, CA

Depth to Water> **Initial:** None

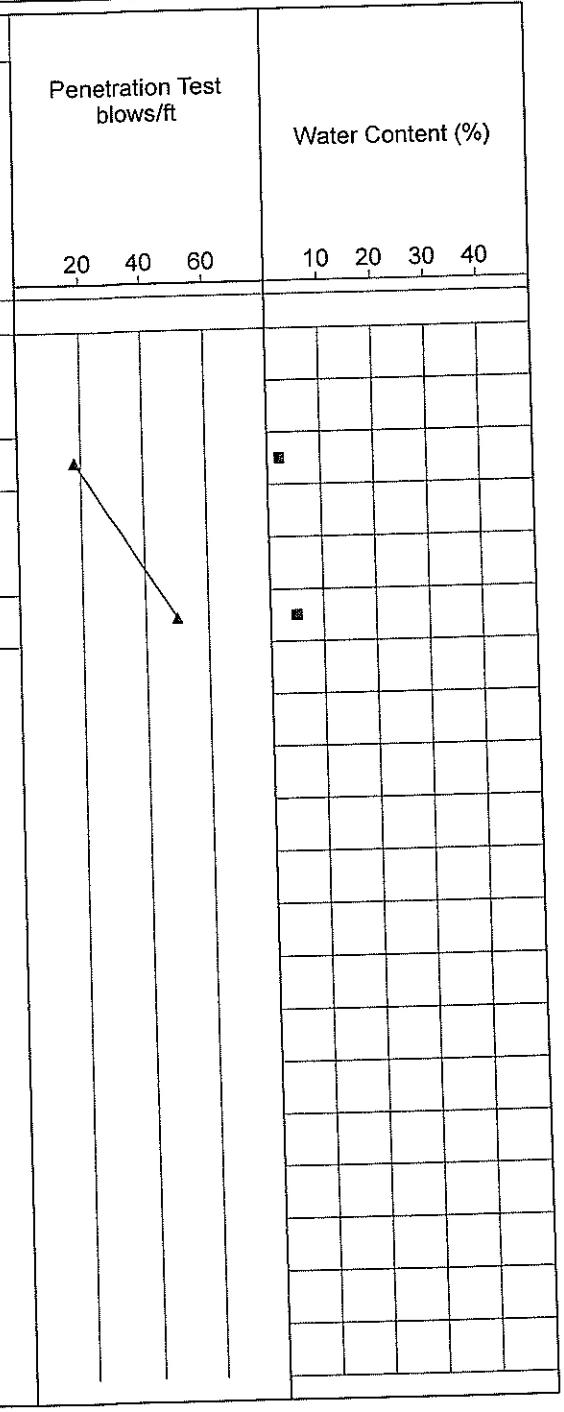
Project No: 112-15020

Figure No.: A-3

Logged By: Dave Adams

At Completion: None

SUBSURFACE PROFILE			SAMPLE			
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0–4		***SILTY SAND (SM)*** Very loose, fine- to medium-grained with trace CLAY and GRAVEL; brown, damp, drills easily Loose below 12 inches Medium dense below 2 feet				
2			122.2	2.4		18
4–10		***CLAYEY SAND (SC)*** Very dense, fine- to medium-grained; reddish-brown, damp, drills easily				
5				5.1		50+
10		End of Borehole				



Drill Method: Solid Flight

Drill Rig: CME 45C-3

Driller: Jim Watts

Krazan and Associates

Drill Date: 4-15-15

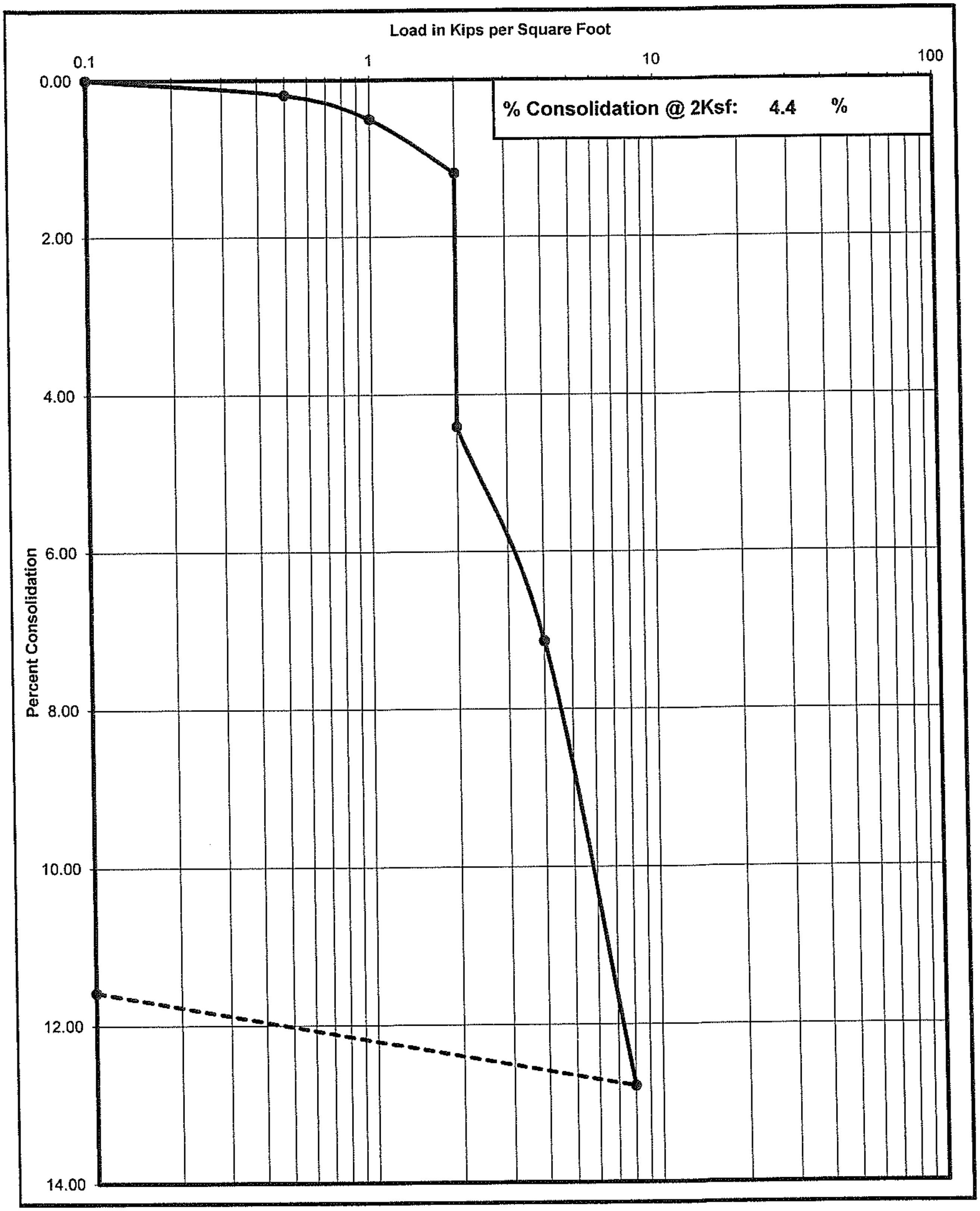
Hole Size: 4½ Inches

Elevation: 10 Feet

Sheet: 1 of 1

Consolidation Test

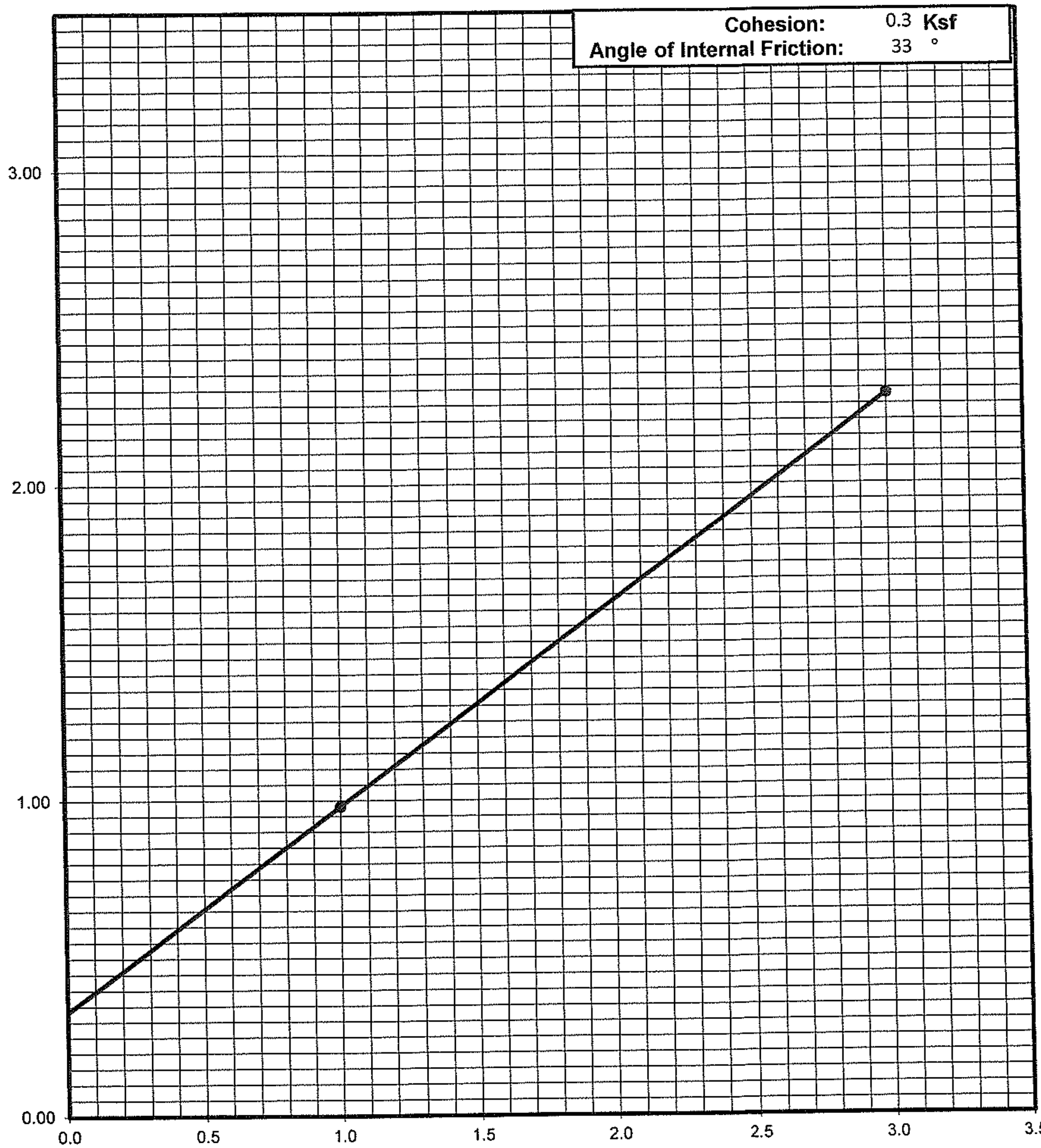
Project No	Boring No. & Depth	Date	Soil Classification
112-15020	B3 @ 2-3'	4/27/2015	SM w/ grvl



Krazan Testing Laboratory

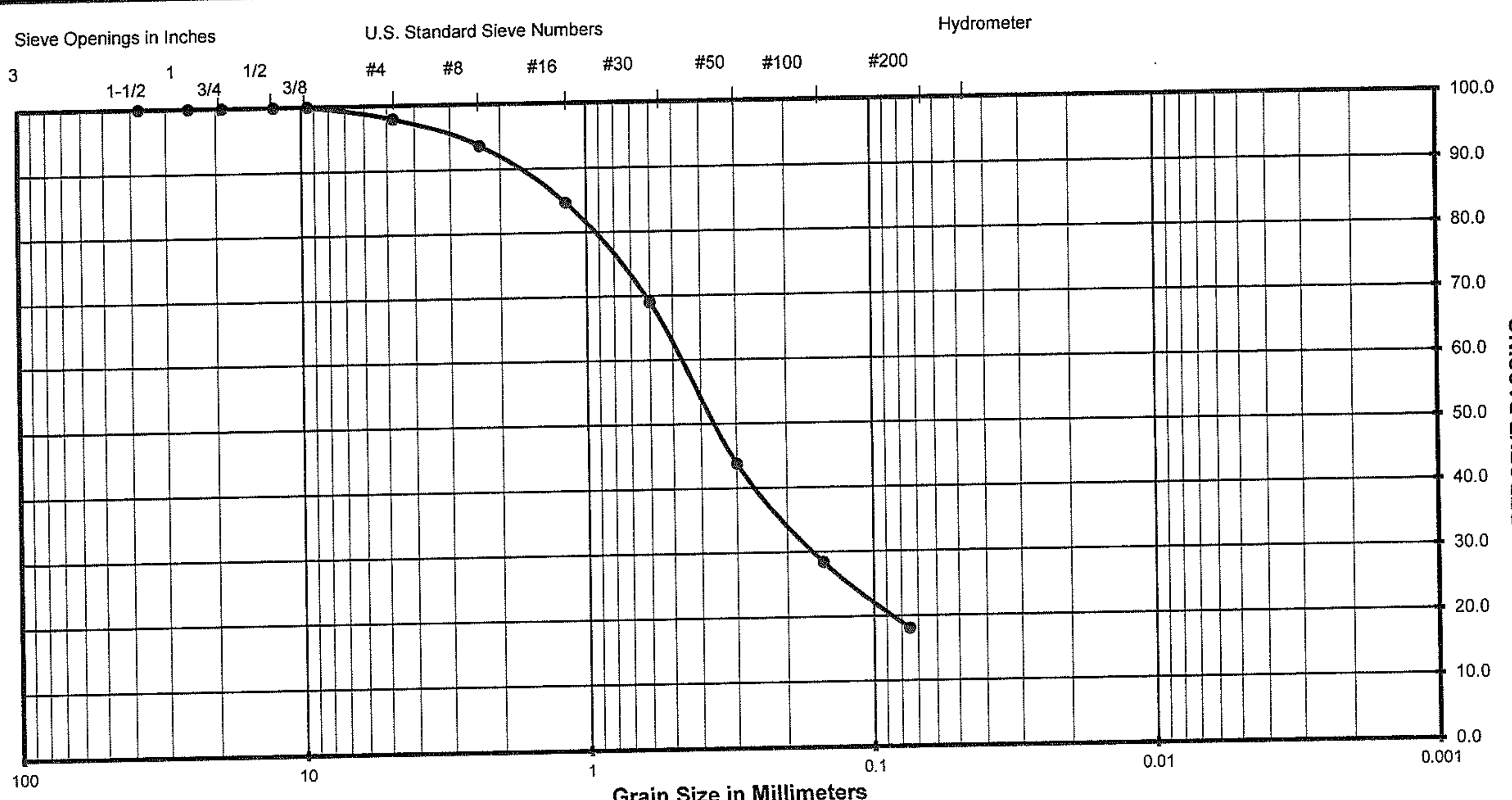
Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
112-15020	B1 @ 2-3'	SC	4/27/2015



Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Warehouse Building
Project Number	112-15020
Soil Classification	SM w/ grvl
Sample Number	B3 @ 2-3'

Krazan Testing Laboratory

General Earthwork Specifications

Appendix B

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less than 90 percent relative compaction based on ASTM Test Method D1557 or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contract documents for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious or otherwise unsuitable. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 90 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 90 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any of the fill material.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill areas shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

General Paving Specifications

Appendix C

APPENDIX C

PAVEMENT SPECIFICATIONS

1. **DEFINITIONS** - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the 2010 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. **SCOPE OF WORK** - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically noted as "Work Not Included."

3. **PREPARATION OF THE SUBGRADE** - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. **UNTREATED AGGREGATE BASE** - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent.

5. **AGGREGATE SUBBASE** - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading and shall conform to the requirements set forth in Section 39 of the 2010 Standard Specifications. The drying, proportioning and mixing of the materials shall conform to Section 39 of the 2010 Standard Specifications, as well.

The prime coat, spreading and compacting equipment and spreading and compacting mixture shall conform to the applicable chapters of Section 39 of the 2010 Standard Specifications, with the exception that no surface course shall be placed when the atmospheric temperature is below 50° F. The surfacing shall be rolled with a combination of steel wheel and pneumatic rollers, as described in Section 39-6 of the 2010 Standard Specifications. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.

Krazan & ASOCIATES, INC.
GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

August 28, 2019 KA Project No. 112-19078

Mr. Jim Fielden
Fielden Engineering Group
410 E. Avenue K-12, Suite 101
Lancaster, CA 93535

RE: Update to Geotechnical Engineering Investigation Report
Proposed Light Industrial Facility
Indian Trail
Helendale, California 92342

Reference: Geotechnical Engineering Investigation, Proposed Warehouse Building, Indian Trail Near Wheeler Road, Helendale, California, Project No. 112-15020, dated April 29, 2015.

Dear Mr. Fielden:

In accordance with your request, we are providing this letter to update our previous Geotechnical Engineering Investigation report, KA Project No. 112-15020, dated April 29, 2015 for the above-referenced project site.

Based on our review of the proposed site plan and our discussions with the project representative, we understand that the proposed development includes construction of a new light industrial facility at the subject site located in Helendale, California. It is understood that the proposed structures will be of wood, metal or masonry construction supported on conventional shallow foundation systems.

Based on our recent observation of the subject site, review of the previous geotechnical investigation report, and review of the proposed preliminary development site plan, the site and proposed development are consistent with the conclusions and recommendations presented in the previous Geotechnical Engineering Investigation report. Additional information to conform to seismic design requirements of the 2016 California Building Code (2016 CBC) is provided below.

In the event these structural or grading details are inconsistent with the final design criteria, we should be notified so that we can evaluate the potential impacts of the changes on the recommendations presented in this report and provide an updated report as necessary.

The site class, per Table 1613.5.2, 2016 CBC, is based upon the site soil conditions. It is our opinion that a Site Class D is appropriate for building design at this site. For seismic design of the structures, in accordance with the seismic provisions of the 2016 CBC, we recommend the following parameters:

2016 CALIFORNIA BUILDING CODE		
Seismic Item	**Value**	**CBC Reference**
Site Class	D	Table 1613.5.2
Fa	1.019	Table 1613.5.3 (1)
Ss	1.203	Figure 1613.5 (3)
SMS	1.226	Section 1613.5.3
SDS	0.817	Section 1613.5.4
Fv	1.518	Table 1613.5.3 (2)
S1	0.482	Figure 1613.5 (4)
SM1	0.732	Section 1613.5.3
SD1	0.488	Section 1613.5.4

The recommendations and limitations provided in our Geotechnical Engineering Investigation report, KA Project No. 112-15020 apply to this letter and should be incorporated into the design and construction of the proposed development.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

James Kellogg PE, GE
Managing Engineer
RGE No. 2902/RCE No. 65092

REGISTERED PROFESSIONAL ENGINEER
JAMES M. KELLOGG
NO. 65092
EXP. 9/30/2019
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
JAMES M. KELLOGG
NO. 2902
EXP. 9/30/2019
GEOTECHNICAL
STATE OF CALIFORNIA

August 28, 2019 KA No. 112-19078

Mr. Jim Fielden
Fielden Engineering Group
410 E. Avenue K-12, Suite 101
Lancaster, California 93535

RE: Results of Infiltration Testing
Proposed Light Industrial Facility
Indian Trail
Helendale, CA

Dear Mr. Fielden:

In accordance with your request and authorization we have performed infiltration testing at the subject site. The infiltration testing was performed at two locations within the proposed infiltration areas located at the subject site. The approximate test locations are identified on the attached site plan. In order to perform these tests, two (2) borings were drilled to depths of approximately five and ten feet below existing site grades. Infiltration testing has been performed at each of the boring locations. Infiltration testing has been performed using open borehole percolation testing. The infiltration rates have been calculated using the Inverse Borehole procedures.

In accordance with the County of San Bernardino Technical Guidance Document for Water Quality Management, the estimated infiltration rates were determined using the results of open borehole percolation testing at two locations at the subject site. The infiltration rates have been calculated using the Inverse Borehole procedures. Prior to infiltration testing, approximately four inches of gravel was placed at the bottom of each borehole. The borehole was pre-soaked prior to testing using clean water. The depth of the borehole was measured at each reading to verify the overall depth. The depth of water in the borehole was measured using a water level indicator or well sounder.

Infiltration Test Results

In accordance with the County of San Bernardino Technical Guidance Document for Water Quality Management, the estimated infiltration rates were determined using the results of open borehole percolation testing at two locations at the subject site. The infiltration rates have been calculated using the Inverse Borehole procedures.

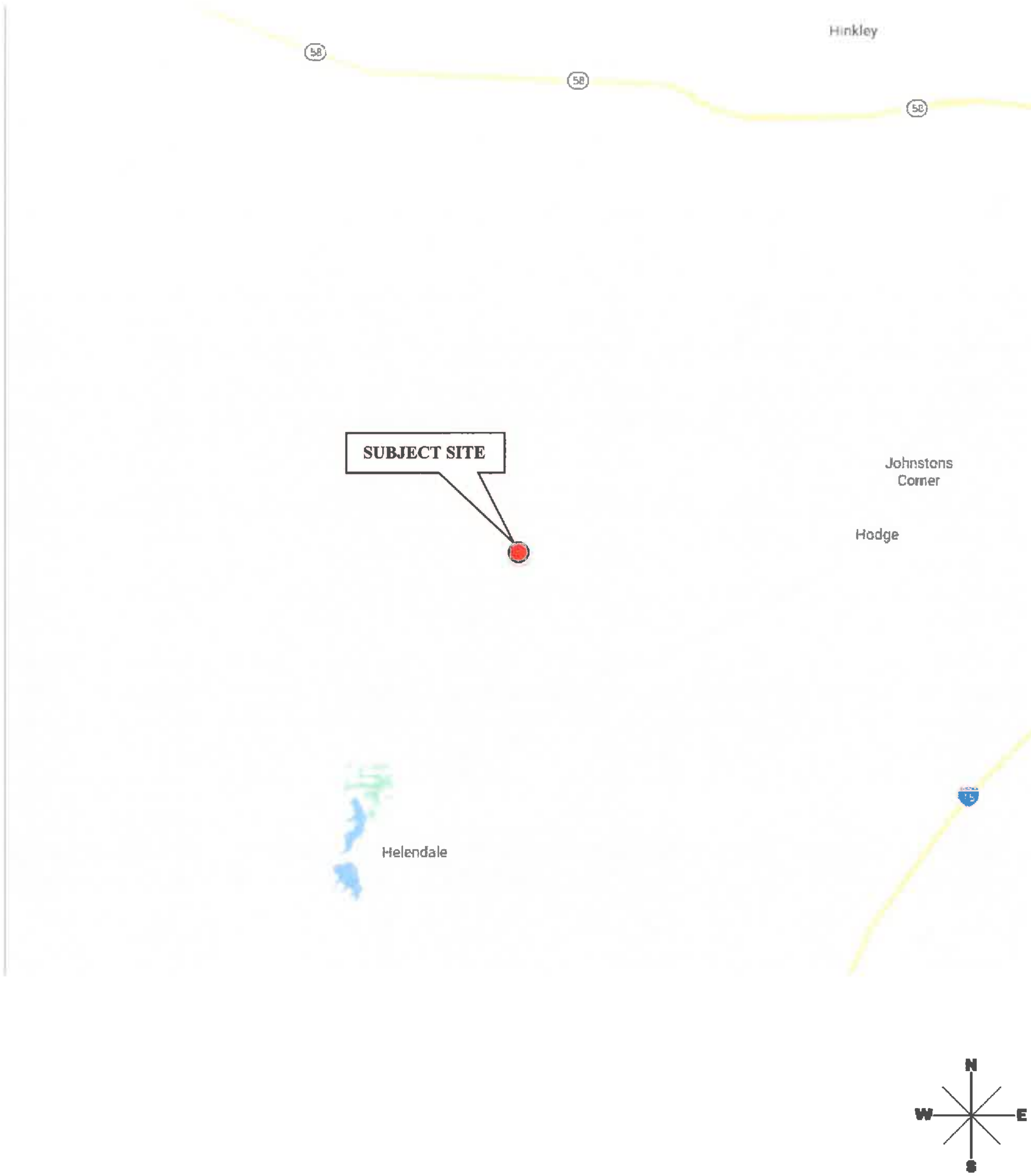
The infiltration rates at the end of the tests indicated infiltration rates of approximately 1.22 and 1.64 inches per hour at depth of approximately 10 feet and 5 feet below site grade, respectively. Detailed results of the infiltration testing are included as an attachment to this report. The soil infiltration rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the infiltration system to compensate for these factors as determined appropriate by the designer. In addition, routine maintenance consisting of clearing the system of clogged soils and debris should be expected.

If there are any questions or if we can be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

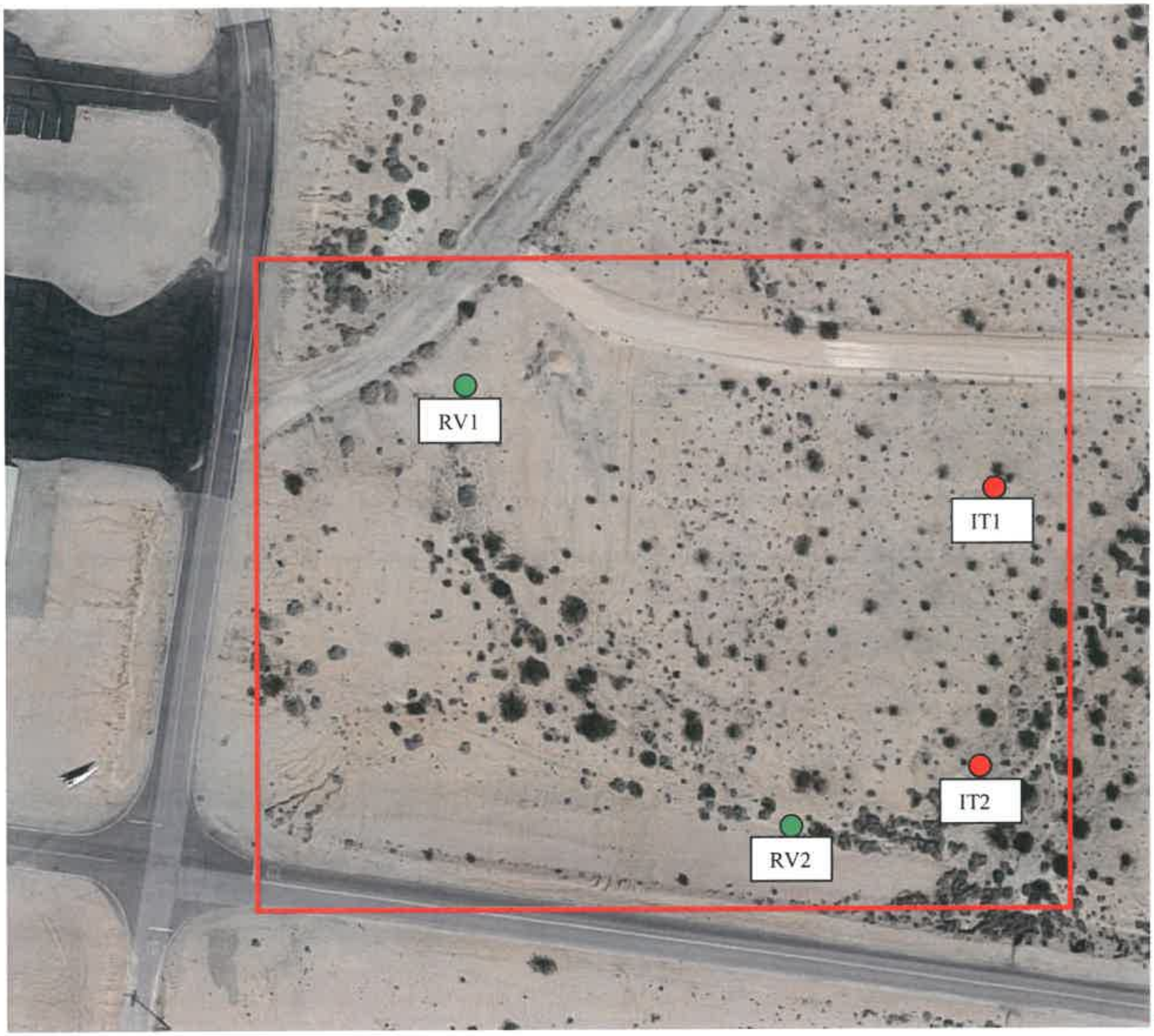
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

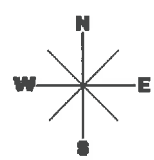
James M. Kellogg, PE, GE
Managing Engineer
RCE No. 65092, GE No. 2902

Attachment: Infiltration Test Results



VICINITY MAP	**Scale:** NTS	**Date:** August, 2019	**Krazan** GEOTECHNICAL ENGINEERING
PROPOSED LIGHT INDUSTRIAL FACILITY INDIAN TRAIL HELENDALE, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-19078	**Figure No.** 1	





🔴 APPROXIMATE INFILTRATION TESTING LOCATION

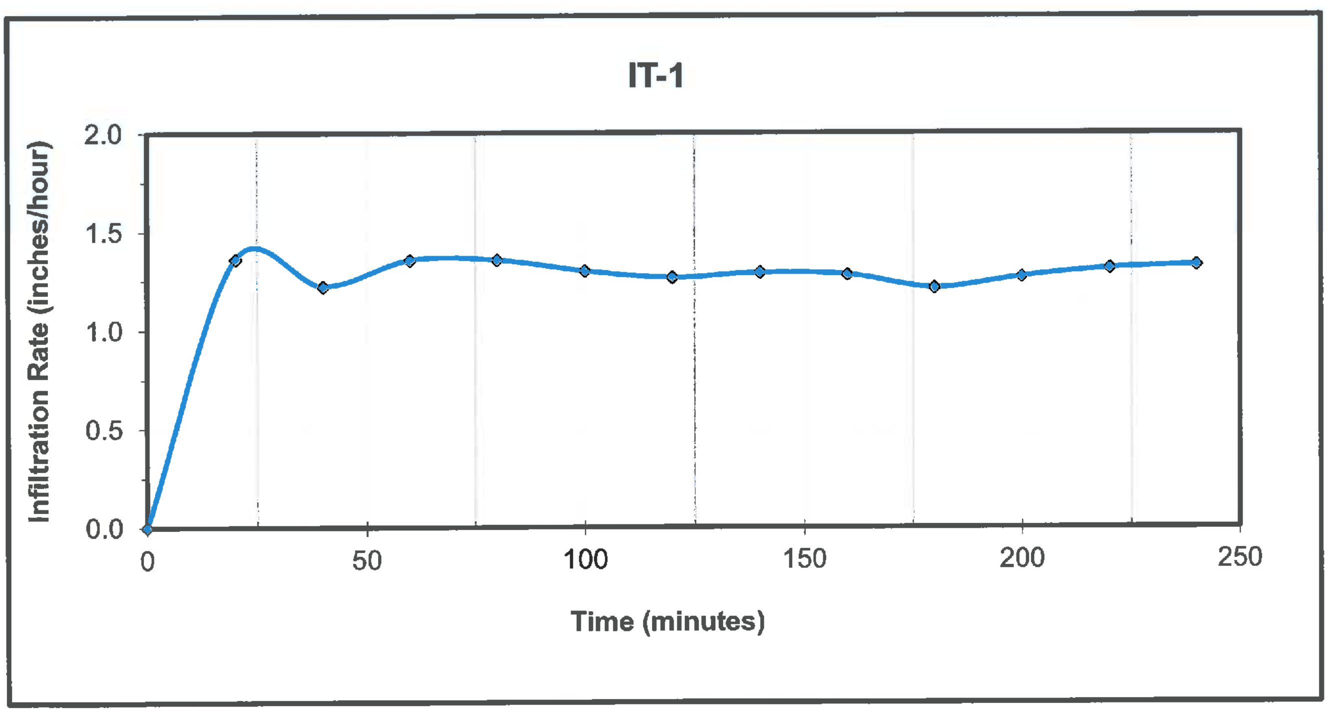
🟢 APPROXIMATE R-VALUE LOCATION

SITE MAP	**Scale:** NTS	**Date:** August, 2019	Krazan GEOTECHNICAL ENGINEERING
PROPOSED LIGHT INDUSTRIAL FACILITY INDIAN TRAIL HELENDALE, CALIFORNIA	**Drawn by:** JP	**Approved by:** JK	
	Project No. 112-19078	**Figure No.** 2	

RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**11219078**				**Date**	**8/28/2019**
Project Name	Light Industrial Facility					
Project Address	Helendale, CA					
Test No:	IT-1	**Total Depth (in.)**		120	**Test Size (in)**	9
Depth To Water	>50'	**Soil Classification**		SM		

Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		6.0	--	--
1	20.00	20.00	6.0	24.0	18.00	1.36
2	40.00	20.00	24.0	38.0	14.00	1.22
3	60.00	20.00	38.0	51.0	13.00	1.36
4	80.00	20.00	51.0	62.0	11.00	1.36
5	100.00	20.00	62.0	71.0	9.00	1.30
6	120.00	20.00	71.0	78.5	7.50	1.27
7	140.00	20.00	78.5	85.0	6.50	1.29
8	160.00	20.00	85.0	90.5	5.50	1.28
9	180.00	20.00	90.5	95.0	4.50	1.22
10	200.00	20.00	95.0	99.0	4.00	1.27
11	220.00	20.00	99.0	102.5	3.50	1.31
12	240.00	20.00	102.5	105.5	3.00	1.33
	Infiltration Rate in Inches per Hour					1.22

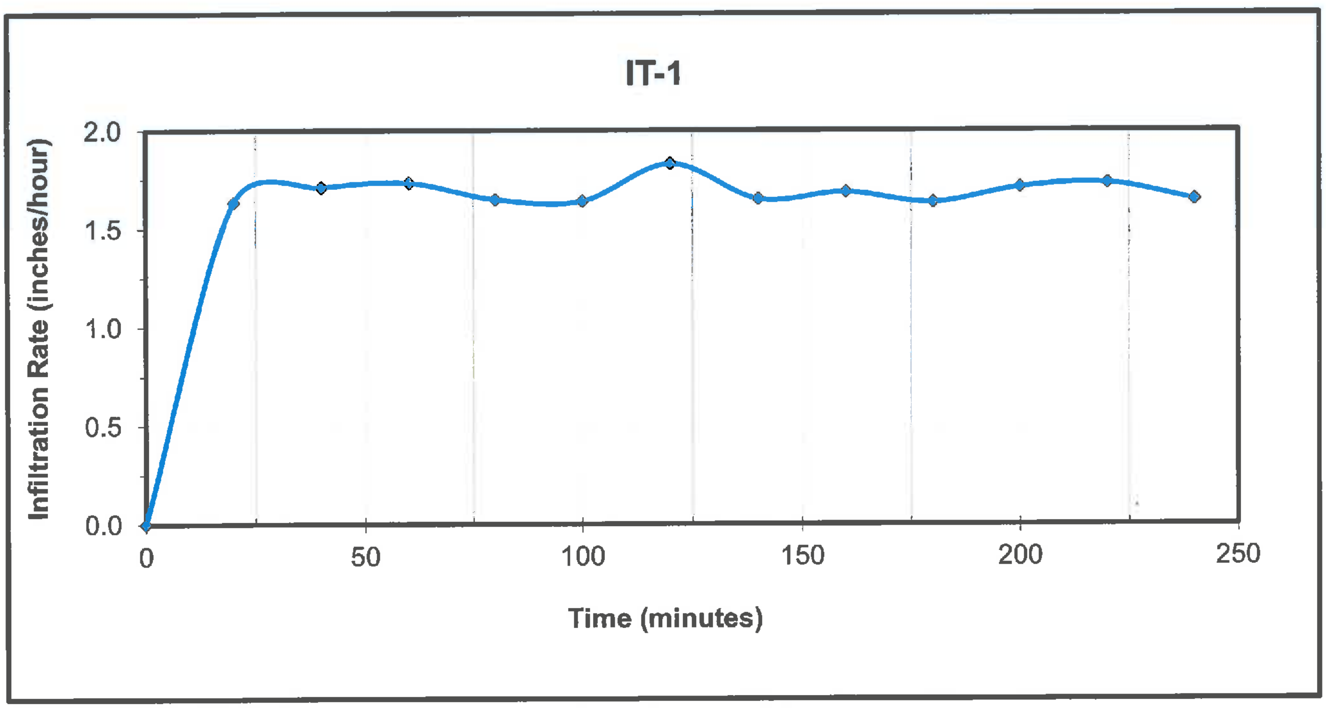


RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

Project #	**11219078**	**Date**	**8/28/2019**
Project Name	Light Industrial Facility		
Project Address	Helendale, CA		

Test No:	IT-2	**Total Depth (in.)**		60	**Test Size (in)**	9
Depth To Water	>50'	**Soil Classification**		SM		

Reading	Elasped Time(min.)	Incremental Time (min.)	Initial Depth To Water(in.)	Final Depth To Water(in.)	Incremental Fall of Water(in.)	Incremental Infiltration Rate (in/hr)
Start	0	0.00		6.0	--	–
1	20.00	20.00	6.0	16.0	10.00	1.64
2	40.00	20.00	16.0	24.5	8.50	1.71
3	60.00	20.00	24.5	31.5	7.00	1.73
4	80.00	20.00	31.5	37.0	5.50	1.65
5	100.00	20.00	37.0	41.5	4.50	1.64
6	120.00	20.00	41.5	45.5	4.00	1.83
7	140.00	20.00	45.5	48.5	3.00	1.65
8	160.00	20.00	48.5	51.0	2.50	1.69
9	180.00	20.00	51.0	53.0	2.00	1.64
10	200.00	20.00	53.0	54.7	1.70	1.71
11	220.00	20.00	54.7	56.1	1.40	1.73
12	240.00	20.00	56.1	57.2	1.10	1.65
	Infiltration Rate in Inches per Hour					**1.64**



APPENDIX F STORWATER POLLUTION AND PREVENTION PLAN

Storm Water Pollution Prevention Plan – Plant 9 (Helendale)

Prepared for

Lockheed Martin Aeronautics Company

1011 Lockheed Way
Palmdale, California 93599

September 2018

Revision Q

Approved by

Michael T. Haro
ESH Principal Engineer
Environmental Resources
Lockheed Martin Aeronautics Company

TABLE OF CONTENTS

CHANGE DESCRIPTIONS

Revision	Date	Description or Reason for Change
Q	September 2018	Annual Review, administrative changes, update BMPs (i.e., regulated waste, oily chip bins).
P	December 2016	Revised sampling location SP-105; minor updates to define Minimum and Advanced BMPs; revised site maps
O	August 2016	Annual Review, administrative changes, sampling, training.
N	August 2015	Updated administrative changes, updated storm water monitoring program to meet new requirements, update structural and non-structural BMPs, updated site maps, updated inspection forms
M	April 2014	Updated Section 2 (changed Tom Henderson to Tiffany Haskins).
L	July 25, 2013	Annual Review, updated administrative changes including Authorized Individual and PPT team.
K	Sept. 18, 2012	Annual Review, changes to Training (Section 7), updated Pollution Prevention team member.
J	July 20, 2011	Annual Review, administrative changes, training.
I	June 29, 2010	Annual Review, added new director of ESH as Authorized Individual and notation in Section 9 of process to use Maintenance.
H	June 25, 2009	Annual Review, update sections 3 and 4 (removal of gas tank)
G	April 14, 2009	Update Building Manager Training Requirements, Section 7.
F	August 1, 2008	Update Obsolete Information in Sections 4.0 and 9.0
E	March 28, 2008	SWPPP Annual review. Update Section 2.0 Team personnel information.
D	February 8, 2007	Updated Section 2.0 PPT information, Section 3.0 List of Significant Materials, Section 4.0 Structural BMPs , Section 4.2 Significant Spills and Leaks, Section 5.0 Assessment of Potential Sources, Section 7.0 Training, and Section 8.0 Storm Water Pollution Prevention BMPs.
C	January 31, 2006	Annual SWPPP review. Updated Section 2.0 team information. Updated Section 4.0 structural BMPs and Section 4.2, significant spills and leaks. Updated Section 8.0 Table 2, a BMP added for Pit 2 discharge/leak. Assigned a unique document number to plan. Updated Section 12.0 recordkeeping.
B	August 12, 2004	Updated and added Sean Van Gorder to Section 2.0 Authorized Individual and Pollution Prevention Team.
A	July 9, 2004	Updated SWPPP to ISO 14001 standards.

Purpose
The purpose of this Storm Water Pollution Prevention Plan (SWPPP) is to establish procedures and responsibilities for Lockheed Martin Aeronautics Company (LM Aero-Palmdale) Plant 9 (Helendale) required by State Water Resources Control Board Water Quality Order No. 2014-0057-DWQ, National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit (General Permit) CAS000001, and Waste Discharge Requirements for Discharges of Storm Water Associated With Industrial Activities Excluding Construction Activities (WDID 6B36I003495).

Plant 9 is located at 17452 Wheeler Road, Helendale, CA.

Objective
The objective of this document is three-fold:
1. To identify potential sources of pollution that may affect the quality of storm water discharges and authorized non-storm water discharges
2. To describe and ensure the implementation of Best Management Practices (BMPs) to reduce or prevent pollutants in industrial storm water discharges and authorized non-storm water discharges
3. To describe a monitoring program that demonstrates compliance with the General Permit, aids in the implementation of the SWPPP, and measures the effectiveness of the BMPs in reducing or preventing pollutants in storm water discharges and authorized non-storm water discharges.

Description of Operations
The business activity at Plant 9 focuses on radar testing of prototype aircraft. Normal operating hours are Monday through Friday, 6:00 AM to 4:00 PM. Radar operations are conducted at night, which would create dangerous conditions for monitoring activities. Therefore, inspections and monitoring are only to be performed during daylight hours.

In Appendix A, Figure 1, Plant 9 has a storm water drainage conveyance system that consists of aboveground drainage ditches and belowground pipes that convey the storm water to a retention basin south of Plant 9 as well as to open land north of the facility. The closest surface waters are the Mojave River and Silver Lake. Runoff that leaves from the eastern boundary of the facility flows south toward the Mojave River, storm water that discharges from the southwest side of the facility flows into the retention basin, and runoff flowing north from the facility flows into open desert land.

Site Specific Definitions
<u>Building Manager</u> – The LM Aero-Palmdale designated employee at each building responsible for monthly ESH inspections/compliance.
<u>Emergency Coordinator</u> - The employee, either on the facility premises or on call, with the responsibility for coordinating the emergency response measures specified in the LM Aero Palmdale Contingency Plan.

1.0 Storm Water Pollution Prevention Plan Background Information

The 1987 Clean Water Act Amendments established the NPDES Program. In 1990, the EPA published final regulations for Storm Water discharge permits. The General Permit mandates that each discharger create a SWPPP by 1992 (if an existing business) and revise as appropriate.

2.0 Authorized Individual and Pollution Prevention Team

The Legally Responsible Person for LM Aero-Palmdale is:

Kevin Dykema, Sr. Manager of Environmental Safety and Health (x4300)

The Approve Signatory Individual for LM Aero-Palmdale is:

Michael Haro, Environmental Engineer Senior Staff, Alternate (x4302)

Pollution Prevention Team (PPT) Members are:

Maurita Denley, Environmental Engineer, Coordinator (x1568)
Michael Haro, Environmental Engineer Senior Staff, Alternate (x4302)

Inspections and Plan Maintenance (Alternates for Sampling)

Patricia Cosentino, Environmental Engineer Senior, SWPPP Coordinator (x3374)
Mike Colburn, Environmental Engineer Staff, Alternate SWPPP Coordinator (x2428)

Inspections, Sampling, and Overseeing BMP Implementation

On-Site General Maintenance Personnel (760) 952-4243

In the case that one of the designated PPT members are not available for implementing the SWPPP, a replacement will be specified internally prior to such periods (e.g. vacation, sick leave, etc.).

3.0 List of Significant Materials

Table 1 contains the significant materials used at Plant 9 that have the potential of contaminating storm water.

Table 1 Significant Materials

Item #	Material	Maximum Quantity Stored	Unit	Location	Quantity & Frequency
1	Diesel	1000	Gal	AST	400 gal/mo
2	Diesel	1000	Gal	B/913 Emergency Generator	1 gal/mo
3	Diesel	300	Gal	Mobats, Emergency Generator	1 gal/mo
4	Diesel	50	Gal	B/941 Emergency Generator	1gal/mo
5	Gasoline	3	Gal	B/910 Emergency Generator	1 gal/mo
6	Diesel	500	Gal	B/980 Fire Pump	1 gal/mo
7	Diesel	550	Gal	B/982 Fire Pump	1 gal/mo
8	Hydraulic Oil	700	Gal	B/913 Hydraulic Lift	5 gal/mo
9	Hydraulic Oil	1350	Gal	B/912 Hydraulic Lift	5 gal/mo
10	Hydraulic Oil	25	Gal	B/912 Hydraulic Arm	5 gal/mo

11	Hydraulic Oil	25	Gal	B/911 Hydraulic Lift	5 gal/mo

Table 1 Significant Materials, Continued					
Item #	**Material**	**Maximum Quantity Stored**	**Unit**	**Location**	**Quantity & Frequency**
12	Sodium Hypochlorite	35	Gal	B/901T Well	10 gal/mo
13	Sodium Hypochlorite	35	Gal	B/980 Well	10 gal/mo
14	Sodium Hypochlorite	35	Gal	Pit 3 Well	10 gal/mo

4.0 Assessment of Potential Pollution Sources

Sources of the materials listed in Table 1 are as follows: Item number 1 are products that may spill during storage tank filling and while fueling vehicles at the gas pump. Items 2, 3, 4 and 5 may be spilled while filling emergency generators. It is unlikely that diesel or gasoline used in items 5 and 6, fire pumps, would become storm water pollutants as these materials are stored indoors and in secondary containment. Hydraulic lifts for test pylons, items 8, 9, 10 and 11 may leak hydraulic oil. There is the likelihood that hydraulic oil may be a potential pollutant in storm water discharge as rainwater runs over the hydraulic lifts and drains to a storm water conveyance. Items 12 to 14, sodium hypochlorite, may leak or spill while dispensed to potable water storage tanks.

5.0 Description of Potential Pollution Sources

5.1 Industrial Processes, Material Handling, and Storage Areas

Appendix A, Figure 1 shows the layout of Plant 9. Industrial processes, material handling and storage are conducted indoors with the exception of radar test range operations, vehicle fueling, and outdoor equipment storage areas.

The following is a list of operations that may be potential pollution sources:

- Radar Test Range – Two Pylons, containing hydraulic oil, raise and lower prototype aircraft. Secondary containment is available.
- Vehicle fueling - consists of pumping of diesel at the pump station.
- Outdoor equipment storage – Equipment may leak oil.

5.2 Significant Spills and Leaks

The LM Aero - Palmdale Spill Prevention Control and Countermeasures Plan (SPCC), Helendale Operations Plant 9, establishes procedures and responsibilities for significant spills or leaks throughout Plant 9. In addition, under the LM Aero-Palmdale Contingency Plan, Emergency Coordinators have the authority to react with funds and personnel if the incident dictates. The hazardous materials/waste storage area is equipped with spill capture systems such as berms and sumps to prevent the transport of any hazardous material offsite in the event of a spill or leak. No discharges/spills of significant materials have occurred within the last five years with regard to storm water discharge contamination at Plant 9.

5.3 Dust and Particulate Generating Activities

There are no dust and particulate generating activities conducted outdoors. Therefore, storm water quality is not affected by such activities.

5.4 Soil Erosion

Soils around Plant 9 are susceptible to erosion by wind, especially where soil has been disturbed. No significant sources of soil erosion are anticipated. "Soil Seal," an acrylic soil stabilizer, or vegetation is used to prevent significant soil erosion if it is discovered.

5.5 Chemical List

A current list of all chemicals used in any specific building is retained on-site and can be requested through ESH (x4334).

6.0 Authorized Non-Storm Water Discharges

Non-storm water discharges are authorized by the General Permit if they are fire hydrant/fire prevention system flushing, potable water sources, including potable water related to the operations maintenance or testing of potable water systems; drinking fountain water and atmospheric condensate including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; and/or groundwater.

7.0 Storm Water Pollution Prevention Best Management Practices

Table 2 contains a summary of the industrial activities that could potentially impact storm water, potential pollution sources, and the Best Management Practices (Non-structural) implemented to prevent storm water contamination. All listed BMPs are "existing BMPs" and have proven to be very effective as no storm event sample has ever resulted with any evidence of contamination. Note: Only State of California Licensed/Certified contractors are used by Plant Engineering for insecticide, biocide, herbicide, or rodenticide problems/applications, eliminating the concern of storm water contamination.

Table 2. Storm Water Pollution Prevention Best Management Practice

Location	Activity	Pollution Source	Pollutant	Best Management Practice
Diesel AST, Various emergency generators	Vehicle and equipment fueling and fuel transfer	Spills and Leaks	Diesel	• Good housekeeping • Various preventative maintenance programs • Inspect AST and fueling areas regularly to detect problems before they occur • Use drip buckets under connections during filling of the AST and emergency generators to catch any potential minor leaks of fuel • Train employees on proper spill response • Train employees on proper refueling including not "topping off" equipment

Table 2. Storm Water Pollution Prevention Best Management Practice, Continued				
Location	**Activity**	**Pollution Source**	**Pollutant**	**Best Management Practice**
Radar Test Range	Raising and lowering pylons	Spills or leaks	Hydraulic oil	• Good housekeeping • Preventative maintenance programs • Inspect water in secondary containment sump prior to rain events and prior to discharge • Check AST located near B/912 (Pit 2) prior to rain and events and prior to discharge • Rainwater recovery/diversion system for Pit 2 • Train employees on proper spill response
Equipment Storage Areas	Equipment storage	Spill or leak	Diesel or engine oil	• Good housekeeping • Preventative maintenance programs • Train employees on proper spill response • Keep ample supply of absorbent nearby • Inspect parking/storage areas for signs of leaks or spills • Equipment stored outdoors are located on an impermeable surface and covered and/or bermed where possible
Potable Wells	Changing or dispensing	Spill or leak	Sodium Hypochlorite	• Preventative maintenance programs • Train employees on proper spill response • Keep ample supply of absorbent nearby • Transfer carefully
B983 Hazardous Waste Storage Area	Hazardous waste storage activities	Spill or leak	Various	• Good housekeeping Covered berms and sump Spill capture system – i.e., berms and sumps. • Train employees on proper spill response • Keep ample supply of absorbent nearby • Documented regular inspections for signs of leaks or spills
Various	Other regulated waste (e.g., oily chip bins) storage	Leak	Solids, oils, various	• Store in secondary containment or fixed cover storage or movable cover (keep containment covers closed)

Table 2. Storm Water Pollution Prevention Best Management Practice, Continued				
Location	**Activity**	**Pollution Source**	**Pollutant**	**Best Management Practice**
Various	General equipment/ vehicle usage	Spill or leak	Oils, coolant, dirt, etc.	• Ensure adequate preventative maintenance program • Train employees on proper spill response
Throughout Facility	Non-Industrial	Wind	Sediment	• Remove sediment from paved surfaces and pits.

MINIMUM BMPS

<u>Good Housekeeping</u>
Good housekeeping is used across the facility to minimize storm water impacts and include:

- Keep area clear of trash and dirt and clean up any spills or leaks promptly
- Using dry clean-up methods (e.g. sweeping, damp cloth/mop, and using absorbent for spills) rather than hosing down area
- Empty small waste storage containers to waste tank, drum, or dumpster, as appropriate for the type of waste, as soon as possible
- Conduct vacuum-assisted street-sweeping regularly, if necessary

<u>Preventative Maintenance</u>
Preventative maintenance is required by the Minimum BMPs in the General Permit. Preventative maintenance of equipment and vehicles located and used at the facility is conducted regularly and includes:

- Regular visual inspections of equipment and storage area for evidence of leaks or spills
- Regular cleaning of equipment to prevent build-up of materials that can be washed off by storm water
- Only wash equipment in designated areas where wash water is collected for disposal
- Keep drip pans under the equipment during maintenance conducted outside
- Drain fluids from any retired equipment that is stored at the facility

<u>Material Handling and Waste Management</u>
Material handling and waste management should be conducted to prevent contact with storm water and includes:

- Bulk solid materials (gravel, sand, lumber, soil, concrete, metal products, etc.) that are stored outdoors are located on an impermeable surface and covered and bermed where possible
- Equipment stored outdoors are located on an impermeable surface and covered and bermed where possible
- Materials that are stored outside temporarily will be placed on a paved surface and covered with tarps and secured with weights
- Keep dumpster covers closed and store on a paved area
- Do not keep empty drums onsite if not needed; otherwise, kept empty drums sealed
- Follow proper hazardous waste storage and disposal regulations

Training
All Plant 9 personnel are given Storm Water Pollution Prevention awareness training conducted through a mandatory annual web based course in conjunction with Fires and Spills (Course Number 208871WPL00). Storm Water pollution prevention measures are also discussed in Safety Topic # 73 "Water Quality Compliance" given to shop employees.

PPT member Mike Colburn is a First Responder trained for spill response.

ADVANCED BMPs

The Advanced BMP implemented and maintained at the facility consist of:

- All liquid material drum storage areas and aboveground storage tanks are equipped with secondary containment vessels/structures.
- Outdoor emergency generators are equipped with secondary containment vessels/structures.
- Fire pumps are located indoors.
- A covered and bermed storage area is provided for hazardous waste storage.
- Hazardous material storage cabinets are located indoors.
- Rainwater recovery/diversion system (installed in 2006) for the Hydraulic Lift/Pylon in Building 912 (Pit 2).
- Rainwater Recovery/Filter System for Pit 2 (installed in 2008).

8.0 Storm Water Monitoring Program

Compliance with the General Permit requires storm water sampling and inspection, monthly visual inspections, and reporting. Note: Because of the distance of Plant 9 to the main Plant 10 location (>1.5 hours away), On-site General Maintenance Personnel (Plant 9 Maintenance) perform sampling and observations at Plant 9 with coordination by Environmental personnel. They have been instructed by Environmental personnel as to the requirements of the program. A Maximo System PMO will be issued for the first week of each month requiring the inspection to be performed. He is also given an annual review of the requirements for the SWPPP by Environmental personnel.

8.1 Visual Inspections

Visual inspections of each drainage area are required at least once per calendar month on days without precipitation. The purpose of the monthly inspection is to identify the presence of unauthorized discharges, observe authorized discharges and associated BMPs, assess the condition of BMPs, and observe potential sources of storm water pollution. The monthly visual inspections should be conducted during daylight hours of the normal facility operating hours and on days without precipitation. Each monthly inspection should be documented (see Form 1 in Appendix B) and any missed inspection should be explained in the Annual Report.

8.2 Storm Water Discharge Sampling

During each reporting year, two qualified storm events (QSEs) within the first half of the reporting year (July 1 to December 31) and two QSEs within the second half of the reporting year (January 1 to June 30) should be observed and sampled. A visual inspection should be conducted at the same time that the discharge is sampled.

The sampling and observations are only required for storm water discharges (or QSEs) that produce a discharge for at least one drainage area at the facility, is preceded by 48 hours with no discharge from any drainage area of the facility, and occur during scheduled facility operating hours or within four (4) hours of the start of discharge or the start of scheduled facility operating hours if the storm event occurred in the previous 12 hours.

Sampling locations are indicated in Appendix A, Figure 2, as SP-105 through SP-109. Samples should only be collected from Sample Point SP-105 if runoff is discharging from the adjacent, downstream retention spillway to ensure the samples are representative of industrial activity at the facility. When this discharge occurs, samples should be collected at the edge of the pavement nearest the retention basin near buildings 942 and 943. The sampling and analysis results will be recorded/uploaded to SMARTS. The inspection form (Form 2) for Storm Water Discharges is can be viewed in Appendix B.

Effluent from four (4) QSE per year must be sampled and analyzed as outlined in Table 3.

Table 3. Analytical Methods for Sampling Storm Water Discharge	
Pollutant	**EPA Analytical Method**
pH	150.1 / Field
Total Suspended Solids (TSS)	SM 2540D
Oil and Grease	1664A

The analytical results should be compared to the numeric action levels (NALs) to determine if an exceedance occurred. Any exceedances must be self-reported on SMARTS and will cause the facility to fall in Level 1 requirements the following reporting year. The NALs are provided below in Table 4.

Table 4. Numeric Action Levels		
Pollutant	**Annual NAL**	**Instantaneous Maximum NAL**
pH	N/A	<6.0 or >9.0
Total Suspended Solids (TSS)	100 mg/L	400 mg/L
Oil and Grease	15 mg/L	25 mg/L

8.3 Annual Evaluation

An annual comprehensive site compliance evaluation should be conducted no less than 8 months or more than 16 months apart without justification and submitted to the Lahontan Regional Water Quality Control Board. Additionally, an inspection of all drainage areas previously identified as having no exposure to industrial activities and materials (if applicable) should be conducted as part of the annual evaluation. The SWPPP, if required, shall be revised as appropriate and the revisions implemented within 90 days of the evaluation. The Compliance Evaluation form (Form 3) is provided in Appendix B.

Evaluations must include all of the following:

- A review of all visual observation records, inspection records, and sampling and analysis results from the previous reporting year.
- A visual inspection of all potential pollution sources for evidence of, or the potential for, pollutants entering the drainage system.
- An inspection of all drainage areas previously identified as having no exposure to industrial activities and materials (if applicable).
- A review and evaluation of all BMPs to determine whether they are adequate, properly implemented and maintained, or whether additional BMPs are necessary.

8.4 Reporting

Electronic reporting is required using the SMARTS system. Monitoring data should be submitted via SMARTS within 30 days of receiving the results. Any violations should be self-reported via SMARTS.

9.0 Discrepancies

If, during any inspection, (including mandated Storm Water Monitoring inspection), any potential pollution source is discovered that could affect the Plant 9 Storm Water discharge, it will be immediately reported to ESH or the Pollution Prevention Team, and will be remedied through BMPs or removal of the potential threat.

10.0 Sampling Methods

Sampling will be achieved with either the use of fully automated portable liquid sampler or by taking grab samples. Refer to Water Quality Field Instruction Manual Plant 10. Storm water sampling using automated samplers can sample during the storm's early stage or first flush. In most cases during normal work hours ESH personnel will take grab samples of individual storm events.

11.0 Record Keeping

Table 5 contains a list of the required storm water records.

Table 5. Storm Water Record Keeping

Deliverable	Frequency and Submittal Date(s)
Sampling and Inspection Results	Four per reporting year; analytical results submitted on SMARTS 30 days after receiving results
Non-Storm Water Inspection Report	Conducted monthly
Annual Report	Submitted annually
Annual Comprehensive Site Evaluation Report	Evaluation conducted annually; submitted on SMARTS annually
Non-Compliance Report	As-needed

ESH is required to retain all records and copies of all reports required by the General Permit for at least five years. A copy of the General Permit and the SWPPP must be maintained at the site and must be available to the operating personnel. The SWPPP must be provided, upon request only, to the Lahontan Regional Water Quality Control Board.

Related Documents

SPCC Plan Palmdale Plant 9
Water Quality Field Instruction Manual Plant 10
Integrated Contingency Plan

APPENDIX A

Site Maps and Sampling Location Photographs

Figure 1: Regional Location of the Plant 9 Facility

Figure 2: Locations of Drainage Areas and Sampling Points

Figure 3: Site Map

Sampling Location Photographs

For sampling location SP-105, samples should be collected at the edge of the pavement near buildings 942 and 943, only if runoff is discharging from the adjacent, downstream retention basin spillway (i.e., when discharging from the facility) (see Photos 1 and 2).

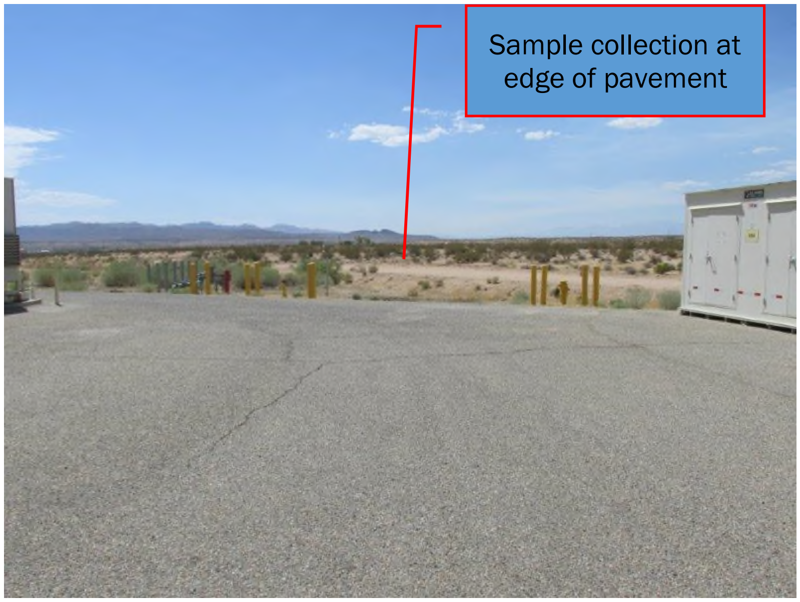


Photo 1. SP-105 sampling location

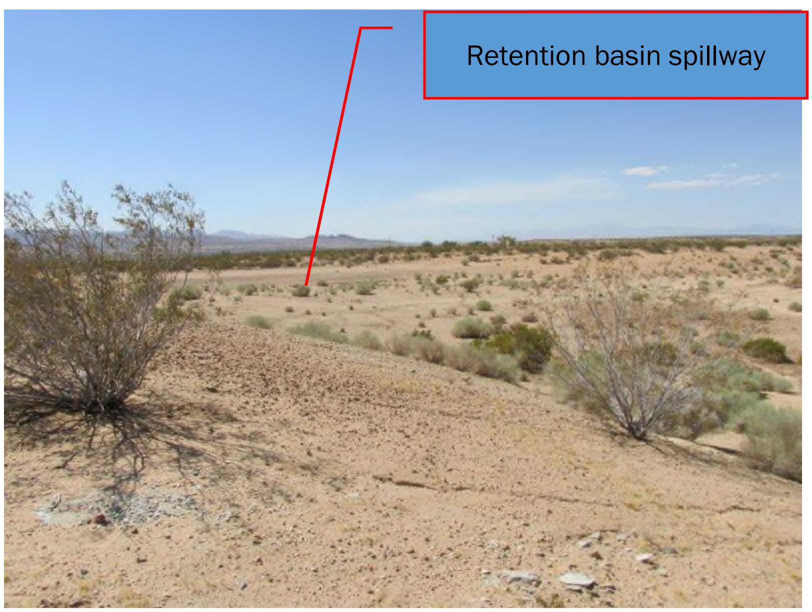


Photo 2. Retention basin spillway

Sampling Location Photographs, Continued

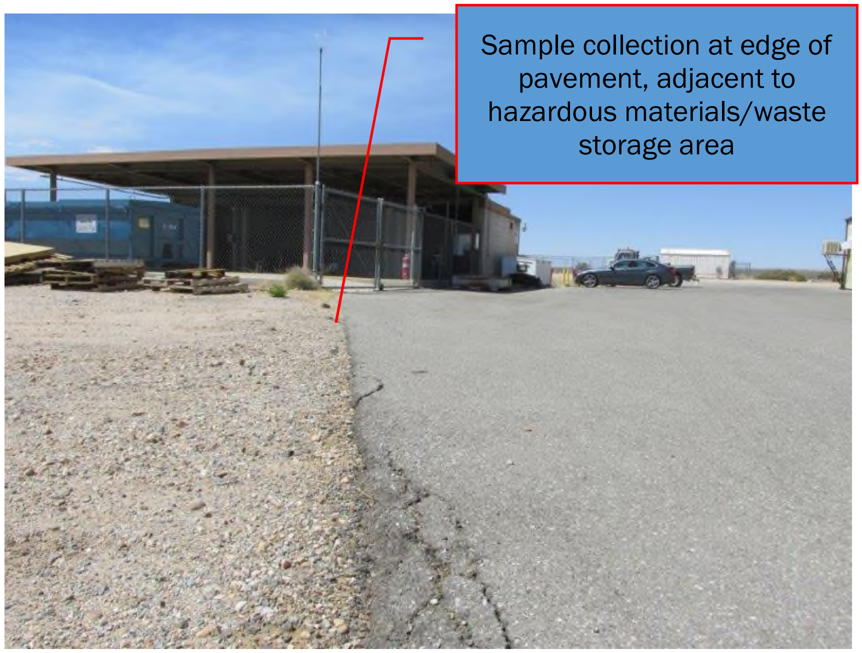


Photo 3. SP-106 sampling location

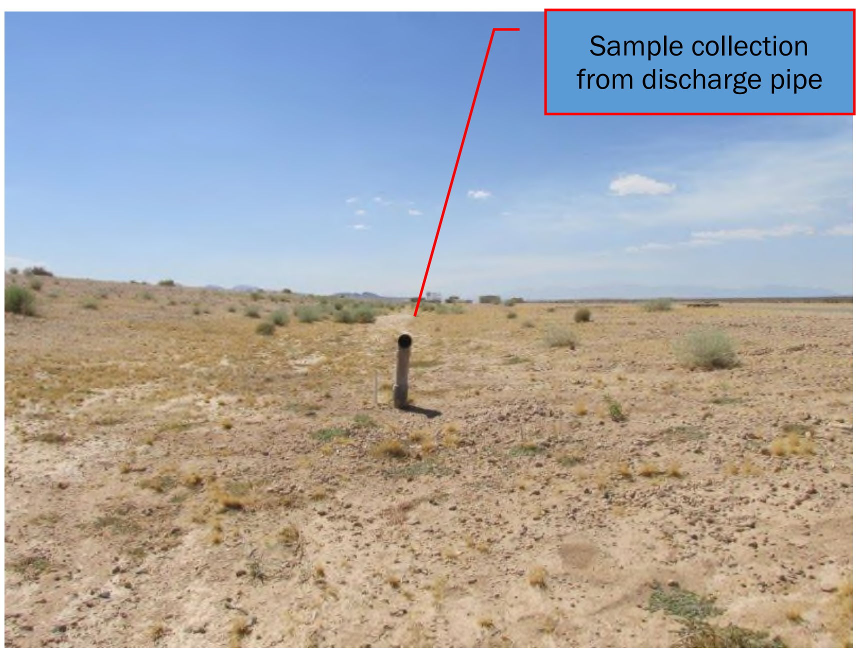


Photo 4. SP-107 sampling location

Sampling Location Photographs, Continued

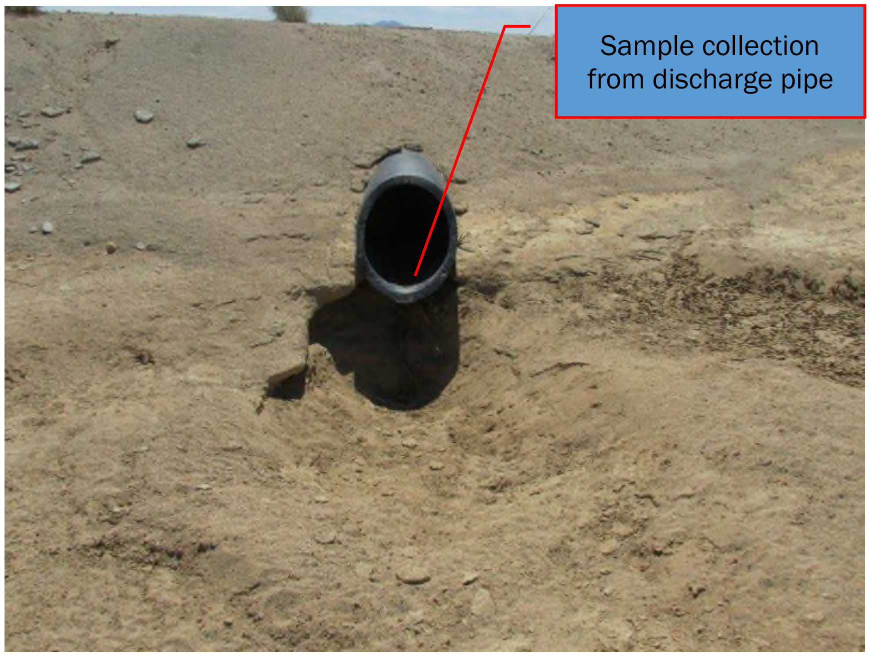


Figure 5. SP-108 sampling location

APPENDIX B

Forms

Form 1: Monthly Visual Inspection

INSPECTOR ______________________________________ DATE:________________________

______ **(July 1st – December 31st)** DATE ________________________________

______ **(January 1st – June 30th)** DATE ________________________________

OUTFALLS:

- SP-105 SE B943 TIME: ______________________________
- SP-106 Outfall SE B970 TIME: ______________________________
- SP-107 NE Outfall Pit 2 TIME: ______________________________
- SP-108 NW Outfall Pit 1 & 3 TIME: ______________________________

1. Are there non-storm water discharges present? YES / NO (If YES, Describe)____________________________

____

2. Are there stains, sludges, odors, or other abnormal conditions present? YES / NO (If YES, Describe) _________

____

3. Are all hazardous wastes and materials being stored inside storage buildings? YES / NO (If No, Describe) ____

____

4. Are storm drains clear and in good working condition? YES / NO (If No, Describe)________________________

____

5. Are any storm water pollution prevention measures failing? (i.e., no covers, broken dikes, etc.) YES / NO
(If YES, Describe)____

____

Plant 9 Structural BMP's

- Secondary Containment - Liquid drum storage areas, aboveground storage tanks, emergency generators
- Covered and bermed Plant 9 Hazardous Waste Storage Area
- Rainwater recovery / diversion system – Hydraulic Lift / Pylon Pit 2
- Rainwater recovery / filter system – Pit 2

Plant 9 Non-Structural BMP

- Vehicle and Equipment Fueling and Fueling Transfer – Diesel AST, Various Emergency Generators
- Raising and lowering pylons – Radar Test Range
- Changing or adding oil – Various locations
- Routine Operation of Vehicles – Various locations
- Changing or dispensing - Potable Wells

"I certify that the information submitted is, to the best of my knowledge and belief, true accurate, and complete".

Signed By: ____ DATE: ___________

Form 2: Qualifying Storm Event (QSE)* Discharge Visual Observation

INSPECTOR ______________________________ DATE:____________________

_______ **(July 1st – December 31st)** DATE ____________________

_______ **(January 1st – June 30th)** DATE ____________________

*QSE is a rainfall event that 1) produces a discharge in at least one drainage area and 2) was proceeded by 48 hours or more of dry weather**.**

*****Samples shall be collected from each drainage location within the first four (4) hours of: 1) the start of discharge, OR 2) the start of facility operations when the QSE occurs within the previous 12 hours.

48 Hours of dry weather prior to discharge: YES / NO **TIME DISCHARGE BEGAN**: __________

Date/ Time of Observations:
<u>OUTFALLS:</u>

- SP-105 SE B943 TIME: ____________________
- SP-106 Outfall SE B970 TIME: ____________________
- SP-107 NE Outfall Pit 2 TIME: ____________________
- SP-108 NW Outfall Pit 1 & 3 TIME: ____________________

1. Are floating materials present? YES / NO (If YES, Describe)________________________________

____

2. Are suspended materials present? YES / NO (If YES, Describe)______________________________

____

3. Is oil and/or grease visible? YES / NO (If YES, Describe)___________________________________

____

4. Is an odor noticeable? YES / NO (If YES, Describe)_______________________________________

____

5. Is the storm water is discolored? YES / NO (If YES, Describe)_______________________________

____

6. Are any storm water pollution prevention measures failing? (i.e., covers, broken dikes, etc.). YES / NO

(If YES, Describe) ____

"I certify that the information submitted is, to the best of my knowledge and belief, true accurate, and complete".

Signed By: ____________________________________ DATE: __________

Form 3: Annual Comprehensive Site Evaluation

INSPECTOR ____ DATE:__________________________

Potential Pollution Source Area Inspected (CHECK ONE):

_______Item 1. 1,000-Gallon Diesel – AST:

_______Item 2. Building 913 1,000-Gallon Diesel – Emergency Generator

_______Item 3. Mobats 300-Gallon Diesel – Emergency Generator

_______Item 4. Building 941 50-Gallon Diesel – Emergency Generator

_______Item 5. Building 910 3-Gallon Gasoline – Emergency Generator

_______Item 6. Building 980 500-Gallon Diesel – Fire Pump

_______Item 7. Building 982 550-Gallon Diesel – Fire Pump

_______Item 8. Building 913 700-Gallon Hydraulic Oil – Hydraulic Lift

_______Item 9. Building 912 1,350-Gallon Hydraulic Oil – Hydraulic Lift **(9/14/17 not in use)**

_______Item 10. Building 912 25-Gallon Hydraulic Oil – Hydraulic Arm

_______Item 11. Building 911 25-Gallon Hydraulic Oil – Hydraulic Lift

_______Item 12. Building 901T 35-Gallon Sodium Hypochlorite – Well

_______Item 13. Building 980 35-Gallon Sodium Hypochlorite – Well

_______Item 14. Pit 3 35-Gallon Sodium Hypochlorite - Well

_______Item 15. Other:____

OBSERVATIONS:

1. Have any BMPs not been fully implemented? YES / NO (If YES, Describe)______________________________

____

2. Are any additional BMPs necessary? YES / NO (If YES, Describe)____________________________________

____

3. Have any of the NALs been exceeded in the previous reporting period that can possibly be attributed to this area? YES / NO (If YES, Describe changes for next reporting year)______________________________________

____

"I certify that the information submitted is, to the best of my knowledge and belief, true accurate, and complete".

Signed By: ____ DATE: ____________

APPENDIX G PALEONOTOLOGICAL MEMO

TETRA TECH

June 17, 2015
100-PAS-T30327-13

Ms. Melinda Massey
Lockheed Martin Aeronautics Company-Palmdale
1011 Lockheed Way
Palmdale, California 93599

Subject: Submittal of Paleontological Resource Assessment for the Proposed Expansion Project at the Helendale Radar Measurement Facility in San Bernardino County, California

Dear Ms. Massey:

Tetra Tech is pleased to provide to you with the attached Paleontological Resources Assessment for the proposed expansion area at the Helendale facility completed by our subcontractor, Applied Earthworks, Inc.

Based on the literature reviewed and a County of San Bernardino museum record search for the project vicinity, the potential for encountering fossilized remains during earthwork greater than three feet below ground surface has been determined to be high. We recommend that during earthwork greater than three feet deep in previously undisturbed sediments, a paleontological monitor be present to note and document any paleontological resources inadvertently discovered.

Do not hesitate to contact the undersigned at (909) 381-1674 or Ms. Nisha Bansal at (916) 276-7846 if there are any questions.

Sincerely,
TETRA TECH, INC.

Stephanie Pacheco

Stephanie Pacheco
Task Manager/Environmental Scientist

cc: Nisha Bansal, Tt

Applied EARTHWORKS Inc.

133 N. San Gabriel Blvd., Suite 201
Pasadena, CA 91107-3414
(626) 578-0119

June 17, 2015

Ms. Stephanie Pacheco
Tetra Tech, Inc.
301 East Vanderbilt Way, Suite 450
San Bernardino, CA 92408

RE: Paleontological Resource Assessment for the Proposed Lockheed Martin Aeronautics' Radar Cross Section Test Range Expansion Project near Helendale, San Bernardino County, California

Dear Ms. Pacheco:

At the request of Tetra Tech, Inc., Applied EarthWorks, Inc. (Æ) performed a paleontological resource assessment the Lockheed Martin Aeronautics' (LM Aero's) Radar Cross Section (RCS) Test Range Facility Expansion Project (Project) near Helendale, San Bernardino County, California. The scope of work included a museum records search, a literature and geologic map review, and preparation of this technical memorandum in accordance with the California Environmental Quality Act (CEQA). This letter serves as a summary of our findings.

Project Description

The Project area is located approximately 5 miles northeast of Helendale in western San Bernardino County, California. The Project area encompasses approximately 300 acres of privately owned land within portions of Township 8 North/Range 4 West, Sections 3 and 4, and Township 9 North/Range 4 West, Sections 27, 28, 33, and 34, San Bernardino Baseline & Meridian, as depicted on the Wild Crossing, CA 7.5' U.S. Geological Survey quadrangle maps (Attachment 1).

LM Aero has proposed several improvements to the RCS Facility. These improvements may include the construction of a large crane or possible pit structure, a new warehouse building, and the widening of existing roads. A large, spoils pile will also be created by construction activities. A variety of ground-disturbing activities are expected to occur during these improvement including grading and trenching for the preparation and construction of the crane and building sites, slope and drainage easements, and utility installations.

Regulatory Context

Paleontological resources cannot be replaced once they are destroyed. Therefore, paleontological resources are considered nonrenewable scientific resources and are protected under the CEQA. Specifically, in Section V(c) of Appendix G of the CEQA Guidelines, the "Environmental Checklist Form," the question is posed: "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

In order to determine the uniqueness of a given paleontological resource, it must first be identified or recovered (i.e., salvaged). Therefore, mitigation of adverse impacts to paleontological resources is mandated by CEQA. In addition, paleontological resources are addressed under the Conservation Element of the County of San Bernardino General Plan (2007). The following policies are set forth under GOAL CO 3 in the Cultural/Paleontological Resources Section (V-C2), which stipulates that the San Bernardino County will preserve and promote its historic and prehistoric cultural heritage:

1. In areas of potential but unknown sensitivity, field surveys prior to grading will be required to establish the need for paleontologic monitoring.

2. Projects requiring grading plans that are located in areas of known fossil occurrences, or demonstrated in a field survey to have fossils present, will have all rough grading (cuts greater than 3 feet) monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Fossils include large and small vertebrate fossils, the latter recovered by screen washing of bulk samples.

3. A report of findings with an itemized accession inventory will be prepared as evidence that monitoring has been successfully completed. A preliminary report will be submitted and approved prior to granting of building permits, and a final report will be submitted and approved prior to granting of occupancy permits. The adequacy of paleontologic reports will be determined in consultation with the Curator of Earth Science, San Bernardino County Museum [V-18–V-19].

Paleontological Resource Potential

Absent specific agency guidelines, most professional paleontologists in California adhere to the guidelines set forth by the Society of Vertebrate Paleontology (SVP) (2010) to determine the course of paleontological mitigation for a given project. These guidelines establish protocols for the assessment of the paleontological resource potential of underlying geologic units and outline measures to mitigate adverse impacts that could result from project development. Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic unit(s) (or members thereof) underlying a Project area can be assigned to one of four categories defined by SVP (2010). These categories include high, undetermined, low, and no paleontological resource potential.

Methodology

In order to assess whether a particular project area has the potential to contain significant fossil resources at the subsurface, it is necessary to review published geologic mapping to determine the geology and stratigraphy of the area. Geologic units are considered to be “sensitive” for paleontological resources if they are known to contain significant fossils anywhere in their extent. Therefore, a search of pertinent local and regional museum repositories for paleontological localities within and nearby the project area is necessary to determine whether fossil localities have been previously discovered within a particular rock unit. For this Project, a museum records search was conducted at the Los Angeles County Museum of Natural History (LACM) on June 5, 2015. The records search was supplemented by a review of the University of California Museum of Paleontology's (UCMP's) online database, which contains paleontological records for San Bernardino County.

Resource Context

The Project area is situated within the Mojave Desert geomorphic province in southeastern California (Norris and Webb, 1976). A geomorphic province is a region of unique topography and geology that is readily distinguished from other regions based on its landforms and diastrophic history. The Mojave Desert geomorphic province extends from the San Andreas and Garlock faults toward the Basin and Range Province and Colorado Desert (Dibblee and Hewett, 1966). The Mojave Desert was formed as a result of pre-Mesozoic subsidence and sediment accumulation; Mesozoic volcanism, plutonic intrusion, regional uplift, and metamorphism; and ongoing Cenozoic uplift, depression, erosion, volcanism, and crustal deformation associated with movement along the Garlock and San Andreas faults (Dibblee, 1967). The western Mojave Desert is situated on top of an uplifted basement block consisting of Proterozoic to Mesozoic crystalline rocks covered by a thin veneer of Cenozoic sedimentary rocks and Quaternary alluvium (Garfunkel, 1974). In general, the Mojave Desert is dominated by broad alluvial basins and uplifted, unroofed basement rock, including the nearby Kramer Hills; late Cenozoic basaltic and rhyolitic volcanic rocks; and active faulting, including the right-lateral strike-slip Helendale fault southwest of the Project area (Stamos et al., 2003). Approximately 2 miles south of the Project area, the Mojave River, an ephemeral stream with headwaters in the San Bernardino Mountains, flows through the central Mojave Desert on its way to the endorheic (i.e., closed-basin) Soda Lake and Silver Lake in the east (Enzel et al., 2003). The Mojave Desert is entirely landlocked and averages 2,500 feet above mean sea level (amsl) in elevation (Norris and Webb, 1976).

The Project area is mapped at a scale of 1:62,500 by Dibblee (1960) and is entirely underlain by Quaternary older alluvium (Qoa), which accumulated during the Late Pleistocene and unconformably overlies plutonic basement rock at depth. The total thickness of the Quaternary older alluvium varies locally, but is up to 1,400 feet thick in the region between Helendale and State Route 58 (Dibblee, 1960). The Quaternary older alluvium is composed of weakly to moderately consolidated, light-gray to tan alluvial gravel, sand, and silt primarily derived from granitic, metamorphic, and volcanic sources. Eolian deposits are present locally. The Quaternary older alluvium displays massive to indistinct bedding and poor to moderate desert pavement development. The Pleistocene deposits typically grade from coarse gravel in the highlands and at the ground surface to finer-grained sand and silt in the playas and at shallow depth below the coarse surficial deposits (McLeod, 2015). In the vicinity of the Project area, the Quaternary older alluvium was likely deposited as a result of bedrock erosion coincident with uplift of nearby highlands and sedimentation along the Mojave River tributary and distributary channels.

Quaternary alluvial deposits of Pleistocene age have yielded significant vertebrate fossil localities throughout California and near the Project area (Cox et al., 2003; Jefferson, 2003; Scott and Cox, 2008; UCMP, 2015). Numerous terrestrial vertebrate fossils have been recovered from within Pleistocene-age alluvial deposits in the Mojave Desert within San Bernardino County. South of the Project area near Victorville, vertebrate fossil remains have been recovered within Pleistocene Mojave River deposits, including specimens of mammoth (Cox et al., 2003). Additional Pleistocene-age vertebrate fauna from the central Mojave Desert were reported by Scott and Cox (2008), including horse, camel, lama, pronghorn, deer, sheep, and bison. These mammal fossils were recovered from within Pleistocene-age deposits throughout San Bernardino County, including the Calico Hills, Newberry Mountains, Fort Irwin, Daggett, Yermo, and the Kramer Hills (Scott and Cox, 2008). In addition, taxonomic data for a vertebrate locality in the vicinity of the Project area in San Bernardino County was downloaded from the Paleobiology Database (paleodb.org) on June 8, 2015. The locality, near Calico ghost town, yielded specimens of pack rat and horse from within Pleistocene-age deposits.

Records Search Results

The LACM reports that there are no previously recorded vertebrate fossil localities in the Project area or in the immediate vicinity of the Project area; however, museum collections record at least three vertebrate localities within similar deposits in San Bernardino County near the Project area (McLeod, 2015; Table 1). Recovered specimens include mammoth, camel, and vole from fine-grained Pleistocene deposits. Furthermore, a review of online museum collections records maintained by the UCMP revealed that at least three additional vertebrate localities from unnamed Pleistocene age sedimentary deposits have been previously documented within similar deposits within San Bernardino County. Records retrieved from the UCMP database do not provide the exact locations of recovered fossil specimens; only a rough description of the locality is given. As such, locality queries were performed for the entirety of San Bernardino County. In addition to specimens already reported from the LACM, the UCMP localities yielded taxa of fossil horse, camel, rabbit, rodent, and turtle (UCMP, 2015). Depth of recovery below ground surface (bgs) was not provided for the LACM and UCMP vertebrate localities. The results of the museum records search and literature review are presented in Table 1.

Table 1
Vertebrate Localities Reported from within Pleistocene Alluvial Deposits, San Bernardino County

Locality No.	Geologic Unit	Age	Taxa
UCMP V3625	Quaternary older alluvium	Pleistocene	*Equus* (horse), Camelidae (camel)
UCMP V5930	Quaternary older alluvium	Pleistocene	*Lepus* (rabbit) and rodents
UCMP V99366	Quaternary older alluvium	Pleistocene	*Hesperotestudo* (turtle)

Sources: McLeod, 2015; UCMP, 2015

Findings and Recommendations

Based on the literature review and museum records search results, the paleontological sensitivity was determined in accordance with the SVP’s (2010) sensitivity scale. The Quaternary older alluvium deposits are determined to have a high paleontological resource potential because similar Pleistocene age deposits throughout San Bernardino County have been known to yield significant paleontological resources. According to McLeod (2015), the Quaternary older alluvium in the Project area fines down from coarse surficial deposits; as a result, because fossilized material is more likely to be preserved within fine-grained sediments, fossilized material is not expected in the coarser lithology near the ground surface, but may be present at moderate depth within finer-grained material. Therefore, substantial excavations (greater than 3 feet bgs) within finer-grained sediments could encounter fossilized remains. Further, because the Quaternary older alluvial deposits are potentially hundreds of feet thick in the area according to Dibblee (1960), there is no lower limit for monitoring, unless crystalline bedrock is encountered, at which point monitoring would cease for that particular location.

As a result of the high paleontological resource potential of the Quaternary older alluvium in the Project area, further paleontological resource management, including construction monitoring in previously undisturbed sediments at depths greater than 3 feet bgs, is recommended (see Attachment 1).

It has been a pleasure assisting you with this Project. If you have any questions, please do not hesitate to contact Jessica DeBusk at jdebusk@appliedearthworks.com or (626) 578-0119.

Sincerely,

Heather Clifford
Associate Paleontologist
Applied EarthWorks, Inc.

Jessica DeBusk
Paleontology Program Manager
Applied EarthWorks, Inc.

References

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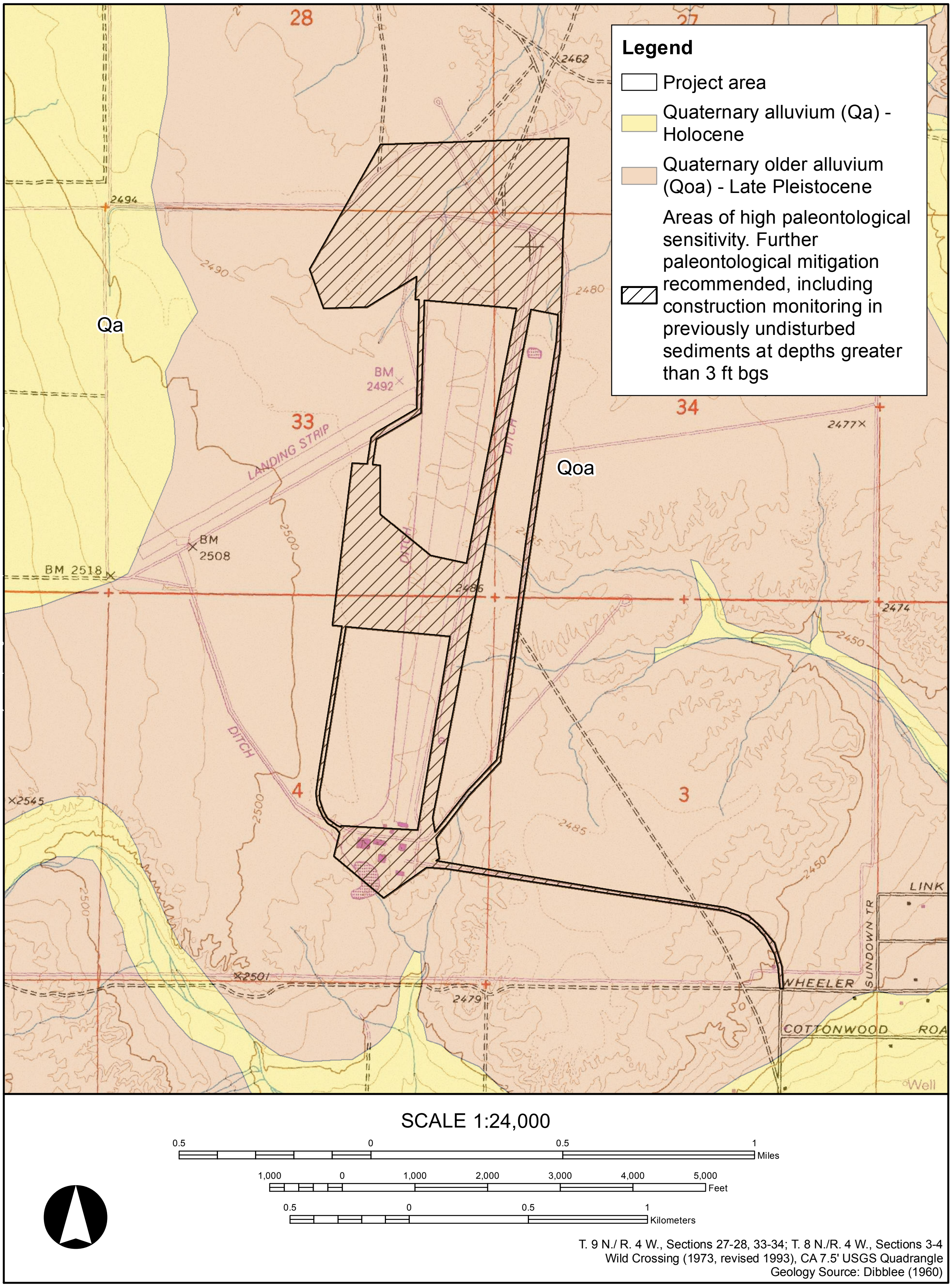

Attachment 1 Paleontological Sensitivity and Areas of Recommended Mitigation in the Project Area

APPENDIX H REQUEST FOR TRIBAL CONSULTATION

385 N. Arrowhead Ave, First Floor, San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019 **CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

Amanda Barrera, Tribal Secretary
Colorado River Indian Tribes
26600 Mohave Road
Parker, AZ 85344

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Ms. Barrera:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 N. Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to Suzanne.Peterson@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

385 N. Arrowhead Ave, First Floor, San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019 **CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

Darrell Mike, Tribal Chairman
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA 92236

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Mr. Mike:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

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Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

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SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Linda Otero
Fort Mojave Indian Tribe
P.O. Box 5990
Mojave Valley, AZ 86440

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Ms. Otero:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

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Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

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www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Travis Armstrong
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Mr. Armstrong:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

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Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

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SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019 **CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

Joseph Ontiveros
Cultural Resource Director
Soboba Band of Luiseno Indians
P.O. Box 487
San Jacinto, CA 92581

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Mr. Ontiveros:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 N. Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to Suzanne.Peterson@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

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www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Terri Rahhal
Director

September 13, 2019

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Jessica Mauck
Cultural Resources Analyst
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH EAST OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Ms. Mauck:

The Land Use Services Department recently initiated the environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. A project location map and project description is enclosed for your review.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 N. Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to Suzanne.Peterson@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

S. Peterson

Suzanne Peterson, Planner
SP/cgw/lb

Enclosures: Project Notice - Location and Description
cc: Project File

TWENTY-NINE PALMS BAND OF MISSION INDIANS

46-200 Harrison Place . Coachella, California . 92236 . Ph. 760.863.2444 . Fax: 760.863.2449

September 27, 2019

Suzanne Peterson, Planner
San Bernardino County
Land Use Services Dept. | Planning
385 N. Arrowhead Ave
First Floor
San Bernardino, CA 92415

RE: MINOR REVISION TO AN APPROVED ACTION TO CONSTRUCT A NEW 19,395 SQUARE FOOT BUILDING, 65 FEET IN HEIGHT, TO SUPPORT AN EXISTING AERONAUTICS AND RADAR TEST FACILITY; THE PROJECT IS LOCATED NORTH OF WHEELER ROAD, WEST OF SUNDOWN TRAIL; ON A PORTION OF 650 ACRES; NORTH OF THE COMMUNITY OF HELENDALE/SILVER LAKES; APN: 0466-021-01; PROJECT NO.: P201900193

Dear Ms. Peterson,

This letter is in regards to consultation in compliance with AB 52 (California Public Resources Code § 21080.3.1) in regards to a revision to an approved action to construct a new 19,395 square-foot building. The Twenty-Nine Palms Band of Mission Indians Tribal Historic Preservation Office (THPO) is not aware of any additional cultural resources or Tribal Cultural Resources, as defined California Public Resources Code § 21074 (a) (1) (A)-(B) in the project area that pertains to the Twenty-Nine Palms Band of Mission Indians (Tribe). However, since this project is in an underdeveloped area adjacent to the Chemehuevi Traditional Use Area (TUA) the Tribe has concerns for subsequent development. The THPO requests a copy of any cultural reports related to this project. After a review of these documents, the THPO may provide further recommendations/comments.

If you have any questions, please do not hesitate to contact the THPO at (760) 775-3259 or by email: TNPConsultation@29palmsbomi-nsn.gov.

Sincerely,

Anthony Madrigal, Jr.
Director of the Tribal Historic Preservation Office

cc: Darrell Mike, Twenty-Nine Palms Tribal Chairman
Sarah Bliss, Twenty-Nine Palms Cultural Resources Manager

From:	Travis Armstrong
To:	Peterson, Suzanne
Subject:	AB 52 - Project No.: P201900193
Date:	Friday, October 11, 2019 2:53:03 PM
Attachments:	image001.jpg

Hello Suzanne,

Regarding the above referenced project, we have no additional comments to provide at this time.

Thank you for reaching out to our office.

Sincerely,

Travis Armstrong
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
951-755-5259
Email: thpo@morongo-nsn.gov

Morongo

From:	Jessica Mauck
To:	Peterson, Suzanne
Subject:	P201900193 - Expansion to Aeronautics and Radar Test Facility
Date:	Friday, October 11, 2019 3:55:26 PM
Attachments:	imagef2a867.PNG

Hello Suzanne,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 17 Sep 2019, pursuant to CEQA (as amended, 2015) and CA PRC 21080.3.1. The proposed project area exists within Serrano ancestral territory and, therefore, is of interest to the Tribe. For your knowledge, Helendale is the location of the Serrano village “Cacumeat”, though the project area is further north (about 1/3 of the way to another village called “Sisugenat” closer to Barstow/Hinkley), and there is nothing to indicate that the project area will have an impact on the village “center”, if you will. That being said, there are resources both within and nearby the project area that are worth considering and, as such, SMBMI is requesting some additional information.

- Geotechnical report (if required for the project)
- Project plans showing the depth of proposed disturbance

The provision of this information will assist San Manuel Band of Mission Indians in ascertaining how the Tribe will assume consulting party status under CEQA and participate, moving forward, in project review and implementation. Please note that if this information cannot be provided within the Tribe’s 30-day response window, the Tribe automatically elects to be a consulting party under CEQA, as stipulated in AB52. If you should have any questions with regard to this matter, please do not hesitate to contact me at your convenience, as I will be your Point of Contact (POC) for SMBMI with respect to this project.

Once again, the San Manuel Band of Mission Indians appreciates the opportunity to comment on the proposed project.

Respectfully,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive Highland California 92346

Pacheco, Stephanie

From: Peterson, Suzanne <Suzanne.Peterson@lus.sbcounty.gov>
Sent: Monday, December 9, 2019 2:17 PM
To: Pacheco, Stephanie
Cc: Ko, REENU M; Chov, Steven L; Galli, Michael; Johnson, Suzanne Q; Bansal, Nisha; michael.j.bonds.jr@lmco.com
Subject: RE: Warehouse Project, Helendale Radar Measurement Facility, San Bernardino County

Hi Stephanie,

Here are the comments from San Manuel. Consultation has concluded with them. Twenty-nine Palms Band of Mission Indians has also contacted me with an initial letter but I tried calling multiple times and emailed them 3 times with no reply. I'll talk to my supervisor to see how to proceed at this point.

Hi Suzanne,

Thank you again for providing the requested documentation. It took me a bit of time to ascertain the exact project footprint, as the cultural report, project plans, soil study, and County notice all show different things. However, I was able to figure it out by placing the project plans over some aerial imagery, and realized the footprint is actually tiny compared to the larger survey area in the cultural study for which I initially had concerns. Fortunately, SMBMI does not have concerns with the proposed effort within the much smaller project area and, as such, simply requests the following language be included within the COAs/MMs with regards to inadvertent discoveries:

CUL MMs

1. In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed within TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

2. If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to SMBMI for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

3. If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

TCR MMs

1. The San Manuel Band of Mission Indians Cultural Resources Department (SMBMI) shall be contacted, as detailed in CR-1, of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a cultural resources

Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with SMBMI, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents SMBMI for the remainder of the project, should SMBMI elect to place a monitor on-site.

2. Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to SMBMI. The Lead Agency and/or applicant shall, in good faith, consult with SMBMI throughout the life of the project.

Note: San Manuel Band of Mission Indians realizes that there may be additional tribes claiming cultural affiliation to the area; however, San Manuel Band of Mission Indians can only speak for itself. The Tribe has no objection if the agency, developer, and/or archaeologist wishes to consult with other tribes in addition to SMBMI and if the Lead Agency wishes to revise the conditions to recognize additional tribes.

Please provide the final copy of the project/permit/plan conditions so that SMBMI may review the included language. This communication concludes SMBMI's input on this project, at this time, and no additional consultation pursuant to CEQA is required unless there is an unanticipated discovery of cultural resources during project implementation. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience.

Thanks,
Suzanne