BRIGHTLINE WEST – LAS VEGAS TO VICTOR VALLEY – HISTORIC PROPERTIES TREATMENT PLAN

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Prepared for
Federal Railroad Administration, Washington, D.C.

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Contents

Appendices

Figures

Tables

Abbreviations and Acronyms

ACHP	Advisory Council on Historic Preservation
ADI	Area of Direct Impact
AII	Area of Indirect Impact
AME	archaeological monitoring exhibit
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
BNSF	Burlington National Santa Fe
BLM	Bureau of Land Management
Caltrans	California Department of Transportation
CCS	cryptocrystalline silicate
CFR	Code of Federal Regulations
CLAD	Cronese Lake Archaeological District
cm	centimeters
CS	column sample
CSC	controlled surface collection
DPR	Department of Parks and Recreation
EIS	Environmental Impact Statement
EOF	end of field report
ESA	environmentally sensitive area
FHWA	Federal Highway Administration
FGV	fine-grained volcanics
FOE	finding of effect
FRA	Federal Railroad Administration
ft	feet
GIS	geographic information systems
HPTP	Historic Properties Treatment Plan
HSC	Health and Safety Code
I-	Interstate
km	kilometers
LADWP	Los Angeles Department of Water and Power
LOD	limits of disturbance

MLD	Most Likely Descendant
MNI	minimum number of individuals
MRLL	Mojave River Lithic Landscape
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
NISP	number of indentifiable specimens
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
OHV	off-highway vehicle
PA	Programmatic Agreement
PI	Principal Investigator
PQS	professional qualifications standards
PRC	Public Resources Code
Project	Brightline West—Las Vegas to Victor Valley
ROW	right of way
SQAD	Sidewinder Quarry Archaeological District
SRAD	Soapmine Road Archaeological District
SRL	segregated reduction locus
SRU	surface recording unit
SSU	subsurface unit
STP	shovel test pit
TCL	Traditional Cultural Landscape
TU	test unit
UCLA	University of California, Los Angeles
U.S.C.	United States Code
WEAP	worker environmental awareness program

1. Executive Summary

This Historic Properties Treatment Plan (HPTP) (Attachment 5 to the Programmatic Agreement [PA]) provides for the treatment of historic properties identified in the Area of Potential Effects (APE) for the Brightline West – Las Vegas To Victor Valley High-Speed Rail Project (Project). The HPTP also includes a framework for additional phased identification, evaluation, and assessment of effects to historic properties that may be required due to changes to the Project as design progresses. Also included are an inadvertent discoveries plan and provisions for monitoring and sensitivity training. For California and Nevada, separate archaeological inventory reports were prepared for the Project (ICF and Dudek 2022; Hale et al. 2022; Barton and Hale 2022a, 2022b), documenting archaeological resources in the APE, along with separate archaeological National Register of Historic Places (NRHP) eligibility and effects reports prepared by Dudek (Hale and Barton 2022a, 2022b). Regarding historic built environment resources, separate reports were prepared for California and Nevada that inventoried and evaluated historic built environment resources (ICF and HNTB 2022). These documents are referenced as follows:

Barton, Loukas, and Micah J. Hale
2022a Subsurface Archaeological Inventory: Addendum to the XpressWest High-Speed Passenger Train Project, Archaeological Inventory Report, San Bernardino County, California, prepared for U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development, Washington, DC, by Dudek, Encinitas, CA, March 15, 2022.

Barton, Loukas, and Micah J. Hale
2022b Subsurface Archaeological Inventory: Addendum to the XpressWest High-Speed Passenger Train Project, Archaeological Inventory Report, Clark County, Nevada, prepared for U.S. Department of Transportation, Federal Railroad Administration, Office of Railroad Policy and Development, Washington, D.C., by Dudek, Encinitas, CA, March 15, 2022.

Hale, Micah J., and Loukas Barton
2022a Brightline West—Las Vegas to Victor Valley—Archaeological Resources Finding of Eligibility and Effect: California. Prepared for the Federal Railroad Administration, Washington D.C.

Hale, Micah J., and Loukas Barton
2022b Brightline West—Las Vegas to Victor Valley—Archaeological Resources Finding of Eligibility and Effect: Nevada. Prepared for the Federal Railroad Administration, Washington D.C.

Hale, Micah J., Loukas Barton, Scott Wolf, and David Faith
2022 FINAL *Confidential XpressWest High-Speed Passenger Train Project Archaeological Inventory Report, Clark County, Nevada,* February 2022. Prepared for the Federal Railroad Administration, Washington D.C.

ICF and Dudek
2022 FINAL *Confidential XpressWest High-Speed Passenger Train Project Archaeological Inventory Report, San Bernardino County, California,* February 2022. With edits by Micah Hale, Loukas Barton, Scott Wolf, and David Faith, Dudek. San Bernardino County, California. Prepared for the Federal Railroad Administration, Washington D.C.

ICF and HNTB
2022 DRAFT XpressWest High-Speed Passenger Train Project Historic Built Environment Technical Report: (one is for Nevada, one for California). Prepared for the Federal Railroad Administration, Washington D.C.

ICF and HNTB
2022 FINAL XpressWest High-Speed Passenger Train Project Historic Built Environment Technical Report: (one is for Nevada, one for California). Prepared for the Federal Railroad Administration, Washington D.C.

A previous HPTP was prepared by ICF (2020), *XpressWest High Speed Train Project, Historic Property Treatment Plan, San Bernardino County, California*. However, this earlier version was developed with the assumption that no resources would be evaluated for significance under the NRHP, and that a process-driven PA would guide evaluation and mitigation prior to a formal Finding of Effect. Also, the 2020 HPTP was limited to archaeological resources. Since the 2020 HPTP was produced, all cultural resources (archaeological and historic built environment) in the APE were evaluated for significance, and effects to historic properties have been determined by the Federal Railroad Administration (FRA).

The Project will cause an adverse effect to 26 archaeological historic properties, including 23 in California and 3 in Nevada. For the Project as a whole, FRA determined that visual intrusions introduced by the Project would have no adverse effect to archaeological historic properties. Additionally, FRA determined that effects from the Project, when considered cumulatively, will have no adverse effect on historic properties in California and Nevada.

The Project will have no adverse effect on built environment historic properties. In total, there are six NRHP eligible built environment historic properties within the APE, two in California and four in Nevada. The built environment historic properties include four resources in the Los Angeles Department of Water and Power (LADWP) Boulder Dam to Los Angeles Transmission Lines (located in both California and Nevada), the SCE-owned 132 kV Hoover Dam Transmission

Line (within the APE in California, only) and the Jean Underpass, located in the vicinity of Jean, Nevada.

Effects to Archaeological Historic Properties in California

Twenty-three historic properties will be adversely affected by the Project in California. Physical effects from Project construction and operation would damage or displace artifacts from contributing elements to four archaeological districts (Sidewinder Quarry Archaeological District [SQAD], Mojave River Lithic Landscape [MRLL], Soapmine Road Archaeological District [SRAD] and Cronese Lake Archaeological District [CLAD]), along with five individually-eligible archaeological sites not affiliated with archaeological districts (P-36-000541, P-36-000885, P-36-006023, XPW21-SW-015, ICF-XW2-007) and 14 sites that are both individually eligible and eligible as contributors to archaeological districts (P-36-000562, P-36-002283, P-36-008321, P-36-006950, P-36-003485, P-36-002129, P-36-000223, P-36-003694, ICF-XW1-010, ICF-XW2-017, ICF-BV-001, ICF-XW1-004, P-36-008923, P-36-004198). Effects from noise and vibration generated by Project construction and operation would have an adverse effect, which may be cumulative in nature, on the CLAD and on P-36-004198 (which is both individually eligible and eligible as a contributing element to CLAD). Visual intrusions generated from Project construction and operation would have no adverse effects to any archaeological historic property in California.

Effects to Archaeological Historic Properties in Nevada

In Nevada, physical effects from Project construction and operation would have adverse effects to three archaeological sites (26CK7189, 26CK11252, and 26CK5760). Visual intrusions and noise and vibrations generated from Project construction and operation would have no adverse effects to any prehistoric or historic sites in Nevada.

Resolving Adverse Effects to Archaeological Historic Properties

The methods used to resolve adverse effects to archaeological historic properties outlined in this HPTP are primarily phased data recovery, focused on the scientific investigation and recovery of an archaeological sample that best represents the affected archaeological sites or portions of sites. Minimization of adverse effects to the CLAD also includes erection of sound walls during construction and creative vegetation plantings to minimize effects due to noise and vibration during Project construction. Completion of additional site recordation in the APE-Area of Indirect Impact (AII) and ethnological inquiry further minimizes effects to the Traditional Cultural Landscape type of significance conveyed by archaeological historic properties.

This HPTP provides for the treatment of unanticipated effects to known or newly discovered historic properties, including evaluation of significance and mitigation, and archaeological and Native American monitoring.

Effects to Historic Built Environment Resources

FRA determined that the Project would result in a Section 106 Finding of No Adverse Effect to built environment historic properties that are eligible for listing on the NRHP. This HPTP

outlines measures or conditions that can be incorporated into the Project to address unanticipated adverse effects to NRHP-eligible built environment historic properties.

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2. Project Description

The Project seeks to construct a 174.36-mile high-speed passenger train line connecting Victor Valley California, to Las Vegas, Nevada. Most of the fully grade-separated, passenger-only railroad would be constructed within the Interstate 15 (I-15) highway corridor. Two passenger stations would be built, one in Victor Valley, the other in Las Vegas; each would be located immediately adjacent to the I-15 corridor. The Project also includes ancillary operations and maintenance facilities, as well as utility corridors to link proposed electrical substations to external sources of power, thus accommodating the preferred electrically powered technology option.

In 2011, FRA issued a *Final Environmental Impact Statement and Final Section 4(f) Evaluation for the Proposed DesertXpress High-Speed Passenger Train from Victorville, California to Las Vegas, Nevada* (DesertXpress EIS) and a Record of Decision for the *DesertXpress High-Speed Passenger Train* (DesertXpress ROD), to comply with the National Environmental Policy Act (NEPA). The Project footprint has since been modified and significant time has passed since the 2011 DesertXpress ROD; as such, FRA, as lead federal agency, requested that the APE, surveys, and findings be updated as a result.

The purpose of this document is to provide a Historic Properties Treatment Plan for adversely affected historic properties in the Project APE and includes a framework for additional phased identification, evaluation, and assessment of effects to historic properties that may be required due to changes to the Project as design progresses. Also included are an inadvertent discoveries plan and provisions for treatment of unanticipated effects to known historic properties, monitoring and sensitivity training. This document focuses primarily on resources that intersect or are within the APE-Area of Direct Impact (APE-ADI). However, some resources located in the APE-Area of Indirect Impact (APE-AII) are also included in this document due to their proximity to the APE-ADI or relationship to archaeological resources within the APE-ADI. The treatments and methods in this report incorporate all actionable information received to date from Consulting Native American Tribes by FRA.

2.1. Project Location

The total Project APE extends 174.36 miles from Victor Valley, California to Las Vegas, Nevada, encompassing 52,134.79 acres. The California segment of the Project is located between Victor Valley, California, and Primm, Nevada; the Nevada segment of the Project is located between Primm and Las Vegas, Nevada (Figure 2-1). The Federal Highway Administration (FHWA) represented by the California Department of Transportation (Caltrans) has jurisdiction over the I-15 corridor as identified by rights-of-ways issued under 23 USC 317. Caltrans and the Nevada Department of Transportation (NDOT) have entered into agreements with Brightline West for lands within the I-15 corridor. FRA is the lead agency for compliance with Section 106 of the National Historic Preservation Act (NHPA) for the Project with the FHWA and the respective Departments of Transportation serving as the responsible resource agencies for land within the I-15 Right of Way (ROW).

2.2. Area of Potential Effects (APE)

The Area of Potential Effects (APE), as defined in 36 Code of Federal Regulations (CFR) § 800.16(d), is:

> *…the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.*

Consistent with 36 CFR Part 800, FRA defined the APE in consideration of where potential effects resulting from the Project could occur. The total APE extends across California and Nevada along 174.36 linear miles for 52,134.79 acres. The APE in California totals 41,790.26 acres along 139.98 linear miles while the APE in Nevada totals 10,344.53 acres along 34.39 linear miles. Table 2-1 summarizes the delineation values for the Project APE.

Table 2-1. APE Delineation Values

Project Component		APE Delineation
Urban Alignment (CA, NV)	**Trenched and At-Grade**	**450 ft (60.96 m) from centerline**
--	**Elevated At-Grade**	**750 ft (228.60 m) from centerline**
--	**Elevated Guideway/Elevated Roadway (emergency crossovers equate to elevated roadway)**	**1,000 ft (304.80 m) from centerline**
Rural/Desert Alignment (CA, NV)	**Trenched and At-Grade**	**1,000 ft (304.80 m) from centerline**
--	**Elevated At-Grade**	**1,500 ft (457.20 m) from centerline**
--	**Elevated Guideway/Elevated Roadway (emergency crossovers equate to elevated roadway)**	**1,500 ft (457.20 m) from centerline**
Utility corridors (CA only)		**200 ft (60.96 m) on either side of footprint (400 ft or 121.92 m total)**
Station areas (CA, NV)		**1,000 ft (304.80 m) from edge of footprint**
Ancillary facilities (substations, autotransformers, temporary construction easements) (CA, NV)		**100 ft (30.48 m) from edge of footprint**
Access roads (CA, NV)		**100 ft (30.48 m) from centerline (200 ft or 60.96 m total)**
Historic Properties, including those of Religious or Cultural Significance to Tribes		**Variable - Distance delineated in consultation with Consulting Parties including Tribes; PA will provide for a process to refine the APE further in consideration of new information provided by a Consulting Party to FRA**

Project Component	APE Delineation
Vertical height of project components (CA, NV)	**Up to 65 ft (19.81 m) above current grade; 86 ft (26.21 m) in Barstow, CA only**
Limits of Disturbance (alignment, highway improvements only, interchange modifications) (CA, NV)	**Variable - Project footprint**
Vertical depth of Project components (CA, NV)	**Down to 120 ft (36.58 m) from current grade**

1
2

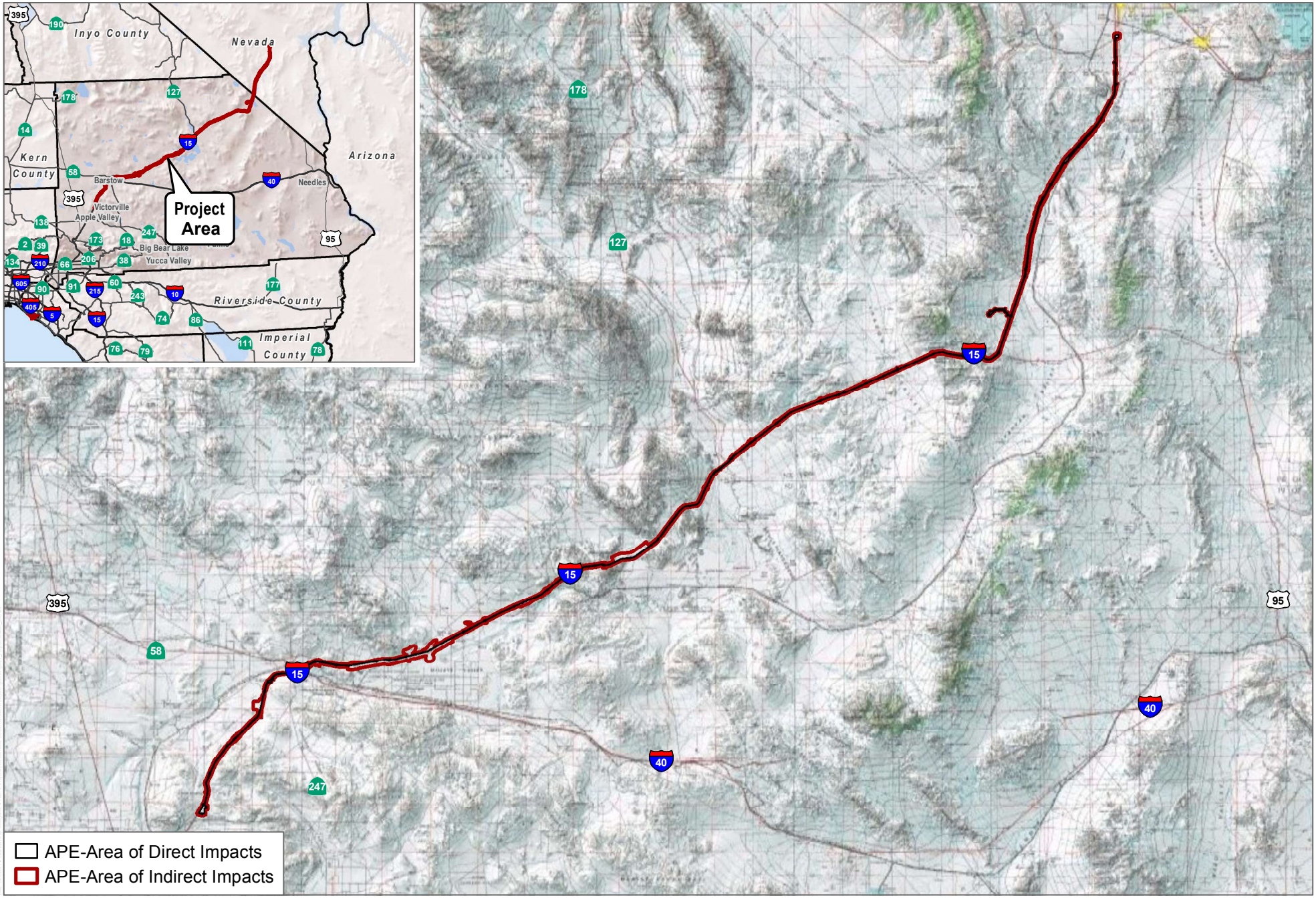
2.2.1. Area of Direct Impact (ADI)

The APE-ADI, which is defined as the Project's Limits of Disturbance (LOD), considers where historic properties may be physically impacted by construction and operational activities. The APE-ADI includes the footprint of the alignment, facility features, and ancillary features. Facility features consist of station locations, substations, and operations, maintenance, and service facilities. Ancillary features include temporary construction easements, staging areas, roadway reconstruction locations, emergency crossovers, utility corridors, and autotransformers. The APE-ADI also includes all areas proposed for eventual double-tracking. The total Project APE-ADI contains 5,732.07 acres (3,607.27 acres in California and 2,124.8 acres in Nevada).

The APE-ADI for the Project takes into consideration the vertical depth of ground disturbance. FRA defined the vertical depth of the APE-ADI based on revised plan and profile designs prepared for the Project. It accounts for the final depths necessary to construct rail bed and footings or foundations of structural components. The APE-ADI depth is expected to range from a few feet (ft) for at-grade work, up to 8 ft (2.43 m) below grade to account for support pilings, and more than 100 ft (30.4 m) for footings associated with waterway crossings. Throughout most of the Project alignment, construction of tracks will require some 'over-excavation' to depths no greater than 2-3 ft (0.61-.91 m). Then, fill material is placed and it is mechanically compacted to provide a stable base for the trackway. Other Project features such as new underpasses with pilings and/or footings may require excavation to depths up to 100 ft (30.4 m). To account for varying depths of project components and provide flexibility for minor project changes, FRA delineated the maximum depth of the Project APE-ADI as up to 120 ft (36.6 m) below current grade. Table 2-1 summarizes the delineation values for the Project APE-ADI.

2.2.2. Area of Indirect Impact (AII)

The APE-AII, which encompasses the APE-ADI, considers both where historic properties may be physically harmed by construction and post-construction Project operation, and, where there may be changes in the pattern of use, or changes in historic character caused by visual intrusions, noise, and/or vibration. The APE-AII is a larger area than the APE-ADI to account for potential effects to historic properties of religious or cultural significance to Consulting Tribes that extend past the APE-ADI. This report focuses primarily on resources that intersect or are within the APE-ADI. However, records search-level information, including maps and site forms, are provided in Confidential Appendices A and B for those resources that have been previously recorded in the APE-AII. The total Project APE-AII contains 46,402.72 acres (38,182.99 acres in California and 8,219.73 acres in Nevada). Table 2-1 summarizes the delineation values for the Project APE-AII.



SOURCE: USGS 7.5-minute Quadrangle

DUDEK

0 44,500 89,000 Feet
0 65,000 130,000 Meters

FIGURE 2-1

Project Location

Brightline West

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3. Historic Properties Requiring Treatment

3.1. Affected Historic Properties Requiring Treatment—Archaeological Resources

A total of 26 archaeological historic properties are located in or partially in the APE and will be adversely affected by construction and operation of the Project, including four prehistoric archaeological districts, 14 individual archaeological sites within those districts, and eight individual archaeological sites (Table 3-1). Three of the individual archaeological sites are located in Nevada; the remaining five are located in California. Maps depicting the location of affected NRHP-eligible archaeological resources are located in Appendix A, and associated archaeological resource records can be found in Appendix B.

Table 3-1. Affected Historic Properties Requiring Treatment—Archaeological Resources

California		
Prehistoric Archaeological Districts		Adverse Effects
SQAD	**Eligible, Criteria A and D**	**Yes**
P-36-000562	**Individual and Contributor, Criteria A and D**	**Possible**
P-36-002283	**Individual and Contributor, Criteria A and D**	**Possible (paved in ADI)**
P-36-003485	**Individual and Contributor, Criteria A and D**	**Yes**
P-36-006950	**Individual and Contributor, Criteria A and D**	**Possible**
P-36-008321	**Individual and Contributor, Criteria A and D**	**Possible**
MRLL	**Eligible, Criteria A and D**	**Yes**
ICF-XW1-010	**Individual and Contributor, Criteria A and D**	**Yes**
ICF-XW2-017	**Individual and Contributor, Criteria A and D**	**Yes**
P-36-000223	**Individual and Contributor, Criteria A and D**	**Yes**
P-36-002129	**Individual and Contributor, Criteria A and D**	**Yes**
P-36-003694	**Individual and Contributor, Criteria A and D**	**Yes**
SRAD	**Eligible, Criteria A and D**	**Yes**
ICF-BV-001	**Individual and Contributor, Criteria A and D**	**Yes**
ICF-XW1-004	**Individual and Contributor, Criteria A and D**	**Yes**
P-36-008923	**Individual and Contributor, Criteria A and D**	**Yes**
CLAD	**Eligible, Criteria A and D**	**Possible**
P-36-004198	**Individual and Contributor, Criteria A and D**	**Possible**
Individual Archaeological Sites		
P-36-000885	**Eligible, Criterion D (prehistoric component)**	**Yes**
P-36-006023	**Eligible, Criterion D (both prehistoric and historic components)**	**Possible**
P-36-000541	**Eligible, Criterion D (prehistoric)**	**Possible**
XPW21-SW-015	**Eligible, Criterion D (prehistoric component only)**	**Yes**
ICF-XW2-007	**Eligible, Criterion D (historic)**	**Yes**
Nevada		

Individual Archaeological Sites		
26CK5760	Eligible, Criterion D (historic)	Yes
26CK7189	Eligible, Criterion D (prehistoric)	Yes
26CK11252	Eligible, Criterion D (prehistoric)	Possible

3.1.1. Sidewinder Quarry Archaeological District

Five archaeological sites that are contributors to the Sidewinder Quarry Archaeological District (SQAD) (P-36-020375), as well as being individually eligible, will be affected by Project construction: P-36-000562, P-36-002283, P-36-003485, P-36-006950, and P-36-008321. Effects to these archaeological sites contribute to adverse effects to the SQAD itself by altering significance-conveying elements within the district.

3.1.1.1. P-36-000562/CA-SBR-000562

P-36-000562 is a prehistoric lithic quarry site measuring 2,000 × 400 m (6,560 × 1,312 ft) located along the Caltrans ROW. The site was previously determined to be a contributing element of the Sidewinder Quarry Archaeological District and was revisited as part of the current survey. It is individually eligible and eligible as a contributor to the SQAD for NRHP listing under criteria A and D.

The site was originally recorded in 1971 by G. H. Strickler (1971) and was described as a quarry site containing chalcedony "bi-face cutting tools, scrapers, workshop material" and seven rock rings well imbedded into desert pavement. The site record was subsequently updated on a few occasions, most recently in 1990 by L. Glover (1990a) who expanded its boundaries. The update described the circular rock alignment features as being used as modern campfires by off road vehicle drivers. Glover also described cryptocrystalline debitage and cores at the site.

In 1996, Michael K. Lerch (Lerch 1996) defined the Sidewinder Quarry Archaeological District, and included P-36-000562 within its boundaries as a contributing element. Lerch recommended the district as eligible for inclusion in the NRHP under criterion D for a number of characteristics and noted that despite some disturbance from the construction of I-15, the district and the sites within it maintain integrity of location, setting, materials workmanship, feeling and association. The most recent 2018 site form update was conducted by John Romani (2018a) as part of a Caltrans project for widening of I-15. The site boundaries were extended 400 m, and the description of cultural materials was consistent with previous recordation and updates. Romani noted that the site appeared to be surficial in nature. Romani also noted that the southwestern portion of the site was heavily disturbed within the Caltrans ROW. Romani noted that the portion of the site within the Caltrans ROW was considered non-contributing to the site and the Sidewinder Quarry Archaeological District due to the amount of disturbance.

ICF surveyed portions of the site due to changes to the Project APE-ADI on three different dates: August 11, May 27, and May 29, 2020. A relatively small portion (approximately 13 acres) of the overall site boundary falls within the Project APE-ADI of this project and was surveyed. Most of the area surveyed is within the Caltrans ROW and is heavily disturbed because of highway construction. A substantial portion of the surveyed area is within the Sidewinder Road/Outlet Center Drive interchange and has been subject to grading and/or construction

activities. Other portions of the Project APE-ADI along the highway have been graded or altered. Areas beyond the Caltrans ROW are mostly intact, with some disturbance related to off-highway vehicle (OHV) activity. Topographically, the setting of the site varies from low rolling hills to relatively flat terrain. The ground surfaces consist of a combination of alluvial sediments and desert pavement surfaces in varying degrees of development. Most of the area surveyed within the Project APE-ADI of this project consisted of highly disturbed sediments. Vegetation within the Project APE-ADI consists of sparse growths of creosote, Russian thistle, bursage, and seasonal grasses. A narrow 20-m-wide strip measuring 290-m long within the Project APE-ADI appears to be undisturbed. A granite hammerstone was identified within the graded shoulder of northbound lanes of I-15, roughly 470 m north of Outlet Center Drive. Surveyors identified a single white multidirectional chert core measuring 3 × 3 × 2 centimeters (cm) and displaying 30 percent cortex was located near the southeastern boundary of the Project APE-ADI on the south side of Outlet Center Drive. Additionally, other debitage was noted in low lying areas adjacent to Outlet Center Drive at the east end of the Project APE-ADI. Surveyors did not identify any other cultural resources within the site boundaries surveyed for the Project APE-ADI of this project. Most of the previously recorded portion of the site is located outside the Project APE-ADI, and pedestrian surveys were not conducted in these areas. Freeway construction and maintenance has severely affected the portions of the site that were surveyed.

The central, northern, and northeastern extents of the site are located on depositional landforms that have the potential for containing surface exposed and buried, Holocene-aged alluvial deposits. The extreme southern and northwestern extents of the site are located on an erosional landform that has limited potential for containing buried deposits. Project construction would directly impact a portion of this site through the damage, displacement, or removal of artifacts within the APE-ADI.

3.1.1.2. P-36-002283/CA-SBR-002283

P-36-002283 is a prehistoric lithic quarry and habitation site measuring 270 × 100 m (886 × 328 ft) located along Caltrans ROW and private lands, and is individually eligible and eligible as a contributor to the SQAD under criteria A and D. The site was first recorded in 1972 by G.H. Strickler who observed 21 “sleeping circles,” three “house rings,” and several flaked stone artifacts on the east side of the I-15 highway. In 1998, the site was revisited by Romani (1998b) as part of the Caltrans I-15 road widening project. Romani recorded 19 rock rings, and at least 45 flaked stone artifacts and tools. Romani expanded the site to extend across both sides of I-15. The site is situated on a low ridge surrounded by intermittent drainages. The site measures approximately 270 m (east to west) by approximately 100 m (north to south) and is bisected by I-15, which runs NNE/SSW at this location. As part of this project, ICF archaeologists surveyed the Project APE-ADI which consists of a corridor within the median of I-15 at this site. An approximately 4,268 m^2 portion of the site is intersected by the Project APE-ADI, and of this area, 100 percent of the ground surface was covered with pavement or asphalt. As such, intensive pedestrian survey of the Project APE-ADI through site P-36-002283 could not be conducted, and as a result, no cultural resources associated with P-36-002283 were observed during the 2019 survey (ICF and Dudek 2022).

The site has been disturbed by the construction and widening of I-15 as the highway has essentially bisected the site. Aerial photographs dating back to 1952 (NETR 2020) show the amount of disturbance created and resulting in an approximately 85 meter wide by 100-meter-long swath of land (approximately 1.95 acres or 7,872 m^2) that was removed or graded from within the site boundary. It is assumed that because resources were encountered on both sides of the highway, they had originally continued into the area currently occupied by the highway ROW and were destroyed.

Project construction would directly impact a portion of this site within the median of I-15 through the damage, displacement, or removal of artifacts. However, given that the ADI is within a paved median, it is unlikely that substantial or intact archaeological deposits are located beneath the pavement. Moreover, the site is characterized as a lithic quarry located on deflated desert pavement that typically do not have substantial subsurface components.

3.1.1.3. P-36-003485/CA-SBR-3485

P-36-003485 is a prehistoric lithic quarry site measuring 225 × 222 m (138 × 128 ft) situated on a series of small ridges incised by intermittent drainages along Caltrans ROW and private lands. The site is individually eligible and eligible as a contributor to the SQAD under criteria A and D.

The site was originally recorded in 1979 by H. James as a small lithic scatter (James 1979) consisting of "several dozen flakes" scattered over an area of approximately 400 m^2. The site was later updated and expanded (Lerch 1996) to include 25 discrete lithic reduction areas (Loci A through Y) consisting of a total of 300+ chert flakes, 19 cores, 5 hammerstones, 2 anvil stones, and numerous tested chert clasts. During an update by EDAW in 2007 (Melmed 2007), 11 of these loci were relocated and recorded, including loci B, C, E, I through O, and Y. A prehistoric trail (P-36-008323) bisects the site.

ICF surveyed the Project APE-ADI adjacent to this site in 2019. At the time, the previously recorded site boundaries ranged from 12–70 m west of the Project APE-ADI. Cultural constituents of the site were found to be in similar condition as those described in the 2007 update, however, additional materials were documented within the Project APE-ADI which was located along the west shoulder of the south bound exit ramp to Sidewinder Road. The newly expanded portion of the site located within the Project APE-ADI includes a light density scatter of chert and chalcedony flakes, tested clasts, hammerstones, and cores. The newly added portion measures roughly 230 m northeast to southwest by approximately 65 m west to east and extends from the western edge of the Project APE-ADI along the exit ramp to the eastern edge of the original site boundary. Modifications to the Project APE-ADI in 2021 (ICF and Dudek 2022) further ensured that the site intersects the APE-ADI.

Soils are described as sandy gravelly loam with a near-ubiquitous surface scatter of poorly sorted sub-rounded to sub-angular gravels comprising several material types including metavolcanic, basalt, quartz, quartzite, and granitic. Topographically, the site is located on a low ridge that is part of a large, dissected alluvial fan. Ground visibility is 80 percent across the site, and vegetation in the area consists of sparse growths of creosote, bursage, Russian thistle, and seasonal grasses.

Disturbances within this portion of the site include OHV traffic, several unnamed dirt roads, freeway construction and maintenance, possible damage from flooding, and natural erosion. Although numerous disturbances are noted, the site does appear to retain integrity

3.1.1.4. P-36-006950/P-36-006951

P-36-006950/P-36-006951 is a prehistoric lithic quarry site measuring 225 × 222 m (738 ×728 ft) and is situated on a broad dissected alluvial fan at the northwest edge of Stoddard Valley along Caltrans ROW. The site is individually eligible and eligible as a contributor to the SQAD under criteria A and D. Soils are described as sandy gravelly loam with a near-ubiquitous surface scatter of poorly sorted sub-rounded to sub-angular gravels and cobbles comprising several material types including metavolcanic, basalt, quartz, quartzite, and granitic. Topographically, the site is located on a large dissected alluvial fan. Ground visibility is 80 percent across the site, and vegetation in the area consists of sparse growths of creosote, bursage, Russian thistle, and seasonal grasses.

The site was originally recorded in 1990 by L. Glover as a moderately sized cobble test/quarry site consisting entirely of cryptocrystalline silicate (CCS) flakes, cores, and shatter (Glover 1990b). No formal tools were noted at that time. Disturbances included off road vehicles and construction activities related to I-15. Sediments were described as a loose, sandy alluvium with a surface layer of small rocks and gravels. A second, very similar site (P-36-006951) was recorded 125 m north at that time.

ICF surveyed the Project APE-ADI adjacent to this site in May and August of 2020. During the May field effort, one pink tertiary chert flake (A9) and a chalcedony tertiary flake (A10) were identified within the site boundary. An additional eight artifacts (A1–A8) were identified extending 250 m south along the graded median of I-15 northbound. Three more artifacts (A10–A13) were identified north of the site between P-36-006950 and P36-06951. The encompassing Sidewinder Quarry Archaeological District is known to be a lithic procurement landscape due to the abundant cobbles of usable materials which can be found on the ground surface. Lithic debitage, tested cobbles, hammerstones, and other stone artifacts are alternately exposed and obscured due to the shifting sands. During the August field effort, the area was surveyed again; however, no artifacts were observed at that time. The spread of the lithic artifacts recorded in May and their proximity to the two known sites, P-36-006950 and P-36-06951 led ICF to combine the two sites under P-36-006950 and expand the site boundary to measure 225 × 222 m (ICF and Dudek 2022).

Disturbances within this portion of the site include OHV traffic, several unnamed dirt roads, freeway construction and maintenance, possible damage from flooding, and natural erosion. Although numerous disturbances are noted, the site does appear to retain integrity east of the Caltrans ROW fence line. Extensive grading of the road shoulders has intermixed mechanically broken nodules with culturally modified lithic material of the same type.

Based on the geology of the area, it was concluded the expanded site is located on the boundary between a depositional and erosional landform. The northern half of the site is located on an erosional landform that has limited potential for containing buried deposits. The

southern half of the site is located on a depositional landform that has potential for containing surface exposed and buried, Holocene-aged alluvial deposits.

The combined site of P-36-006950/P-36-006951 consists of a moderate-sized, moderate-density lithic scatter/quarry site containing numerous flaked stone artifacts, cores, hammerstones, and shatter. It is unknown if a subsurface component exists at the site. No hearth or other thermal features have been noted in any of the previous studies of this site nor did the current survey identify any such features.

The site boundary was expanded again as a result of a subsurface inventory conducted by Dudek (Barton and Hale 2022a; ICF and Dudek 2022). Artifacts were recorded from four positive test units (XPW21-I-112, XPW21-I-113, XPW21-I-114, and XPW21-I-115), and a single surface find (A1) on the west side of the Interstate. Sixteen additional subsurface probes were excavated in the process of boundary testing for this site, all of which were negative. The site, which had previously been known only on the east side of the Interstate was thus expanded to the west.

Project construction would directly impact most of this site along the east and west side of I-15 through the damage, displacement, or removal of artifacts within the APE-ADI. Already the site has been bisected by the construction of I-15.

3.1.1.5. P-36-008321/CA-SBR-8321

P-36-008321 is a prehistoric lithic quarry site measuring 165 × 100 m (541 × 328 ft) and is situated on a broad dissected alluvial fan at the northwest edge of Stoddard Valley along Caltrans ROW. The site is individually eligible and eligible as a contributor to the SQAD under criteria A and D.

The site was originally recorded in 1996 and was described as a “lithic resource procurement area with multiple reduction loci and a light-to-moderate density lithic scatter situated on a level area of desert pavement” (Lerch 1996). The site was updated in 2007 and described as a “lithic quarry area with multiple reduction areas of local white chalcedony/chert nodules” (Melmed 2007). The site as previously delineated consists of 14 individual lithic reduction loci and a scatter of lithic materials. The site is located on an excessively drained alluvial fan approximately 9 km west of Daggett Ridge, approximately 10 km west of Iron Mountain, and centrally between Hinkley, Brisbane, and Stoddard Valleys. Vegetation in the area consists of sparse growths of creosote bush, saltbush, Mormon-tea, Joshua trees, Indian rice grass, and annual grasses and forbs. The depositional setting for the site and greater vicinity is alluvium derived from multiple sources with gravel and cobble inclusions. Sediments within the site boundary are classified as a coarse sandy loam with up to 60 percent of the matrix composed of gravel inclusions. Overall, there was good (90 percent) surface visibility, with some areas slightly obscured by seasonal grasses and creosote. The portion of the Project APE-ADI surveyed near the site during ICF’s 2019 fieldwork was located approximately 30 m east of the boundary originally mapped for the site. Cultural materials were identified at the western edge of the Project APE-ADI, on the shoulder of the southbound lanes of I-15, approximately 30 m from the original site boundary. The newly identified portion of the site consists of two chert primary flakes, and one chert secondary flake. The archaeological materials were identified within an

approximately 30-meter diameter area situated on a gently sloping, slightly undulating surface on the north side of a barbed wire fence. Artifacts documented during this update are similar to those previously recorded elsewhere on the site and within the district as a whole. The debitage represents early stage lithic reduction. The portion of the larger site that was not located within the Project APE-ADI was not surveyed as the property ownership of this area was unknown.

Disturbances noted in the portion of the site (within the Project APE-ADI), include a dirt road, construction of the I-15 and maintenance of the ROW, a metal chain link fence, and effects from flooding and natural erosion. Previously recorded resources which fell outside of the Project APE-ADI were not investigated by ICF, and as such, no determination can be made about the overall condition of the site. Within the Project APE-ADI, the site has been heavily disturbed. Construction activities within the APE-ADI would physically remove the western extremity of this site, affecting the artifacts listed above.

3.1.1.6. Effects to the SQAD

Project construction would directly impact individual contributing archaeological sites within the boundaries of the SQAD through the damage, displacement, or removal of artifacts within the APE-ADI. These impacts also constitute adverse effects to the district itself by altering elements that, together, convey the significance of the district under criteria A and D.

3.1.2. Mojave River Lithic Landscape Archaeological District

Five archaeological sites that are individually eligible and eligible as contributors to the Mojave River Lithic Landscape (MRLL) will be affected by Project construction: ICF-XW1-010, ICF-XW2-017, P-36-000223, P-36-002129, and P-36-003694. Effects to these individual sites contribute to adverse effects to the MRLL itself by altering significance-conveying elements within the district.

3.1.2.1. ICF-XW1-010

ICF-XW1-010 is a prehistoric lithic scatter measuring 20 × 153 m (66 × 502 ft) and located on poorly formed desert pavement along Caltrans ROW. It consists of over 300 lithic artifacts including cores, debitage, hammerstones, and four concentrations measuring 160 × 21 m located within the median of I-15. The site is individually eligible and eligible as a contributor to the MRLL under criteria A and D.

Topographically, the site rests on the valley floor near the base of a series of alluvial fans dissected by numerous small and large drainage channels. The site rests on an exposed, poorly formed desert pavement surface along a slightly elevated ridge. Several small drainage channels cut the ridge and are filled with sediment. Soils on the site consist of sandy loam, and accumulations of finer sand and silt in lower lying drainage channels. Vegetation on the site consists of sparse growths of creosote, Russian thistle, and seasonal grasses.

The site consists of over 300 lithic artifacts including four concentration features and 16 tools such as cores, hammerstones, and utilized flakes. Two of the four features contain single reduction loci representing materials testing and/or reducing to produce tools or preforms. The

point provenienced artifacts include multiple bifacial and multidirectional cores, flaked tools of various types, and vesicular basalt hammerstones. Lithic material types identified within the site boundary include chalcedony, metavolcanics, and chert. The predominate lithic material utilized at the site is chert which occurred in various colors including white, grey banded, and pink in various color combinations. All phases of flaked stone reduction are represented, however most of the debitage appears to represent early-stage reduction. Artifacts observed are highly weathered, some with "desert varnish" on one side. Feature 1 contains three distinct lithic reduction loci. The loci represent isolated flintknapping episodes in which a single type of raw chert material was reduced. Furthermore, most edges on artifacts are moderately rounded likely from aeolian processes which would also cause some artifacts to be deposited in low areas.

Overall, the site retains its physical integrity, however it has been disturbed by the construction of I-15 and has been affected by vehicular traffic driving through the median. Refuse dumping from passing traffic has also affected the site. Additionally, natural processes of erosion and deposition are actively disturbing the site, albeit to a moderate degree. Modern roadside refuse is lightly scattered within the site boundary. The site is cut by several shallow drainages and lower areas within the site are filled with sediment. Despite the site's location within the median and being subject to vehicular traffic, the site is in surprisingly good condition. The desert pavement surface that the site rests on is in fairly stable condition, and it does not appear that construction of the highway disturbed the natural topography of this site.

No temporally diagnostic artifacts or dateable materials have been identified at the site, and no features other than discreet reduction loci were recorded. Project construction would directly impact this site through the complete damage, displacement, or removal of artifacts, as this site is entirely within the project footprint.

3.1.2.2. ICF-XW2-017

ICF-XW2-017 is a prehistoric lithic scatter measuring 14 × 223 m (46 × 731 ft) located in the median of I-15. This site is individually eligible and eligible as a contributor to the MRLL under criteria A and D. The site is located at the northeast end of the Mojave Valley, south of Alvord Mountain, north of the Mojave River and northeast of Manix Wash. The site consists of a large, dense lithic scatter including one concentration (Concentration 1) and extends for approximately 200 m for the entire width of the median. Most of the artifacts are located on high spots in an undulating terrain of poorly formed desert pavement.

Topographically, the site rests on the valley floor near the base of a series of alluvial fans dissected by numerous small and large drainage channels. The site rests on an exposed, poorly formed desert pavement surface along a slightly elevated ridge. Several small drainage channels cut the ridge and are filled with sediment. Soils on the site consist of sandy loam, and accumulations of finer sand and silt in lower lying drainage channels. Vegetation on the site consists of sparse growths of creosote, Russian thistle, and seasonal grasses. Visibility is excellent (approximately 95 percent) across the project site.

The site contains a lithic concentration of over ninety large primary flakes, secondary flakes, debitage, a smaller number of tertiary flakes, and one core (PP1). Many artifacts and

unmodified cobbles exhibit rubification on either their top or undersides and heavy weathering indicating that these materials have been exposed for a long period of time. The predominant lithic materials are chert and chalcedony with metavolcanics identified less frequently. A large percentage of the material is extremely weathered, making in-field analysis of the lithic material difficult. It is likely that some of the debitage may have been utilized as expedient tools, but without magnification or better means of analysis it was difficult to determine whether the materials had use ware due to the degree of weathering. Concentration 1 is located at the southern end of the site and consists of over forty pieces of debitage. A 1 × 1-m sample unit was recorded from within Concentration 1 to ascertain the representative types of lithic artifacts and material types in the concentration. Three chert primary flakes, 3 chert secondary flakes, and 3 chert tertiary flakes were identified within the sample unit. Most of the debitage measures greater than 5 cm in length and width. A single multidirectional chert core was also identified at the site (ICF and Dudek 2022).

Generally, the site retains its physical integrity and is in fair condition. The northern and southern boundaries within the median are obscured by fill associated with the construction of the I-15 north and southbound lanes. It is likely that the site continues on either side of the highway considering that the archaeological materials extend to the edges of the median and the landform that the site is situated on continues on the northern and southern sides of the highway ROW. Alluvial and aeolian activity has partially buried many of the artifacts and it is likely that others are completely obscured. Additionally, the site has been affected by the construction of I-15 through the movement of equipment and vehicles over the ground surface. Numerous artifacts and other cobbles appear to have been displaced as they exhibit rubification on their dorsal surfaces when the ventral (underside) should exhibit this property. The site is also affected by the presence of modern refuse dumping from vehicular traffic along I-15.

The site appears to be the location of opportunistic lithic materials acquisition, testing and reduction. Although the portion of the site within the Project APE-ADI certainly has been impacted due to the construction of the highway and from vehicular traffic, the archaeological deposits appear mostly intact. A majority of the lithic debitage represents early-stage lithic reduction and materials testing, however all stages of reduction are noted. A single chert core was the only artifact identified that wasn't debitage. No other artifact types, faunal material, or features have been recorded at the site.

No temporally diagnostic artifacts or dateable materials have been identified at the site, and no features other than one lithic concentration were recorded. Project construction would directly impact this site through the complete damage, displacement, or removal of artifacts, as this site is entirely within the project APE-ADI.

3.1.2.3. P-36-000223/CA-SBR-223

P-36-000223/CA-SBR-223 is a multicomponent site consisting of historic period structural foundations and refuse scatters along with an expansive lithic quarry. The site measures 2,050 × 780 m (6,724 × 2,558 ft) and is located along Caltrans ROW and private lands. The prehistoric

component of this site is individually eligible and eligible as a contributor to the MRLL under criteria A and D.

The site was originally recorded in 1939 by Malcolm J. Rogers as Site SDM-M-100 and described as a dense quarry site with a total of 52 rock cairns spaced at large intervals and generally following the crests of the hills they were placed on. Rogers noted a high density of flaked stone both within and surrounding the cairns. Subsequent updates (1958, 1970, 1971, 1987, 1988, 1999, 2008, and 2012 – see ICF and Dudek 2022) mention numerous cores and unifacially and bifacially flaked tools, including scrapers and choppers. The presence of a stratified subsurface deposit is also described. In 2012, Chambers Group (Bodmer et al. 2013a) extended the site boundaries to include numerous historic resources, including concrete foundations, historic refuse concentrations, mining pits and debris and two historic/modern rock alignments that form the letters “R” and “P” associated with a historical period quarry.

The site is located on a series of low, alluvial finger ridges and a ridgeline which extend to the dry lakebed known as Lake Manix. The well-developed desert pavement on the ridge tops becomes less well developed toward lower elevations and grades into alluvial sand deposits at the bottom. The hills are dissected by a number of wash channels that run off in all directions from the crests of the hills. Vegetation on site is of the Creosote Bush Community. A large portion of the site was destroyed when I-15 was constructed by grading directly through a portion of the ridgeline that site components are located on.

The portion of the site within the Project APE-ADI was surveyed in December of 2019 by the ICF team and was found to be in similar condition as described in the 2012 update, however additional artifacts were identified and the site boundary was extended approximately 100 m to the north and west of the southbound side of I-15. The newly added portion of the site is located within the south bound shoulder of I-15 and includes a dense scatter of primarily chert, basalt, and chalcedony debitage, predominately representing early-stage reduction and/or materials testing. Numerous primary, secondary, and tertiary flakes were observed, along with at least nine cores and five flaked tools. Primary, secondary, and tertiary flakes are present in many different size classes, and material types and at least one piece of debitage with edge modification was noted. Although the revisited portion of the site is consistent with previously recorded data, the site boundary was expanded 80 m to the north and 50 m to the west to incorporate newly identified site components. This portion of the Project APE-ADI is located along a large cut into a hill for I-15 within and adjacent to an approximately 3-m-wide by 0.76-m-deep drainage ditch along the south bound shoulder of I-15. Historical period resources were not observed within the surveyed portion of the site. The majority of known historical period components of the site are located outside of the current Project APE-ADI. Vegetation in the area consists of sparsely scattered creosote, Russian thistle, bursage, and seasonal grasses. Surface visibility was very good at approximately 90–100 percent.

Disturbances within this portion of the site include potential OHV traffic, Hacienda Road, I-15 construction/maintenance, alluvial activity, and natural erosion. Overall, the site retains good integrity, however, it has been affected by construction of I-15 and the prehistoric component has been affected by historical period quarrying activities. The construction of I-15 through the southern section of the site has had a major impact that likely displaced a significant number of

cultural materials. Artifacts identified during this survey (ICF and Dudek 2022) were seen at the crest of the graded hill, and were seen to be eroding down the steep slope of the cut that was created as a result of highway construction. As a result, artifacts were also identified in the median of I-15 some 20 ft or more below where they were originally deposited. These artifacts were clearly redeposited during grading for the highway.

The prehistoric component of the site represents gathering and processing of lithic resources on a large scale, and likely over a long period of time. The portion of the site that was updated in the Project APE-ADI was extremely dense with lithic materials, however no features were identified. This area may have mainly been used for resource extraction with a base camp being located somewhere nearby, such as at the lake margins. ICF's 2019 update does not change the interpretation of the site but further bolsters what has been previously recorded.

Construction within the median of I-15 would physically remove a portion of this site. The project would permanently destroy all elements of the site within the APE-ADI.

3.1.2.4. P-36-002129/ CA-SBR-002129

P-36-002129 is an extensive prehistoric lithic quarry measuring 3.6 × 0.88 km (11,808 × 2,886 ft) located along Caltrans ROW and private lands. The site is individually eligible and eligible as a contributor to the MRLL under criteria A and D.

P-36-002129 is very large and extends approximately 3 kilometers (km) north and east of the Project APE-ADI. The site was originally recorded by G. Smith at an unknown date and known as the Toomey Hills site under the trinomial SBCM-1508 locus 168B. The record has been updated multiple times since the original recordation. Sayles and Leakey conducted updates to the site from 1963 to 1967 (see ICF and Dudek 2022). The Sayles 1966 update noted the presence of reduction loci, features, bifaces, choppers, scrapers, and thousands of flakes within the upper 2 ft of the deposit and as depth of 6 ft (1.8 m) to lake deposits. Sayles and Leakey noted "workshop clusters" surrounding the "main" portion of the site, which was described as the quarry area. Sayles and Leakey also noted that the site was being looted and that there was disturbance from natural erosion and two track roads. The site was updated again in 1979 by Lipp, who established the sites current boundary as covering "2.5 × 0.75-mile." Lipp's description of the site was similar to earlier documentation of the site.

ICF archaeologists surveyed areas adjacent to the site on December 13, 2019, and August 7–10, 2020. In December, the ICF team surveyed the median of I-15 adjacent to the previously recorded site boundaries; however, only one isolate was recorded consisting of two pieces of debitage. At the time, these artifacts were interpreted as an isolated occurrence and not part of the site. After additions were made to the Project APE-ADI, areas adjacent to the site boundaries were surveyed again in August of 2020. These areas consisted of two large blocks adjacent to the north and south sides of the highway. On the north side of the highway, a scatter of artifacts was found that connected the previously mapped southern boundary of the site to the highway. Survey in the block on the southern side of the highway encountered another relatively dense scatter of artifacts, expanding the boundary further to the south. Dudek archaeologists surveyed the area again, along the north side of the southbound lane of I-15 in August 2021, and in both the median and the shoulder south of the northbound lane in

October, 2021 as part of the Subsurface Inventory (Barton and Hale 2022a). This effort recorded an additional 19 isolated artifacts on both sides of the interstate (though not in the median), requiring an addition expansion of the site boundary to the southside of the interstate east of the ICF's expansion.

The expanded portion of the site is located on an alluvial fan with a slight slope of 0 to 2 percent towards the Mojave River to the south. Surface soils consist of alluvium derived from mixed sources (SoilWeb 2020). The underlying formation is uplifted sedimentary bedrock containing numerous cobbles and pebbles of a variety of lithic material types. This uplifted formation has been incised by the construction of the I-15 in some areas. The sediments at the site are identified as grayish brown silt and coarse sand with occasional rounded to sub-rounded gravels on a slight slope with a deflated surface of rhyolite, chert, chalcedony, gabbro, and a mixture of other lithic sources at the top of the ridge to the north. Vegetation on site consists mostly of creosote and Russian thistle, with some seasonal grasses. Vegetation density decreases at the top of the ridge.

The expanded portion of the site within and immediately surrounding the Project APE-ADI was found to contain five discrete lithic reduction loci containing debitage indicating all stages of reduction, exhausted cores, battered and tested cobbles, formal flaked tools, a rock cairn feature (F1) and a large, tested CCS boulder (F2). This newly recorded lithic assemblage is consistent with materials recorded in earlier documentation of site P-36-002129, and it was decided that the new materials would be recorded as an expansion of the site (ICF and Dudek 2022). As discussed previously, cultural materials within the Project APE-ADI and up to 20 m beyond the boundaries of the Project APE-ADI were analyzed and recorded in full, whereas materials from 20 to 100 m beyond the Project APE-ADI were tallied and noted but not fully analyzed. The site boundaries appear to expand beyond 100 m in all directions to an unknown distance from the original southern boundaries of the site. Another very large prehistoric lithic scatter and lithic quarry site (P-36-001933) is located approximately 400 m to the south of the southern-most recorded artifacts at P-36-002129, and it is possible that the two lithic scatters may connect.

The expanded portion of the site is bisected by I-15 and measures approximately 210 m south × 420 m east to west. It extends approximately 50 m north of Yermo Road, 240 m west of Call Box 15 916, and 200 m west of Coyote Lake Road. However, as discussed above, it is likely that the site boundaries extend even further south. Newly added elements to the site include 23 point provenienced lithic flaked artifacts, 4 discreet reduction loci, and 1 cairn feature.

In addition to point-provenienced tools and features, the ICF team conducted a tally of lithic artifacts within the Project APE-ADI and within a buffer of 20 to 100 m. The dominant lithic material observed during the tally was debitage and tools of various kinds of CCS, such as cherts and chalcedony, with a smaller number of artifacts of igneous materials such as rhyolites and basaltsrepresented. The purpose of the tally was to determine a general density, material type, and range of stages of the lithic assemblage present within the newly expanded portion of P 36 002129 beyond the Project APE-ADI and 20-m buffer that was more intensively analyzed and recorded. A total of 724 lithic artifacts were tallied by material type and artifact. This tally includes the entire expanded area both north and south of I-15. It was noted that artifacts

continued south of the expanded boundary, although full recordation of the materials beyond 100 m of the Project APE-ADI boundaries was beyond the scope of the inventory.

Disturbances within the newly recorded portion of the site include road toss refuse, OHV activity, foot traffic, looting, I-15 construction/maintenance, natural alluvial and aeolian activity, and natural erosion. Overall the site retains good integrity; however, it has been affected by construction of I-15, likely the construction of Yermo Road and the Union Pacific Railroad, and has been affected by historical period excavation and looting of the site. The construction of I-15 through the site has certainly displaced or destroyed a significant number of cultural materials. The pre-I-15 Route 91, now Yermo Road, is still in use and has provided passers-by easy access to the site for decades. Artifacts identified during this survey were seen at the crest of the graded hill to the north and eroding down the steep slope of the cut created because of highway construction. Artifacts identified in the northern portion of the bisected expanded area north of the I-15 southbound lanes were likely moved from their original depositional contexts.

Based on the geology of the area, it was concluded the site extends across both depositional and erosional landforms. The southern, south-central, and northern portions of the site are located on depositional landforms that have the potential for containing surface exposed and buried, Holocene aged alluvial deposits. The central portion of the site is located on an erosional landform that has limited potential for containing buried deposits. Previous recordation of the site suggests that a subsurface component exists, and it appears that some form of subsurface testing may have been conducted; however, no reporting on the results of this activity could be located.

Because of its size, many of the main site constituents were not updated due to their locations outside of the Project APE-ADI. The site has been disturbed by several different activities, including the construction of I-15, grading, OHV activity, looting, and natural erosional and depositional activity. Large portions of the site, however, appear to be mostly unaltered. The portions of the site within the Project APE-ADI that were documented by ICF have been heavily disturbed.

Project construction would directly impact a portion of this site through the damage, displacement, or removal of artifacts within the APE-ADI. Although the impact area is small relative to the overall area of the site, it is unknown if buried deposits exist there. If present, buried deposits would be located to the north and south of I-15 since the median consists of displaced and prepared sediments from construction of the highway, including a substantial cut to the north.

3.1.2.5. P-36-003694/CA-SBR-3694/H (The Midway Site)

P-36-003694 is a multicomponent site that includes mid-twentieth century foundations and refuse and a lithic quarry measuring 560 × 5,300 m (1,836 x 17,384ft) and located along Caltrans ROW and private lands. This site is individually eligible and eligible as a contributor to the MRLL under criteria A and D.

P-36-003694, also known as the Midway Site, is a large lithic scatter located along the southern edge of the I-15 near the Midway Safety Roadside Rest stop (Clyde V. Kane Rest Area).

Hammond and Lando originally recorded the site in 1979, describing it as a temporary camp represented by a discontinuous scatter of lithic tools and debris dispersed over a large area. The site was revisited in 1987 by R. Apple and T. Gonzalez, who described it as a large lithic procurement and reduction site. In 2008, J. Peabody, M. Button, P. Meadville, and R. Abell updated the site and its boundaries to include multiple historic period trash scatters within the site boundary. Peabody updated the site again in 2008 to include additional prehistoric lithics. Caltrans also visited and updated the site in 2008 and described prehistoric and historic resources within the site boundaries adjacent to the Clyde V. Kane Rest Area.

The 1979 site record appears to show the site boundaries on both sides of I-15, and Prehistoric cultural constituents recorded at the site include numerous pieces of debitage of different materials, cores, utilized flakes and bifaces, a "Gypsum Cave" projectile point, a projectile point base, grinding implements such as manos and metate fragments, discreet chipping stations, and one rock ring feature with associated cores and debitage. The historical component of the site includes structural remains associated with an old service station and scatters of historical period artifacts said to date from the early to mid-twentieth century.

The current project required survey of the median of I-15, portions of the shoulder of the southbound lanes and portions of the graded areas at the Clyde V. Kane Rest Area. Surveys within and adjacent to the previously recorded site boundary were conducted by ICF on December 19, 2019 (median), August 5, 2020 (rest stop area), and August 6, 2020 (new Project APE-ADI north of I-15). As a result, ICF identified previously unrecorded lithic assemblages in the highly disturbed survey area north of the site boundary on the shoulder of the southbound lanes and in the median of I-15. The discovery of artifacts and features led to the expansion of the site boundaries to the northwest. ICF also recorded two lithic artifacts in the highly disturbed survey areas adjacent to Clyde V. Kane Rest Area within the existing site boundary. In addition to five pieces of chert debitage, one white-grey chert secondary flake, one red and brown mottled core fragment and two rock rings of unknown age were also identified within the median of I-15. The rock ring features are of unknown age, as there were no temporally diagnostic materials that could be directly associated with them. Some portions of the median in this area appear to be significantly disturbed from grading of the median and construction of the highway, whereas other areas appear to be relatively undisturbed and look similar to the surrounding landscape. It is unknown whether the lithic artifacts identified in the median are intact or have been moved or redeposited as a result of highway construction and/or maintenance (ICF and Dudek 2022).

Soils on the site are described as poorly sorted sand and decomposing granite with sub-angular and sub-rounded gravel and pebble inclusions. Ground visibility is 90 percent across the site and vegetation is described as patchy Russian thistle, creosote, and seasonal grasses.

Disturbances within this portion of the site include the construction of I-15 and the Clyde V. Kane Rest Area. Some portions of the median have been significantly graded, whereas other areas appear to be relatively undisturbed. Large drainpipes and "guzzlers" or intake drains are also present in the median, however it is unknown how extensive this system of drainage pipes is. The Clyde V. Kane Rest Area has significantly disturbed a portion of the site and destroyed a previously recorded historical period portion of the site. A mid-twentieth century service

station was in this area and has been demolished; however, remnants of foundations and scattered artifacts remain.

Project construction would directly impact a portion of this site through the damage, displacement, or removal of artifacts within the APE-ADI. Permanent impacts in the APE-ADI include Project construction in the I-15 median, and construction of an emergency crossover. Although the impact area is small relative to the overall area of the site, it is unknown if buried deposits exist in the impact area.

3.1.2.6. Effects to the MRLL

Project construction would directly impact individual contributing archaeological sites within the boundaries of the MRLL through the damage, displacement, or removal of artifacts within the APE-ADI. These impacts also constitute adverse effects to the district itself by altering elements that, together, convey the significance of the district under criteria A and D.

3.1.3. Soapmine Road Archaeological District

Three archaeological sites that are individually eligible and eligible as contributors to the Soapmine Road Archaeological District (SRAD) that will be affected by Project construction are ICF-BV-001, ICF-XW1-004, and P-36-008923. Effects to these individual archaeological sites contribute to adverse effects to the SRAD itself by altering the significance-conveying elements of the district under criteria A and D.

3.1.3.1. ICF-BV-001

ICF-BV-001 is a prehistoric lithic scatter measuring 20 × 17 m (66 × 56 ft) and located on the north side of a bend in the Mojave River east of Barstow along Caltrans ROW. The site sits on a small terrace at the foot of a large weathered igneous outcrop identified as dominantly Dacite on the USGS 1954 Nebo 1:24,000 Geologic map south of Mitchell Range, and east of the Marine Corps Supply Center (Nebo area). The site is individually eligible and eligible as a contributor to the SRAD under criteria A and D.

Topographically, the site is located near the base of an incised alluvial fan or backslope with a slight slope to the southeast. Sediments consist of sandy alluvium derived from granitic sources with cobbles derived from the volcanic sources upslope. Vegetation in the area consists of creosote, saltbush, Russian thistle, and other members of the creosote scrub community. Visibility on the site is good (approximately 80 percent). Some disturbance to the site is likely because of construction of the I-15 overpass adjacent to the site, and a wash channel that cuts along its northeastern boundary.

ICF-BV-001 is a sparse lithic scatter consisting of jasper, chert, quartzite, and rhyolite debitage, representing all stages of lithic reduction, cobble testing, and tool use and retouch. Tools identified at the site include 1 chert expedient tool (A3) and 1 multidirectional rhyolite core fragment (A1). Other artifacts identified at the site include primary, secondary, and tertiary flakes of chert, jasper, quartzite, and rhyolite. All stages of lithic reduction took place at the site with a focus on later stage reduction as indicated by the identification of 2 primary flakes, 21 secondary, and 8 tertiary flakes. It is likely that some expedient tool production and tool

manufacture or retouch took place at the site. The archaeological team (ICF and Dudek 2022) did not record distinct reduction loci, and materials appear to be randomly dispersed across the site. No features were identified at the site.

The site appears to be moderately disturbed via the effects of natural erosion and disturbance from the construction of I-15 located almost immediately adjacent to the site on its western boundary. A residential property is located on the southeastern edge of the site that appears to have been graded. It is unclear whether the grading has affected the location of the site, however the presence of more dense vegetation within the site boundary indicates a low likelihood of such disturbance. Review of aerial photographs dating back to 1952, prior to the construction of I-15 appear to show the area of the site undisturbed and with the same drainage located in the western portion of the site. The site is subject to erosional activity from adjacent drainages and alluvial deposition from the hills above the site to the north. Project construction would directly impact this site through the almost complete damage, displacement, or removal of artifacts, as this site is almost entirely within the project APE-ADI.

3.1.3.2. ICF-XW1-004

ICF-XW1-004 is a prehistoric lithic scatter measuring 67 × 35 m (220 × 115 ft) and located south of Mitchel Range, southwest of the Calico Mountains, and northeast of the Mojave River along Caltrans ROW. The site is individually eligible and eligible as a contributor to the SRAD under criteria A and D.

Topographically, the site is located on the toeslope of an alluvial fan adjacent to a large wash. The fan is dissected by numerous large and small drainages. The ground surface is a moderately developed desert pavement consisting of mostly granitic, volcanic, and metavolcanic pebbles and cobbles. Chert nodules and cobbles area also found in this pavement surface. Sediments within the site boundary are classified as loamy coarse sand with up to 60 percent of the matrix composed of gravel and cobble inclusions. Ground visibility is 90 percent across the site. Vegetation on the site is characterized by species associated with the creosote scrub community and primarily consists of sparse growths of creosote and spiny hopsage.

ICF-XW1-004 consists of a lithic scatter with four artifact concentrations and five flaked and battered stone tools situated on a well-developed desert pavement surface (ICF and Dudek 2022). The lithic material types recorded at the site include various types of chert, metavolcanics, basalt, and quartzite. The lithic tools documented at the site include 1 edge modified flake, 1 quartzite hammerstone, and 2 bifacial flake cores. In addition to artifacts within concentrations, lithic debitage and tools are dispersed across the site, roughly conforming to areas where the pavement surface is exposed. Over 35 pieces of debitage representing all stages of lithic reduction in relatively even numbers were documented within the site boundaries. Materials include various kinds of chert, jasper, chalcedony, rhyolite and metavolcanics.. Some artifacts are embedded in the desert pavement surface, and it is likely that other artifacts are obscured by siltation from shallow drainage channels that cross the site.

Concentration 1 is a small concentration of chert that consists of debitage from all stages of core reduction. At least two different types of chert are represented in this concentration. Concentration 2 is a discreet single episode reduction locus that consists of 20 pieces of

metavolcanic (likely rhyolite) debitage representing mostly early-stage core reduction of a single cobble. Concentration 3 is a large concentration of lithic debitage and two bifacial cores. Most of the debitage in Concentration 3 is representative of late-stage core reduction. Two bifacial chert flake cores are likely the source of most of the debitage within the concentration. Concentration 4 is a relatively dense concentration consisting of two chert cores and chert and metavolcanic debitage representing all stages of core reduction.

The site is in fair condition. It is likely the site has been affected by modern development as the I-15 freeway and associated ROW is to the north and a graded transmission line access road is to the south. The northern margin of the site has been affected by road construction, and vehicular tracks from OHV was noted across the site boundaries. Additionally, the site is subject to erosion associated with several shallow drainage channels that cut through it. Despite the various impacts on the site from natural and other human-induced causes, the desert pavement that the site rests on is mostly intact. Project construction would directly impact a portion of this site through the damage, displacement, or removal of artifacts within the APE-ADI.

3.1.3.3. P-36-008923/ CA-SBR-8923

P-36-008923 is an expansive prehistoric quarry measuring 1,035 × 822 m (3,395 × 2,700 ft) containing multiple rock cairns, rock alignment features, and discrete lithic reduction loci. It is located along Caltrans ROW and private land. The site is individually eligible and eligible as a contributor to the SRAD under criteria A and D.

The site was first recorded in 1997 by ASM Affiliates and described as an extensive prehistoric quarry. The site is situated on desert pavement surfaces covering a series of alluvial fan fingers or terraces dissected by small drainages. Multiple discreet lithic reduction loci, six rock cairn features, and a rock alignment were recorded amongst a light to moderate density lithic scatter. ASM described most of the debitage as representing early-stage reduction and materials testing. The site record was updated later in 1997, also by ASM Affiliates, to document 10 or more rock cairns which they stated were either from the historic or modern periods. At that time, 347 artifacts were collected, with curation planned at a facility that was not identified.

ICF visited the area immediately north of the 1997 site boundary, within the median of I-15, south of the I-15 northbound lanes, and within the Old CA Highway 58 interchange (ICF and Dudek 2022). A relatively small portion of the site overall (approximately 41,224 m^2 or 10 acres) fell within this ICF survey area. Within the previously recorded site area surveyed by ICF, two pieces of debitage and one rock ring of undetermined age were identified. Four concentrations of lithic artifacts and two rock rings were identified and documented north of the 1997 site boundary by the ICF team. Survey by ICF was confined to those portions of the site within the Project APE-ADI. As a result of the ICF survey, the site boundaries were extended approximately 100 m to the north to include newly recorded archaeological materials.

Dudek visited the area immediately north of the 1997 site boundary and east of ICF's investigation in the process of conducting boundary testing as part of the Subsurface Inventory (Barton and Hale 2022a). One concentration of artifacts (Concentration 5) and one point-

provenienced artifact (LB-501) not associated with a concentration were recorded. This warranted expansion of the site boundary to the northbound lane of I-15.

The topography surrounding the site is characterized as erosional, consisting of well-developed desert pavement cut by seasonal drainages and washes. Sediments consist of sandy and gravelly loam with up to 15 percent pebbles and up to 10 percent cobble inclusions. Ground visibility was good, described as 90 percent across the site. Vegetation on the site consists of moderate growths of creosote, bursage, hopsage, Mormon tea, yucca, and occasional Joshua trees.

Overall, portions of the site have been altered by a few different activities including the construction of I-15 and modern refuse dumping. Large portions of the site, however, appear to be mostly unaltered. The portions of the site within the Project APE-ADI that were documented by ICF have been moderately disturbed, however, additional archaeological studies are necessary to determine the exact level of disturbance.

Construction activities within the permanent and temporary project footprint would physically remove the northern portion of this site. It is unknown whether the site contains a subsurface deposit because archaeological testing activities have not been conducted; however, the soil onsite indicates some potential for buried deposits to exist.

3.1.3.4. Effects to the SRAD

Project construction would directly impact individual contributing archaeological sites within the boundaries of the SRAD through the damage, displacement, or removal of artifacts within the APE-ADI. These impacts also constitute adverse effects to the district itself by altering elements that, together, convey the significance of the district under criteria A and D.

3.1.4. Cronese Lake Archaeological District

One archaeological site that is individually eligible and contributes to the Cronese Lake Archaeological District (CLAD) and will be affected by Project construction is P-36-004198. Effects to this individual site contribute to adverse effects to the CLAD itself by altering significance-conveying elements within the district under criteria A and D.

3.1.4.1. P-36-004198/ CA-SBR-4198

P-36-004198 is a large prehistoric habitation site measuring 465 × 350 m (1,525 × 1,148 ft) and situated along the southeastern shore of East Cronese Lake along Caltrans ROW and private lands. The site is individually eligible and eligible as a contributor to the CLAD under criteria A and D.

P-36-004198 has a long history of archaeological work and has undergone several iterations of site boundaries during this time. Previously recorded evidence of habitation includes pottery, flaked and ground stone, hearth features, shell beads, worked bone artifacts, textiles, cremations and inhumations, temporally diagnostic artifacts, house pits, as well as burned faunal bone and shell. Portions of the site were originally recorded and excavated by Malcolm Rogers in 1928 and was described as the largest habitation site of the Mojave Sink region. Rogers identified and analyzed washed out cremations including five cremation pits with

human remains, grave goods of stone and bone tools, shell adornments, and pottery sherds. Rogers conducted testing at the site and artifacts from that excavation were dated to the Yuman II horizon, which Rogers determined to be the period of major occupation (Rogers 1928). Sutton (1981) and Tambunga (1981), of the BLM each updated the site and both described it as a large complete habitation site affected by erosional activities within a dune complex (Sutton 1981). The updates described artifacts such as ceramics, fire affected rock, ground stone, freshwater mussel shell, burned tortoise shell, blown out hearths, activity areas, lithic debitage, and possible human remains. Both archaeologists noted that the site is likely to be more extensive and buried under dune sands. Prior to the current Inventory Project, the most recent updates to the site occurred in 2012 and 2013 by Bodmer et al. (Bodmer et al 2013b), who recorded two loci of artifact concentrations with a curiously small site boundary that didn't include the extents of previous recordings. Bodmer et al. identified similar artifacts to those recorded by previous researchers in addition to worked bone, worked ceramics, a projectile point, and decorated ceramics. Bodmer et al. (2013b) were restricted by their Project APE and only recorded cultural materials within an approximately 60-m diameter area. These authors also noted that the site was likely to be mostly buried under dune sands.

Additional site components were observed during the ICF 2019 survey adjacent to and within the Project APE-ADI (ICF and Dudek 2022). The boundary has been expanded to include these new components and now encompasses the Basin Road I-15 interchange. Survey was conducted to the northwest of the Project APE-ADI to verify that the newly identified resources are contiguous with the previously recorded site boundaries to the north. The ICF team found a continuous scatter of artifacts, ecofacts, and features extending into the boundaries of the previously recorded site. The updated portion of the site measures approximately 25 acres and is located within undulating unstable sand dunes within the Cronese Basin. The general vicinity is characterized by actively shifting sands from the dry lakebeds within the Basin (Bodmer et al. 2013b).

The depositional setting for the site and greater vicinity is an excessively drained igneous alluvium derived from multiple sources and a sandy dune surface. Ground visibility is 95 percent across the site, however, constantly shifting dunes clearly obscure surface visibility and have buried cultural resources. Vegetation surrounding the site is of the Creosote Bush Community and consists primarily of moderate growths of creosote, mesquite, and bunch grasses.

The newly expanded portion of the site includes a dense shell bead and possible cremation feature (F1), a shell midden feature (F2), a possible human cremation feature (F3), two deflated thermal features (F4 and F5), and a second shell midden feature (F6), as well as numerous surface artifacts, including 26 point-provenienced prehistoric artifacts. Surface artifacts recorded include shell and stone beads, ground stone fragments, projectile points, pottery sherds of various types, and possible cremated human bone fragments. F1 measures approximately 20 m (northeast to southwest) × 25 m (northwest to southeast) and is located north of the median of I-15. F1 consists of more than 20 shell beads, including disk beads, possible *Olivella* sidewall beads, possible *Mytilus* disk beads, and numerous fragments of bone; some that are calcined and possibly representative of human cremations. FRA is in the process of making formal identification findings of the possible human remains. F2 measures 30 m in

diameter and is also located within the southbound offramp area north of the I-15 median. F2 consists of a moderately dense freshwater shell midden composed of primarily callus and nacre fragments from species including gastropod, freshwater mollusk, and bivalves. F3 measures 10 × 10 m and is located north of the southbound offramp of I-15. F3 consists of a possible human cremation, burned bone fragments, more than 30 brown and buffware body sherds, and shell and faunal fragments. F4 and F5 each measure 10 m in diameter and are also located north of the southbound offramp of I-15. F4 and F5 consist of two deflated hearth or roasting pit features with burned shell and bone fragments. F6 covers roughly 100 × 25 m and includes more than 200 fragments of freshwater mussel shell nacre scattered off the south side of the eastbound I-15 exit ramp. The newly recorded portion of the site extends the previously recorded boundary by approximately 460 m to the south and 440 m to the east.

Overall, cultural material and features within the newly expanded portion of the site are consistent with the previously recorded large lakeside habitation site containing a high density of freshwater shell, brown and buff ware ceramics, lithic debitage, shell and stone beads, faunal bone, projectile points, ground stone fragments, midden areas, and possible cremated human remains. Both flaked and ground stone artifacts were identified including ground vesicular basalt and sandstone, and debitage representing later stage lithic reduction using multiple material types such as various colors of chert, basalt, chalcedony, and jasper. Three projectile points were recorded: a basalt concave based triangular Cottonwood arrow point, a yellowish chalcedony Desert Side-Notched arrow point, and an opaque chalcedony Desert Side-Notched point. Sherds of brown ware and Colorado buffware ceramics, including rim sherds and numerous body fragments, were recorded as well as “pot drops” likely representing whole vessels. The site is situated in an area of dune sands and hummocks covered in gravel bars or poorly developed pavement surfaces. There is a high potential for subsurface materials due to the constantly moving sand dunes, and natural aeolian deposition.

Natural aeolian deposition has likely buried much of the site; and portions have been disturbed as a result of the construction of I-15, the Basin Road overpass, and on and off ramps. However, resources were identified in the areas between off ramp road segments and the highway indicating that much of the site remains intact within the Project APE-ADI despite highway construction. Disturbances to the site include off-road recreational vehicle traffic, intrusive modern refuse, access to the site by passers-by, rodent activity, apparent looting, and natural erosion and aeolian deposition. Overall, the site retains high integrity having been mostly buried by shifting dunes. Fragments of freshwater shell were identified within the center median of I-15 within the Project APE-ADI; however, no other cultural materials were identified in this area. The extent of disturbance to the site within the median is unknown at this time, however it is likely that some portion of the ground surface was modified during construction of the highway.

P-36-004198 represents an area of dense prehistoric habitation including material evidence of a wide variety of daily and possibly ceremonial activities (Bodmer et al. 2013b). The site has been identified by numerous researchers for many years as important to understanding the prehistory of the Mojave Desert (Coombs et al. 1979; Drover 1979; Moratto 1984; Rogers 1929; Sutton 1996, 2017). Although the site has been recognized as an important site in the region, and for its ability to address numerous research questions, according to documentation

available to ICF the site does not appear to have been formally evaluated for its potential inclusion in the NRHP. The site is slightly altered due to construction of I-15. There is no development (residential or otherwise) in the general region surrounding the site, and apart from a small portion of the site that has been intersected by the highway site characteristics generally remain intact.

Construction activities within the APE-ADI would physically remove a portion of this site. It is unknown whether the site contains a subsurface deposit within the Project APE-ADI; however, the property's location in an active dune complex indicates a high potential for buried deposits to exist. Moreover, the Project will adversely affect possible cremation features near to but outside of the APE-ADI to the north through noise and vibration generated during construction.

3.1.4.2. Effects to the CLAD

Project construction would directly impact individual contributing archaeological sites within the boundaries of the CLAD through the damage, displacement, or removal of artifacts within the APE-ADI and through construction-phase noise and vibration that disturb the setting and feel of sensitive portions of P-360004198. These impacts also constitute adverse effects to the district itself by altering elements that, together, convey the significance of the district under criteria A and D.

3.1.5. Individually-Affected Archaeological Sites in California

Five individual archaeological sites without archaeological district affiliation located in California will be affected by Project construction: P-36-000885, P-36-006023, P-36-000541, XPW21-SW-015, and ICF-XW2-007.

3.1.5.1. P-36-000885/ CA-SBR-885/H

P-36-000885 is a multicomponent site consisting of historic period commercial features and refuse with a prehistoric component that includes a lithic quarry and habitation features contained in a 620 × 310 m (2,034 × 1017 ft) area within Caltrans ROW. The site is individually eligible for NRHP listing under Criterion D because archaeological deposits at the site have high information value.

The site was originally recorded in 1972 by an unknown person who listed Mike McCormack a "5th grade student at Mt. Pass Elementary School" as the person who recorded the site. The McCormack family were the property owners and residents of the Valley Wells Station. The 1972 site record described circular rock alignments at the site. The site was updated in 1979 by R. A. Musser, and was described as having a bedrock mortar, displaced metates, and other historical period debris. The site was updated again in 2018 by Dicken Everson and Ashley Bowman of Caltrans District 8. At that time, it was indicated that a "brief reconnaissance" not a "full recording of cultural materials" had been completed at the site. The cursory survey of the site identified scatters of historical period artifacts, a single metate fragment, and scattered modern refuse associated with the Valley Wells Safety Roadside Rest Area.

ICF examined a portion of the site north of the historic Valley Wells Station area, including a small knoll which is easily visible from the surrounding area (ICF and Dudek 2022). In this area,

the site was found to include a more complete prehistoric component including eight circular rock alignments, a rock shelter, a prospect pit, pottery sherds, a flake, a mano, and a historic rock feature. These elements are located outside of the current ADI. The site boundary has been expanded to include these newly identified resources. The site now measures 620 m (east to west) × 310 m (north to south).

Overall, the historical period component of P-36-000885 consists of the historic location of the Valley Wells Station (a demolished roadside service station, restaurant, and motel) and contains associated historical period refuse scattered structural debris, a prospector's pit, and a large limestone rock pile. The prehistoric component includes several portable metates which were noted as possibly having been brought to the area as a result of historic ranching (as indicated by their position on top of historical period glass fragments), a single bedrock mortar north of the Valley Wells Station, several circular rock alignment features, a rock shelter, and scattered prehistoric artifacts such as ceramics and lithic debitage. An active rest stop was constructed in place of the Valley Wells Station on the north side of I-15 several years ago and affected some of the cultural materials originally recorded on the site. The site covers 620 m (east to west) × 310 m (north to south), an area of 192,200 m^2; however, only a 225 × 1–4-m strip is located within the current Project APE-ADI. The ground surface within the Project APE-ADI has been subject to grading for the construction and maintenance of the freeway and rest stop. Much of the approximately 350 m^2 area surveyed for this project was covered in asphalt or pavement or consisted of areas that had been mechanically graded to an unknown depth.

No cultural materials were identified during the ICF 2019/2020 survey effort in the center median of I-15. It is unknown whether a subsurface component exists at this site, or the extent of disturbance that was caused by construction of the I-15 highway and the Valley Wells Rest Area. Given the surficial expression of site constituents, it does not appear to intersect the current APE-ADI for the Project.

Although cultural materials were not identified within the Project APE-ADI, the prehistoric component for the site overall appears to be representative of a long-term habitation given the diversity of cultural materials and the presence of features such as the circular rock alignments. Such features have been interpreted as being related to living areas or to serve a ceremonial function.

The overall site as currently mapped is approximately 37.29 acres, however no direct and permanent impacts are anticipated as a result of construction in the I-15 median due to extensive previous disturbances. Adverse effects may occur when Project construction removes current paved surfaces and exposes buried deposits.

3.1.5.2. P-36-006023

P-36-006023 is a multi-component site known primarily as the Yermo dump, a historic period rural mass-refuse disposal site. However, this site also contains four individual concentrations of prehistoric flaked lithic debris. Historic period refuse deposits at P-36-006023 are a contributing element to the historic district known as the Community of Yermo (P-36-029386) under Criterion D because these deposits can inform on historic period consumption. The

prehistoric component is also considered individually eligible for NRHP listing under Criterion D for its information potential.

In 2019 ICF archaeologists visited the portion of the site within the Project APE-ADI that included areas directly northwest of the original site boundary, within the Caltrans right of way and including the Calico Road/I-15 overpass and on and off ramps. The ICF team identified an additional 30 historic refuse concentration features as well as four concentrations of prehistoric lithic artifacts and a low-density scatter of historic and prehistoric artifacts (ICF and Dudek 2022). ICF expanded the boundary 1,850 ft (564 m) to the west and 950 ft (290 m) to the north. The site now measures 5,675 ft (1,730 m) (east to west) by 1,665 ft (507 m) (north to south). The topography surrounding the site is a flat dry lakebed.

The newly recorded historical period component of the site is composed of 30 discreet refuse dump features and a scatter of artifacts. Most of the materials identified within features include typical household refuse including food and beverage containers, decorative items, tools, household chemicals, and architectural debris. The newly identified features and artifacts are consistent with materials identified during the original recordation of the site. Temporally diagnostic artifacts were common in many of the features and display a wide range of dates indicating that the area was used for refuse disposal for a long duration prior to waste management services being offered in the region. Some features and artifacts were partially embedded into the ground surface indicating the possibility that buried materials may exist. There were no obvious indications that refuse was intentionally buried at the time of disposal, but the original recordation of the site noted that artifacts were seen in looters pits to depths of 50 cm below the ground surface.

The prehistoric portion of this site consists of approximately 65 pieces of debitage and one biface fragment in four concentrations. The depositional context of these items, which are intermixed with and overlain by historic period refuse, indicates that some disturbance to the lithic deposits occurred in the past. However, there does remain some integrity to deposits with potential for buried deposits. Moreover, enough diversity exists in the types of chert material to indicate that lithic tool repair occurred onsite with the discard of extralocal chert.

Construction within the median of I-15 and the interchange of I-15 and Calico Road would physically remove a portion of this site, including both prehistoric and historic period deposits. The Project would permanently destroy portions of the site within the APE-ADI. It is unknown whether the site contains a subsurface deposit; however, site characteristics indicate the potential for buried deposits to exist.

3.1.5.3. P-36-000541/ CA-SBR-541

P-36-000541 is a prehistoric quarry measuring 850 × 920 m (2,788 ×× 3,018 ft) located along Caltrans ROW. The site is individually eligible for NRHP listing under Criterion D due to high information value.

P-36-000541 is a prehistoric site that was originally recorded in 1964 as part of the University of California Archaeological Survey by Nordstrom. At that time, the site was described as a “work area on gravel terraces with evidence of Early Man industry” (Nordstrom 1964). The site was said to contain “crude scrapers and raw flakes” and measured 610 × 91 m. The site was later

updated in 1970 by Reynolds and described as a "crude quarry" containing bifaces, choppers, and other artifacts known as the "Baker Site." The Reynolds site record also mentions previous excavations by Norm Nakamura of the University of California, Los Angeles (UCLA). The site was again updated by James C. Benton in 1976 as a 30 × 10 m rhyolite quarry north of I-15. Benton also described the excavations by Nakamura as happening in 1965 with a resulting collection of 2,902 artifacts. In 2014, WSA surveyed a 30 m-wide linear corridor that crossed through the southern portion of the site boundary. WSA identified an area of quarrying and cobble testing (Locus 1) that was described as a small chert reduction area consisting of two concentrations of lithic reduction within a wider area of lithic debris that included two cores. Locus 1 was located on desert pavement and measured 36 × 19 m. It contained a total of 60–80 chert secondary and tertiary flakes and two core fragments.

In December 2019, ICF surveyed an area within the median of I-15 that cuts through the center of the previously recorded site boundary of P-36-000541 (ICF and Dudek 2022). Survey was confined to the site area within the Project APE-ADI. More than 200 pieces of a purple/red/gray banded metavolcanic or rhyolite material were observed scattered throughout the I-15 median, mixed in with introduced road gravels and naturally occurring granitic, volcanic, metavolcanic and quartz gravels and cobbles. The identification of these artifacts resulted in the extension of the site approximately 300 m northeast from the original eastern site boundary. Most of these materials resembled shatter, likely from materials testing and early-stage reduction, with some large primary and secondary and some smaller tertiary flakes and several cores. Much of the material had the appearance of being mechanically created, however, at least 25 artifacts exhibited flaking attributes.

Dudek revisited the area in the median and on either side of I-15, both east and west of the site in 2021 as part of the boundary testing portion of the Subsurface Inventory (Barton and Hale 2022a). One subsurface unit (SSU) in the median northeast of the pre-existing site boundary produced a single fine-grained volcanic interior flake, 2 cm below surface, along with glass and asphalt. Six meters away, one assayed fine-grained volcanic cobble and one piece of volcanic shatter were also recorded. Though these artifacts may have been redeposited from the main site area during highway construction, Dudek expanded the site boundary to include them. The expansion is entirely within the median, 200 m northeast of the pre-existing boundary. The memo entitled *Subsurface Archaeological Inventory: Addendum to, XpressWest High-Speed Passenger Train Project, Archaeological Inventory Report, San Bernardino County, California,* attached to the inventory report (Barton and Hale 2022a) contains additional details on the results of the subsurface inventory.

In the central portion of the site, the APE-ADI cuts through several tall ridges and it is likely that approximately 6 m or more of sediment was removed for construction of the highway. Other areas that have not been cut to this extent do appear to have been graded and leveled to an unknown depth below the original ground surface. Despite these disturbances, this site contains a relatively dense accumulation of flaked lithics with intact features representing singular reduction events, along with less common colors of CCS raw material within the APE-ADI.

Construction activities within the permanent and temporary project footprint would physically remove the portions of this site within the APE-ADI. Despite extensive disturbance, intact and/or buried deposits may exist in some portions of the site.

3.1.5.4. XPW21-SW-015

XPW21-SW-015 is a multicomponent site measuring 85 × 140 m (279 × 459 ft) located on the northbound side of the I-15 headed towards Ivanpah and Primm NV within Caltrans ROW and on private lands. The site is located west-southwest of the Nipton Road I-15 exit, and 20 m south of the northbound I-15 roadside edge. This site is also located approximately 120 m northeast and downslope from a currently occupied, private, rural multi-structure residence. The site is individually eligible for NRHP listing under Criterion D for the information value of the prehistoric archaeological deposits.

The site contains a total of six features: three prehistoric quarry features (F2-4), one temporally-unknown burnt rock feature of unknown function (F5), two historic domestic refuse deposits (F1 and F6), and a general background scatter of historic refuse and debris covering a 1.9-acre area (ICF and Dudek 2022). Notably, none of the features were identified within the Project APE-ADI; only a moderately diffuse scatter of historic domestic trash and other historic building material debris was identified within the APE-ADI.

Features 2 through 4 are individual locations of prehistoric opportunistic lithic procurement with a source cobble or exposed bedrock with a low-density scatter of lithic debitage surrounding the source material. All three of these locations are within an approximate 7 × 7 m area, located just 5 m northeast of Feature 1. The site retains strong integrity with the possibility of buried archaeological deposits.

This 1.9-acre multicomponent site is located partially within the Project APE-ADI. Project construction would directly impact a portion of this site through the damage, displacement, or removal of artifacts.

3.1.5.5. ICF-XW2-007

ICF-XW2-007 represents the location of a demolished homestead, measuring 255 × 146 m (836 × 479 ft) on private lands and dating from the mid-1920s to the late 1960s, with the only remaining features being several refuse deposits (ICF and Dudek 2022). The historic period refuse deposits at this site are individually eligible for NRHP listing under Criterion D for their information value.

A residence which was likely associated with the refuse deposit features was present at this location prior to 1932 and was demolished sometime around 1969 based on historic maps and aerials of the site[1]. Research at https://glorecords .blm.gov/ revealed a homestead patent was awarded for this parcel of land in 1924 to a Ms. Carrie L. Boyd, formerly Carrie L. Taylor. Based on the dates of occupation evidenced by the artifact assemblage, historic maps and aerials, and historical documents, it can be assumed that these burned domestic deposits are associated with the day-to-day life of Ms. Carrie L. Boyd and her household beginning in the mid-1920s

[1] Historic aerials.com 2020; https://livingatlas.arcgis.com/topoexplorer/index.html 2020

and continuing up to the 1960s. No structures remain at this site, but refuse deposits are discrete and dense, with strong indications of buried refuse deposits. As this site offers an opportunity to understand the domestic consumption patterns of local homesteaders in the early 1900s, this site is eligible for NRHP listing under Criterion D for its archaeological information potential. Criteria A-C would not apply as Ms. Carrie Boyd is not a person of significance in local or regional history, the homestead was not part of significant events in history, and nothing about the ruins are especially unique.

Construction of the Dale Evans Station in the APE-ADI would physically remove a substantial portion of this site. The presence of diagnostic historic period artifacts and the potential for subsurface deposits provides the opportunity for the site to address important research questions for the region.

3.1.6. Individually-Affected Archaeological Sites in Nevada

Three individual archaeological sites without archaeological district affiliation located in Nevada will be affected by Project construction: 26CK5760, 26CK7189, and 26CK11252.

3.1.6.1. 26CK5760

26CK5760 is a multicomponent site consisting primarily of a railroad construction camp but also having a rock ring and lithic scatter. The site measures 280 × 190 m (918 × 623 ft) and is located on a low alluvial plain on lands administered by NDOT and BLM, and on private land. It is eligible for NRHP listing under Criterion D due to the data potential of the historic period refuse deposits.

This site was originally documented by James and Briggs Archaeological Services in 1999 as a light to dense historic refuse scatter suggested as the remains of the historic Erie Railroad stop that began operation in 1905. In 2007 EDAW archaeologists revisited the site and established that it was significant as an historic property and eligible under Criteria A and D although this recommendation did not receive concurrence from the NV SHPO. In addition to some 26 concentrations of historic artifacts, debris, and features (including a well, an earthen berm, and earthen and concrete platforms) the site also contains a rock ring associated with a light lithic scatter (n=4 pieces of chipped stone debris). EDAW contended that the site contains reasonable potential for documenting the role of distinct ethnic groups – including Native Americans – in the railroad enterprise.

The portion of the site examined by Dudek in 2021 is limited to the Project APE-ADI, which is only a small portion of the total site. This adds approximately 6 acres to the total area of the site. Dudek inventory reaffirms previous assessments that this is a historic site directly associated with the 19th and 20th century operations of the Union Pacific Railroad (UPRR). The expanded portion of the site minimally consists of foundation remains, many discrete consumer trash deposits (several with cans and artifacts ranging in the hundreds per deposit), soil staining and a general scatter of historic consumer trash and habitation refuse debris. The site boundaries were not completely defined due to the massive area of scattered features and debris that extends far beyond the current APE-ADI. The Dudek addition is situated approximately 250 m east of the northbound lane of I-15, and it is located approximately 4.75

miles south of the Sloan Road exit off I-15 in Nevada (Hale et al. 2022). More generally, the site is located inside Clark County, Nevada, and approximately 7.5 miles west of the Sloan Canyon National Conservation Area.

Topographically, the site is situated within a massive alluvial fan deposit. Sediments are sandy alluvium derived from granitic sources. Vegetation in the area consists of a variety of desert scrub bushes, including the Sonora-Mojave Creosote bush and the White Bursage Desert Scrub. Visibility on the site is generally good (approximately 75 percent), however, the desert vegetation is somewhat of a visual impediment.

This historic railroad site boundary was not defined completely because it is very large and exists mostly beyond the current APE-ADI. Throughout the site there are numerous unidentified structure foundation remains, many discrete consumer trash deposits (several with cans and artifacts ranging in the hundreds per deposit), large areas of anthropogenic soil staining, and a general scatter of historic consumer trash and habitation refuse debris. The refuse deposits consist of several very dense concentrations of artifacts (cans, glass, and other materials); there are also hundreds of cans and historic refuse spread more diffusely across the site area. The eastern boundary of the site is currently defined by the active UPRR, but the actual northern, eastern, and southern boundaries are only estimated; only the western boundary was defined in this survey.

Almost all the above-mentioned features and dense deposits are located outside the APE-ADI. The portion of the site recorded within the APE-ADI is represented only by a diffuse scatter of approximately 12 to 15 crushed food and beverage cans and a single deflated cobble and milled wood post feature (F1). This scatter does not constitute an actual original deposit of historic cans, as all these cans sit loosely and diffusely on the ground surface.

Feature 1 (F1), the only historic feature located within the APE-ADI, is identified as a deflated rock cairn with a milled lumber post. The feature consists of approximately 75 various-sized rocks, cobbles, and small boulders loosely consolidated in a roughly 8 × 8 m area. All the rocks and cobbles appear to be of immediate local origin and are all roughly sub-angular to angular and unrefined in shape. A heavily weathered milled lumber post measuring approximately 4 × 4 × 36 inches is lying loosely on top and in the center of this dispersed pile of rock. No artifacts of any era or age were directly associated with this feature; however, this feature is located along a section of land that has very faint evidence of possible old dirt roads or trails and/or possibly an intersection. Areal imagery of this location offers evidence of the possible existence of a historic dirt road along the edge of this feature which heads southeast directly towards the approximate center of this site.

While this site retains some physical integrity and some of the artifact deposits are in generally good condition, the site has undergone a moderate amount of post-depositional disturbance. The areas outside of the APE-ADI have high data potential but the portion of this site within the APE-ADI retain low probability of containing significant subsurface deposits. Project construction would directly impact this site through the damage, displacement, or removal of artifacts in the APE-ADI.

3.1.6.2. 26CK7189

Site 26CK7189 is an artifact scatter located at the edge of an alluvial fan in a relatively flat area near small hummocky dunes, northwest of Roach Lake Playa. The site measures 325 × 350 m (1,066 × 1,148 ft) and is located on lands administered by NDOT and the local government. This site is individually eligible for NRHP listing under Criterion D for its archaeological information potential.

Numerous creosote brush scrub intermixed with rabbitbrush and desert-thorn is scattered within the site boundary and surrounding area with a total ground coverage of 15 percent. The sediment consists of light-brown, sandy loam with gravel.

Site 26CK7189 was originally recorded by MACTEC Engineering and Consulting, Inc. in 2004 as a light artifact scatter northwest of Roach Lake Playa containing more than 25 pieces of debitage, lithic tools, and a limestone milling stone. Lithic tools consist of a chert cobble with battering along the bifacial edge, two obsidian bifaces, and a rhyolite pestle that appeared to be fire affected. Noted materials included obsidian, rhyolite, chert, chalcedony, and basalt. Notably, one obsidian biface (3.0 × 1.5 × 0.5 cm) resembles either a Pinto or Little Lake projectile point, which are known to date from approximately 9,000 – 4,500 years ago. The alluvial setting of this site indicates that it retains some potential for harboring buried archaeological deposits.

26CK7189 is eligible for NRHP listing under Criterion D because it contains obsidian artifacts that can be subject to geochemical sourcing and hydration analysis, potentially yielding chronological information for site habitation which is relatively rare for the local area. Notably, this site is only 1,100 m northeast of the boundary for the Devil Peak obsidian source and quarry (26CK3865). The obsidian projectile point, some obsidian debitage, ground stone, and other artifacts are located within the APE-ADI.

Numerous artifacts are located in the APE-ADI which has been moderately disturbed, although intact cultural deposits are likely present. Project construction would directly impact the portion of this site within the APE-ADI through the damage, displacement, or removal of artifacts.

3.1.6.3. 26CK11252

Site 26CK11252 is a large 428 × 215 m (1,404 × 705 ft) prehistoric lithic scatter located approximately 3.5 miles north of the I-15 exit in Jean, Nevada (NV-161), 175 m east of I-15 and 30 m west of the UPRR. More generally, the site is located about 10 miles southwest of the Sloan Canyon National Conservation Area and 2.5 miles northwest of the Jean Dry Lakebed. This site is eligible for NRHP listing under Criterion D for its archaeological information potential.

Topographically, the site sits along the eastern side of the crest and three, small bowl-shaped drainages of a south-north-trending outcrop of a heavily weathered exposure of gravel conglomerates. This uplift is likely related to the volcanic exposures of the Jean Hills at the southern end of the exposure. Vegetation in the area consists of sparse growths of creosote, saltbush, seasonal grasses, and other sparse members of the Sonora-Mojave Creosote bush-White Bursage Desert Scrub vegetation community. Visibility of the land surface is generally

good (approximately 85 percent). Site 26CK11252 is a prehistoric quarry and lithic scatter located approximately north of the I-15 exit in Jean, Nevada situated east of I-15, and on the west of the UPRR. Four concentrations of lithic artifacts and one isolate were identified, including approximately 120 artifacts such as debitage, cores, tested cobbles, bifaces, simple flake tools, and a source cobble. Material types include CCS, quartzite, and rhyolite. The presence of tools discarded on site indicates site occupants visited the area to make stone tools from the abundant raw material exposed on the landform.

The site retains its physical integrity and is in decent condition. Many of the artifacts are partially embedded into the ground surface likely because of flooding or natural alluvial processes. The artifacts are somewhat weathered, likely due to the ongoing natural aeolian forces that affect the site. The site is situated between the I-15 highway and South Las Vegas Boulevard. There is a dirt road that intersects the site. Moreover, some of the site is situated on an east-facing (and at some points relatively steep) slope, and many of the artifacts have likely been transported a short distance downhill over time (or are prone to do so). The site is nearly entirely within the APE-ADI and Project construction would directly disturb or displace archaeological materials.

3.2. Affected Historic Properties Requiring Treatment—Historic Built Environment

Six built environment historic properties are considered NRHP eligible historic properties in the APE: the LADWP Boulder Dam to Los Angeles Transmission Lines (Boulder Lines 1, 2, and 3) (P-36-007694/CK6238/CK6237/CK6242) (located in both California and Nevada), the SCE-owned 132 kV Hoover Dam Transmission Line (P-36-010315) (within the APE in California, only) and the Jean Underpass(S581) (located in the vicinity of Jean, Nevada).The Project is not expected to cause adverse effects to built environment historic properties as adverse effects will be avoided. However, if adverse effects to built environment historic properties are identified, established context and research themes from HNTB 2022 would be used as a basis for a site specific HPTP, to be developed in accordance with Chapter 6 of this HPTP.

Maps depicting the location of NRHP-eligible historic built environment resources are located in Appendix A, and associated resource records are located in Appendix B.

Table 3-2. Affected Historic Properties Requiring Treatment—Historic Built Environment

California		
Built Environment Historic Properties		Effects
P-36-007694	**Criteria A and C**	**No Adverse Effect**
P-36-010315	**Criteria A and C**	**No Adverse Effect**
Nevada		
Built Environment Historic Properties		Effects
26CK6238	**Criteria A and C**	**No Adverse Effect**
26CK6237	**Criteria A and C**	**No Adverse Effect**
26CK6242	**Criteria A and C**	**No Adverse Effect**
S581	**Criterion C**	**No Adverse Effect**

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4. Treatment of Archaeological Resources

4.1. Prehistoric Research Design and Context

The research design included in this HPTP builds on the full cultural context and research themes provided in the archaeological inventory reports (ICF and Dudek 2022; Hale et al. 2022) and eligibility and effects reports (Hale and Barton 2022a, 2022b) prepared separately for California and Nevada segments of the Project.

4.1.1. Prehistoric Archaeological Research Themes

The archaeological inventory report for this Project (ICF and Dudek 2022) included an in-depth research design with defined cultural context themes. The context identified important prehistoric and historic period research themes, drawing on the available published literature for the broader region. The research design generated questions from the cultural context with the goal of guiding the NRHP evaluation of identified archaeological sites as they were discovered. As is often the case, the initial research design cannot be addressed completely with the data generated from archaeological sites identified in the inventory. Therefore, those research themes and questions that are relevant to this analysis are summarized herein.

4.1.1.1. Site Formation Processes

The archaeological inventory report for this Project (ICF and Dudek 2022) emphasized depositional integrity and geologic context as important considerations for evaluating eligibility. Integrity is defined as the ability to discern occupational components, or episodes, because the artifact-bearing deposits have not been mixed to the point that spatial associations of artifacts and features have been destroyed. For archaeological sites, the interpretive value of an artifact is reduced if it's spatial association with other artifacts cannot be established, hindering efforts to understand chronology of occupation and the human behaviors that resulted in artifact disposition. For example, if ten different artifacts are discovered in a deposit, do those artifacts represent ten independent occupations for different reasons, or one occupation for ten different tasks? This oversimplified question cuts to the core of depositional integrity and the archaeological desire to associate artifacts for the purpose of interpretation.

Geologic context of artifact deposition is also a major factor in determining spatial associations. Depositional environments that accumulate tend to segregate different episodes of human occupation stratigraphically, while deflated desert pavements can compress sediments into a single stratum resulting in the appearance of association between artifacts from different occupations. The truth is more nuanced, particularly when it comes to the dynamics of site formation processes and post-depositional disturbances. For example, desert pavements often harbor undisturbed archaeological deposits, sometimes at great depths such as at the Goldstone Site (CA-SBR-2348) on Fort Irwin located just northwest of Cronese Basin (Basgall and Hall 1994).

Enough archaeological research has been completed across the Mojave Desert that broad patterns of lithic raw material acquisition and stone tool production are relatively clear such that nuances characterizing cultural chronologies are relatively easy to spot, even in mixed

assemblages. For instance, Pinto period stone tool production and use resulted in comparatively less uncontrolled shatter and more refined debitage profiles than the later Saratoga Springs period that saw widespread use of the bow and arrow. As it turns out, production of arrow points and simple flake tools from unprepared raw material masses produced less edge finishing flakes than production of atlatl (i.e., dart) points and formed flaked tools from prepared cores during the Pinto period (Hale et al. 2010).

Such region-level patterning is a blunt interpretive instrument and very difficult to apply to individual assemblages but when viewed at the landscape level with larger datasets, such patterns become more visible making components of individual sites easier to understand. In this scenario, a Pinto period archaeological deposit would fit poorly into the debitage profile of a Saratoga Springs deposit, the diverging patterns of lithic reduction revealing their behavioral context. Indeed, the archaeological literature of the Mojave Desert is full of examples where researchers tease apart occupational components based on such technological hints, even though the endeavor is theoretically and methodologically weak (Giambastiani et al. 2008).

Considering the current suite of prehistoric archaeological sites in the Project APE, lithic raw material acquisition and stone tool production is the most robust pattern observable amongst prehistoric sites, owing primarily to the abundance of stone tool quality raw material exposed in the desert pavements of relatively old colluvium. Erosional processes and a dry climate collectively reduced fine sand and silts to the point that heavier pebbles and gravels settle together resulting in a natural pavement-like surface. In this context, when different types of stone are easy to distinguish visually it makes opportunistic extraction of tool-quality raw material less costly by reducing the time required to search for it.

Resulting archaeological deposits tend to be discrete clusters of debitage, cores, and the occasional stone tool (or aggregates of such deposits termed “segregated reduction loci”[(SRL]). Turning back to site formation processes, these kinds of sites arguably retain strong spatial integrity. The problem of deflation mixing different occupational debris does not present itself as a major issue for interpreting sites.

Data Requirements

Data bearing on the temporal and physical integrity of project sites are critical to assessments of significance, data potential, and management needs. The degree to which temporally discrete components remain, in accordance with their structural integrity, must be considered when completing mitigation or delineating areas for long term protection. To the extent that site integrity enhances or devalues the interpretive potential of a cultural deposit, it may contribute to or detract from its scientific value:

- Do inclusive chronometric data from the project sites permit the identification and definition of temporally and/or spatially discrete prehistoric occupations? Can significant, intact deposits be located in the APE-ADI and targeted for data recovery?
- Is there any evidence that sites are vertically structured and if so, do artifacts sort according to this structure?

- Are the definitions of discrete components supported by multiple, independent chronological controls, and if so, how similar are their age estimates?
- Is there substantial evidence of occupational "overprinting"? How has this affected the temporal integrity of habitation components?

4.1.1.2. Chronology

Like site formation processes, chronology is a key tenet of archaeological interpretation and NRHP eligibility determinations. The ability to place artifact deposits in time, even relative to one another, allows us to decipher human behavior through temporal patterning between chronologically distinct deposits. Chronological indicators ranging from absolute dates, such as those obtained through radiocarbon or obsidian hydration dating, to time sensitive artifact forms and technological patterns are useful for placing deposits in time. Unfortunately, artifacts suitable for absolute dating, time sensitive artifacts such as projectile points and beads, and other artifacts with time markers, are not commonly found, thus placing the burden of deciphering chronology on highly assumptive technological patterning (such as lithic reduction techniques or types of ground stone tools).

In the Project APE, prehistoric archaeological deposits primarily reflect short term camps, and these are less likely to contain information that can be used to place the sites in time, unless time-sensitive artifacts are found, such as projectile points or beads. Longer spans of occupation are more likely to result in the accumulation of food residues such as charcoal or animal bone that can be dated with the radiocarbon method, along with other assemblage constituents that can yield chronological information. Longer term encampments are also more likely to produce robust archaeological deposits, such as those in the Cronese Lake basin.

Strong chronological control of prehistoric archaeological deposits identified within the Project APE is challenging, having only identified a handful of time sensitive artifacts from low density lithic scatters. Moreover, of the identified prehistoric sites that have time sensitive artifacts, most are located outside of the APE-ADI. Despite these limitations, some patterns can approximate age, such as the degree of weathering. Artifacts exposed on the surface for longer periods of time are more likely to have eroded surfaces, smoothing sharp edges and developing patina from exposure than those that have been exposed for a shorter period of time. The problems in such comparisons are obvious but highly eroded artifacts or those with extreme patina can be assumed to have been exposed for long periods of time, allowing chronology to be determined for prehistoric occupation in general.

Data Requirements

Judging by the size and diversity of individual prehistoric assemblages, individual sites, features, and even isolates appear to represent both short-term, transient occupations, and longer encampments. No truly sedentary "villages" are present in the Project APE, but none are anticipated, given what is known about prehistoric hunter-gatherers in the region, and from ethnographic accounts. Some confusion exists around the term "village" in the archaeological literature, including Sutton's (1996) reference to Gypsum period habitations on valley fringes.

The issue of occupational duration has implications for our ability to place archaeological deposits chronologically. Short term camps are less likely to contain information that can be used to place the sites in time, unless time-sensitive artifacts are found, such as projectile points and beads. The idea here is that longer spans of occupation are more likely to result in the accumulation of residues and other assemblage constituents that can yield chronological information, such as charcoal or animal bone that can be radiocarbon dated (Binford 1979). Because chronological controls are essential to any archaeological investigation, it is important to ask a few basic questions concerning the temporal data potential of evaluated sites:

- Can the chronological placement of individual sites be determined?
- What kinds of chronometric data do individual sites contain? Of those already obtained, how well do they correlate in terms of the age estimates they provide (e.g., projectile point types versus obsidian hydration dates)?
- Are there data indicating the presence of multiple occupation episodes at project sites?
- Do marker artifacts appear to fit with temporal patterns recognized in the region? Are there any unique diagnostic items present?
- Can chronometric data from project sites help to refine local dating schemes?

4.1.1.3. Technology, Subsistence, and Settlement Patterning

Subsistence and settlement are two parts of life inextricably linked to the technologies people use to access their environment. For prehistoric sites, the study of lithic technologies (flaked and ground stone) provides clues about how people pursued, acquired, and processed food, and the ways that they embedded those activities in where they lived and for how long (settlement). Ground stone, for example, indicate processing of plants, animals, and other materials (e.g., pigments). Additionally, flat slabs and hand stones are functionally distinct from the morphologically more formal mortars and pestles that indicate more intensive processing and longer use-lives. Likewise, formed flake tools were curated items while simple flake tools (i.e., utilized flakes) were intended as single use expedient tools. Therefore, lithic tool assemblages say a lot about the intent of resource exploitation and site occupation.

Several prehistoric sites in the Project APE are lithic quarries where pebbles on the surface were quarried to replenish stone tool kits. These activities did not require much time and as such, very little other artifacts were deposited at these sites other than the lithic debris discarded during stone tool production, and the occasional broken tool that was replaced. That such quarry sites saw only transient occupation for a temporally and behaviorally limited task does not necessarily reduce their significance but helps build a picture of Native American settlement in the broader region where stone tool manufacture was embedded in a larger settlement system.

Data Requirements

In examining prehistoric sites, the study of lithic technologies (flaked and ground stone) often provides clues to the placement of sites within associated subsistence-settlement regimes and offers insight to the various functions and emphases of site occupations. Ground stone, for

example, indicates processing of plants, animals, and other materials (e.g., pigments). Additionally, flat slabs and hand stones are functionally distinct from the morphologically more formal mortars and pestles that indicate more intensive processing. Likewise, formed flake tools were curated items while simple flake tools (i.e., utilized flakes) were intended as single use expedient tools. Investment in lithic tools then, says a lot about the intent of resource exploitation and site occupation. Among many others, the following questions apply:

- What kinds of manufacturing and tool use activities are represented at the prehistoric sites in the project area?
- If formal lithic tools are present, what is the context? Are they present at small artifact scatters or more prevalent in deposits that indicate longer term encampment?
- What can be inferred from the composition of lithic assemblages about the kinds of resources and habitats exploited by the site inhabitants?
- Do observed lithic technologies at prehistoric sites have any implications for residential mobility and settlement ranges? What does the lithic material profile indicate about the source origins and how raw materials might have arrived at the project sites?
- Can any inference be made in lithic tool or raw material assemblages about Native American themes that extend beyond basic utilitarian concepts, such as those indicating ceremony? For instance, past researchers have suggested the rock cairns within the SRAD are ceremonial markers; can information be gleaned from these that lend support to that inference?

4.1.1.4. Exchange and Mobility

The Mojave River, roughly paralleling part of the Project APE, anchored trade and exchange between disparate Native American groups (Warren and Crabtree 1986). All known Mojave Desert Native American groups are considered to have practiced residential (i.e., household) mobility, the longevity of residential encampments varying by season, and over the entirety of prehistory. For example, ethnohistoric accounts indicate that the Mohave people of the lower Colorado River often traveled through the Mojave Desert, at times to the California coast for purposes of trade and exchange (Kroeber 1925). Indeed, archaeological sites in Serrano territory commonly contain *Olivella* sp. shell beads manufactured along California's southern coast. Raw material sources within the Project APE also exhibit wide ranging distribution, such as the turquoise mined by Native Americans at Halloran Springs. Sigleo (1970, 1975) identified Halloran Springs turquoise beads from Snaketown, a Hohokam site north of Phoenix, Arizona, and Rogers (1929) describes Lower Colorado Buffware found near the Halloran Springs mine (see Leonard and Drover 1980 and Sutton 2017).

It is likely that some of the lithic raw material (especially the CCS such as chert and chalcedony) quarried from desert pavements that intersect the Project APE were also transported relatively long distances away in the hands of those who used it to extract and process resources during the course of foraging. However, CCS are notoriously difficult to assign to a geographic source without obvious and unique macroscopic attributes and/or elemental/molecular composition. Other lithic raw materials (namely obsidian, which can be assigned to a geographic source)

were certainly imported to the Project APE and have been identified in a few archaeological sites in the Project APE.

Finally, several Native American routes of travel, or trails, have been identified as intersecting the Project APE-ADI in several locations. The Old Spanish Trail, Arrowhead Trail, and Mormon Road are recorded within the APE-ADI and APE-AII, and essentially follow large portions of the I-15 corridor, and the Project alignment in California and Nevada. These routes of travel are known to have been used during the historic period and used by Native Americans during both historic and prehistoric times is also inferred and substantiated by archaeological evidence. The Mojave Road, formerly Mojave Trail, which passes through the Mojave Desert, began as a Native American trail and became firmly established as a travel route by non-Native Americans by the 1830s (Norris and Carrico 1978). It stretches westward more than 140 miles from the Colorado River, near present-day Fort Mojave in Arizona to the Mojave River in California, where it connects with the Armijo Route of the Old Spanish Trail. All trails were formally discussed and evaluated in the historic built environment report, entitled *XpressWest High-Speed Passenger Train Project Historic Built Environment Technical Report: California* (ICF and HNTB 2022). However, that these trails intersect and/or parallel the Project APE-ADI provides further context for understanding Native American sites in a broader landscape where lithic raw material acquisition, subsistence, trade/exchange, and spiritual or religious activities occurred.

Data Requirements

Prehistoric archaeological sites in the Project APE-ADI can add value to the regional understanding of Native American trade and exchange, but fine-grained data on specific instances of this are lacking within the APE-ADI. Data recovery at prehistoric sites can address these issues through the acquisition of greater numbers of artifacts and materials for sourcing and potentially for dating. Such information can speak to the place of a particular site or group of sites in the larger regional framework and interaction sphere.

- What materials were locally available on a specific site, and what materials are indicative of trade? What are the proportions of locally available materials versus non-local materials?
- What are the sources of non-local materials, such as obsidian, ceramics, marine shell, and steatite? Are there patterns evident in the proportions of such materials, and do these patterns change over time?
- What forms were non-local materials traded in? Were materials provided in raw form, or were non-local materials traded as complete artifacts?
- Does the presence of non-local materials represent long-distance trade and exchange, or is it indicative of the presence of different cultural groups in the area?
- Is there evidence (such as ceramic artifacts) of an Ancestral Puebloan or Lower Colorado presence?
- Are there any technological indications of broader patterns of travel or trade that can speak to information on Native American cosmologies, rites of passage, or other themes

conveyed by Tribes? Do certain kinds of lithic raw materials follow specific trails, for instance that speak to specific stories?

4.1.1.5. Ethnological Inquiry

FRA received information from Consulting Tribes on the cultural importance of certain places along the Project alignment, including general information regarding traditional ties to the landscape, and more specific information on what certain areas were occupied for.

Locations named by Consulting Tribes may refer to a specific location occupied for a specific reason, such as seed gathering, or it may refer to a broader area, such as the Salt Song trail. No specific place names have been given within Project alignment, but specific locations have been identified as culturally important. Moreover, many sites in the Project APE (AII and ADI) reflect regular transient occupation, indicating that the Project APE may have included common stopover points for people heading to neighboring areas that have existing place names.

Data Requirements

Archaeological sites in Project APE share common assemblage themes pointing mostly to short term occupation to exploit lithic raw materials and seasonally abundant resources, presumably around freshwater stands. The common assemblage themes suggest at a minimum that trans-Holocene occupations visited locations in the Project APE area for similar purposes, and that the ethnohistoric and ethnographic accounts provide good insight into prehistoric occupation. Direct historical approaches aside, the value of Tribal information can convey significance beyond scientific research potential and provide archaeological correlates for ceremonies and other activities that are significant under Criterion A of Section 106. For instance, where shell beads or broken ground stone artifacts are present, are they burned and/or associated with other items that indicate ceremonies related to human cremation or burial? Or, when prehistoric rock cairns are present, are they marking lithic raw material harvesting sites or representations of the broader landscape where the mundane and sacred activities or events are comingling?

Generating data to better understand ethnohistoric occupations is relatively straightforward so long as archaeological deposits can be placed appropriately in time. But, as Delacorte (1991) demonstrates, looking for evidence of the ethnohistoric record in archaeological deposits is risky, partly because the ethnohistoric record is biased by the observers, and because ethnographies for the region are based on limited observations from a time after aboriginal lifeways were substantially altered by the effects of disease and emerging Euro-American economies (see Lightfoot and Simmons 1998). Consulting Tribes have indicated that Tribal values can intersect with archaeological values, not to demonstrate that the people of ethnohistoric times have deep temporal roots, but to better understand ancestral aboriginal behavior. With this in mind, the research goals and methods applied to archaeological themes representing value under NRHP Criterion D also partially address the traditional cultural landscape type of significance as a pattern of important Tribal events.

All too often, issues of archaeological site significance are limited to whether or not a site can contribute scientific value under Section 106 Criterion D. However, while Tribal values have strong overlap with archaeological values, there is some divergence where Tribal perspectives

on human-environment interaction find value in events of significance (Criterion A). For example, a ceremonial place or a place where ceremony is implied, such as a human cremation, could convey significance under Criterion A.

Ethnohistoric information directly describes Native American presence in the Mojave during historic times (see Earle 1990, 2005, and 2010). Notwithstanding academic concerns of extending ethnohistoric and ethnographic information into the prehistoric era, given the similarity in archaeological assemblages across much of the Holocene in the Project APE (mostly lithic quarrying with some focal areas of habitation), it is likely that the ethnohistoric information is indicative of a broader pattern of aboriginal use that spanned several millennia. This pattern would have been anchored by transient, regular visitation of lithic raw material extraction areas along routes of travel that visited well-watered areas with seasonal abundance of plants and small to medium bodied prey, such as Cronese Basin.

Kelly (1995) describes how social activities are deeply embedded in everyday economic activities and that these socioeconomic processes result in the comingling of the mundane and ceremonial aspects of life. Taken together with the archaeology of the Project APE and ethnohistoric information, we should expect to find that some locations have archaeological material reflective of value relating to places and things of cultural significance that may have comparatively little value for understanding subsistence or resource extraction. Indeed, some sites have revealed the presence of archaeological materials that convey the significance of places and items that would not on their own be NRHP eligible under Criterion D.

- Which archaeological resources contain archaeological materials that convey Tribal values apart from scientific values?
- Can information be obtained from individual sites that points to culturally significant activities, such as the possible remnants of ceremonial features in the Cronese Lake Archaeological District?
- As with research questions about mobility, are items present, such as marine shell artifacts or stone from a distant location that can speak to broad patterns of travel or exchange that convey the traditional cultural landscape type of significance under Criterion A?

4.2. Prehistoric Archaeological Site Treatment Methods

Treatment methods are described in general by the kinds of methods used with site specific treatment provided thereafter. Adverse effects to archaeological sites will occur when implementation of the undertaking materially alters archaeological deposits or materials that convey significance under Section 106 significance criteria A or D. Archaeological data recovery is the primary method for mitigating adverse effects and involves sampling affected elements of historic properties within the APE to obtain information that can be used to address research questions and Tribal inquiry. The data recovery methods proposed in this HPTP involve standard forms of sampling that combine intensive surface inspection, exploratory and targeted hand excavation, and backhoe trenching, followed by detailed field and laboratory analyses. Moreover, additional methods are provided to resolve adverse effects to properties significant

under Criterion A that cannot be mitigated in whole or part through archaeological data recovery.

All methods proposed herein are broadly consistent those completed for other major undertakings in the Mojave. Field and lab methods have been developed and honed over decades of study in the Mojave Desert and have their foundation in studies by Basgall (1993) and others (see Basgall and Giambastiani 2000; Giambastiani and Basgall 1999; Hall 1993; Hale et al. 2020; McGuire and Hall 1988). A heavy emphasis on surface characterization is well suited to desert cultural deposits that are commonly aggregated in surface or near-surface contexts due to prolonged or accelerated erosion. Subsurface methods are designed to accommodate the range of depositional variability expected within the Project APE. In all, the methods proposed herein achieve data requirements for mitigation while affording the flexibility required to allow reactionary allocation of field effort to maximize data potential of unanticipated deposits, and to allocate field efforts to address more focused Tribal inquiry that may occur during the course of field investigation.

4.2.1. Field Methods

Conducting data recovery across a broad archaeological landscape requires staging of data recovery methods to better define in-field approaches to sampling. The following methodological stages are separated into broad categories of surface documentation, subsurface exploration, and targeted sampling of key contexts. These categories are not intended to be mutually exclusive or always performed in sequence but represent basic forms of field strategy that come in and out of use during the broader process of data recovery. For instance, exploration of archaeological deposits using a backhoe may be required during the surface analysis stage if aeolian sands appear to obscure promising archaeological deposits. The backhoe exploration would be completed prior to targeted hand excavation of standard 1 × 1 m test units that are intended to sample key deposits. In other cases, the location of archaeological deposits requiring focused hand excavation may be identifiable without exploration using backhoe trenches or other methods of investigation.

For this Project, data recovery will occur in two phases: Phase 1 will involve further delineation of significant archaeological deposits that require mitigation; and Phase 2 will involve targeted sampling of identified significant deposits. In order to protect features and other deposits uncovered during Phase 1 delineation, Phase 2 targeted sampling of identified deposits can occur as soon as the deposit has been identified.

4.2.1.1. Phase 1 Surface Analysis

The data recovery program will begin with re-inspection of site characteristics, first to re-familiarize field crews with the archaeological deposits, and then to determine whether existing conditions match those documented during previous site visits.

It is anticipated that existing site boundaries will broadly encapsulate inclusive surface deposits, especially in areas with dense artifact concentrations. Thus, while site boundaries remain an important management tool, more attention will be paid to identifying areas with stronger

contextual associations, features, or other unique characteristics that have high value relative to research questions and defining single component occupations.

Upon arriving at each site, the first task will be to relocate the site datum, or establish one, and to relocate any items, deposits, or features identified during previous field efforts. Next, a systematic surface inspection will be performed to identify artifacts and features and areas that may require exploration (such as larger hummocks or dunes that may harbor buried deposits). To do this, each site will be thoroughly traversed to mark formed artifacts (i.e., projectile points or beads), artifact concentrations, and features with pin-flags. Formed artifacts (e.g., flaked and ground stone tools, pottery, beads) will be double flagged with a blue flag; unmodified flakes will be marked with single flags of any color other than blue. Any concentrations of artifacts or features will be triple-flagged in multiple colors. Pin-flags or flagging tape will be used to denote the edges of lithic concentrations and occupational loci within site boundaries.

The ESRI Collector application will be loaded with site boundaries, aerials, topographic maps, and other relevant layers to facilitate real-time recordation of loci, particularly interesting artifacts, or areas of interest, such as those that may contain buried deposits. This real-time recording platform will enable efficient allocation of personnel and equipment during data recovery fieldwork, and will facilitate quick and meaningful communication between FRA, principal investigators, field directors, crew chiefs, and Consulting Tribe representatives.

Once the surface of a site, or the affected area within the APE-ADI, is adequately inspected and demarcated, decisions will be made regarding the veracity of pursuing complete surface collection versus in-field surface analysis. The same sample units used for surface collection can also be used for in-field surface analysis. The decision to complete surface collection will take into account the uniqueness or data potential of the surface deposits.

Sites containing some minimum density of surface artifacts in a concentrated area will ×sampled with 10 × 10 m surface recording units (SRU). Each of these units will be divided into four 5 × 5 m cells (labeled A through D). SRUs are flexible units, allowing for detailed mapping, or collection depending on field conditions and constraints. The original intent of SRUs is to individually plot and describe individual artifacts using a grid of sufficient resolution (i.e., 50 × 50 cm, etc.), leaving these artifacts in situ, with formal tools collected individually as piece plots; the fourth cell may be excavated using surface scrape units (SSU). Controlled inventory using SRUs will supplement the collection of all artifacts located outside these units. SRUs are expandable in 5 × 5 m increments to accommodate artifact scatters that are larger or require more detailed analysis that an SRU provides (as opposed to general inspection of individual artifacts). In some situations, a general “grab sample” collection will be made to supplement individually collected piece plots. These are simply general surface collections that do not record individual artifact provenience. Grab samples are the least preferred method of collection and analysis but can aid in analysis when unique artifacts are scattered over a broad area in densities too high to warrant piece plots and too low to warrant establishment of SRUs.

Where appropriate, features or unique artifact concentrations or geologic features will be micro-mapped with precision equipment, such as a total station, or using a 10 cm grid to photograph and hand draw individual artifacts and deposits. Such methods are typically

reserved for thermal features that have strong spatial integrity, human cremations, individual lithic reduction areas where pieces of stone refit, or the like.

For excessively large sites, such as within the MRLL, the site itself will be divided into segments to efficiently identify areas for targeted exploration. In this scenario, the site will be divided up according to areas where deposits are known versus unknown. Where no deposits have been previously identified, save for a low density surface scatter, a subsurface inventory using shovel test pits (STPs) measuring 0.5 × 0.25 meters (m) may be excavated to identify areas with buried archaeological deposits. This is the same method that was used in the inventory outside of buffers around known archaeological site boundaries (see ICF and Dudek 2022a and 2022b).

4.2.1.2. Phase 1 Exploration

Having fully characterized the surface structure and content of individual cultural deposits, the focus shifts to subsurface contexts and the exploration of discrete features. It is proposed that this phase of investigation deploy a range of fine- to coarse-grained methodology, including small excavation exposures to sample the buried content of limited areas as well as mechanical techniques (i.e., backhoe trenches) to rapidly assess the stratigraphy and integrity of specific landforms like dune hummocks or undifferentiated alluvial fan formations. The initial surface inspections will be used to determine where the two approaches are more useful.

Based on surface geomorphology and the distribution of visible cultural materials, decisions will be made regarding the most efficient fine-grained exploration strategy to pursue. Where potential subsurface deposits are expected to have at least moderate depth, a series of shovel test pits (STPs) will be allocated to better gauge the horizontal and vertical extent of buried components, to identify discrete contexts of high artifact density, and to document structure of depositional (natural and cultural) strata across and between sites. These will distributed based on the size of artifact accumulations as well as the initial yields resulting from such probes; if most STPs are effectively devoid of subsurface remains, the effort will be curtailed and field resources reserved for more productive activities.

The STP units will measure 0.5 × 0.25 m in size, be removed in arbitrary 20 cm increments (to a minimum depth of 60 cm or until sterile strata are encountered), with sediments processed over 1/8” or 1/4” screen mesh depending on soil conditions. Because these are not, fundamentally, used to recover archaeological materials but to assess the overall content and structure of often extensive artifact accumulations, the use of coarser screen mesh is considered appropriate. In some cases, it may be useful to open adjacent STP exposures, particularly where soil induration is great and the tempo of excavation can be significantly increased by opening a larger unit; these will be physically removed as single 0.5 × 1.0 m blocks.

It is expected that most project deposits will lack substantial buried deposits and be essentially surface accumulations. Should the STP program indicate that cultural materials still do occur in near-surface contexts, the field strategy would move to excavation of SRUs. These will be deployed as larger exposures, 2.0 × 2.0 to 5.0 × 5.0 m in size, with sediments removed in 5 cm or 10 cm levels and processed over 1/8” screen mesh. In some cases, SRUs may be excavated stratigraphically, removing artifact-bearing deposits from the surface down to 20 to 25 cm, if conditions warrant. These SRUs will be allocated to spatial contexts that harbor higher densities

of artifacts or ecofacts and could be paired up if particularly productive situations are identified. This will be the most effective means of mitigating what are significant, sparse, but mostly surficial cultural deposits.

In all this it is important to understand that Mojave Desert prehistoric sites almost always represent sporadic, short-term human occupations that generated minimal quantities of human debris. As a consequence, artifact densities will be consistently low and sufficient sediment volume needs to be inspected to generate statistically reliable estimates of site content. Likewise, cultural features may be few and widely dispersed.

The previously completed subsurface archaeological inventory avoided excavation within known archaeological sites, including a buffer. As such, it may be determined that continuation of the subsurface archaeological inventory within the boundaries of known sites is a suitable sampling method for identifying potential buried archaeological deposits. The density and scale of STP transects for a subsurface inventory will be determined based on results of the detailed surface inspection.

Finally, the last strategy used for subsurface exploration will involve mechanical excavation with a backhoe. In addition to being a cost-effective means of opening large exposures, the backhoe offers a means of assessing larger landscape features that may contain ancillary classes of data that are invaluable to understanding the cultural record. Within the Project APE-ADI, even non-cultural contexts may contain buried, intact strata useful for documenting the evolution of environments that human populations were exploiting; these might include buried organic horizons that portray extended periods of more mesic climate or interrupted soil processes that reflect times of regional desiccation and landscape instability.

By the same token, mechanical trenching can be an effective means of exploring discrete cultural deposits. There is no better way to synchronize depositional variability across large site areas than to open short, discontinuous trench exposures that clarify structural and temporal relationships across space. Backhoe trenching is also useful in identifying buried cultural features that might otherwise be totally missed by smaller, more scattered excavations. Trenches will be deployed in cultural and putatively non-cultural situations where a broader subsurface window has high potential to elucidate research objectives. Given the spoils that such trenches generate, it is not possible to screen all sediments; but targeted samples of backhoe sediments will be screened over 1/4” screen mesh to assess the presence or absence of cultural remains. The project intends to limit the extent of backhoe excavation in cultural deposits that are obviously significant based on other criteria.

4.2.1.3. Phase 2 Targeted Sampling

Based on other stages of surface documentation and exploratory excavation, certain site contexts will emerge that offer optimal opportunities to address key research questions posed for the project. These deposits will, subsequently, be the target of more intensive and focused data recovery efforts. While some of these situations may represent near-surface accumulations that are most effectively sampled with broad surface scrape exposures, others are expected to constitute deeper, more substantial deposits that retain high artifact densities, good organic preservation, and intact cultural features and stratigraphy. It is further anticipated

that such contexts will retain good to high chronological integrity and represent locations where behavioral coherence is maximized.

Such locations will be targeted with a more intensive excavation program as part of the data recovery effort. The standard procedure will involve use of TUs to recover high-quality data from these deposits, a methodology sensitive enough to react to depositional nuances as they are encountered. Such exposures will be standardized as 1.0 × 1.0 m units but can be expanded as needed to encompass larger feature constructions or expose more extensive blocks. The TUs will be removed in arbitrary 10 cm levels to a depth of up to 2 m (with appropriate shoring) depending on rates of cultural recovery; as this effort is designed for maximal recovery of high caliber archaeological data, all sediments will be processed over 1/8" screen mesh. Where particular situations warrant and clear-cut archaeological strata can be identified, excavation will adhere to those soil units. TUs will be the primary method employed to generate the approximate 2 percent sample goal for data recovery, although SRUs will also factor in where subsurface deposits are 20 cm deep or less. Sufficiently diverse archaeological deposits may require greater sampling to ensure that data redundancy has been achieved and that the sites have been fully characterized.

Any features exposed within TUs (or found using alternative excavation protocols) will be fully documented as discrete cultural contexts. Depending on their structure, such phenomena as burned rock concentrations, living surfaces, chipping areas, and the like will be carefully exposed, drawn and photographed in plan and section; associated cultural remains will be retained as separate sub-samples. Such features will also be subject to various specialized sampling procedures. These may include recovery of datable organics, flotation samples for carbonized plant remains and other micro-constituents, and sediments for potential chemical or pollen analysis. The stratigraphy of representative TU exposures will be drawn and photographed, with sediment and column samples removed to characterize variation in soil composition (Munsell color, grain-size, etc.). Where deemed appropriate, bulk sediment samples may be extracted from sidewalls for possible flotation, pollen, chemical, and micro-constituent sampling.

Phase 2 targeted sampling is anticipated to occur as soon as substantial archaeological deposits are identified, or shortly thereafter, to ensure the integrity of exposed deposits without having to backfill exploratory excavation units. Maximum levels of effort cannot be determined at this time, but data recovery will have the goal of recovering a 2 percent sample of subsurface materials, or a statistically redundant sample when additional artifact recovery will not likely produce increased diversity in assemblage composition.

4.2.1.4. Phase 2 Specialized Field Sampling

Several specialized sampling techniques will be used to address finer-grained sampling needs, including column samples, pollen sampling, and various residue samples (including in-field residue sampling on stationary ground stone (bedrock, excessively large stones, or those that for other reasons will be left in place). Where appropriate, a 20 × 20 cm column sample (CS) will be excavated from the sidewall of a TU and removed in arbitrary 10 cm levels, separated stratigraphically within those levels when necessary. All column sample sediments will be

placed in plastic bags inside buckets, labeled by provenience, and processed using flotation techniques to extract heavy and light fractions. Sediments processed through flotation produce light fraction materials that float into cloth and are subject to microscopic identification and analysis. Heavy fraction materials are then sorted through various screen sizes from 1/4-in to 1/32-in.

4.2.2. Prehistoric Archaeological Site Laboratory Methods

The basic laboratory and analytical methods used to treat collections include cataloging, standard artifact analysis, artifact-specific analysis, and special studies. Cultural remains and record documentation generated at the project sites will be organized in the field, boxed according to provenience, and returned to Dudek facilities for further treatment. Non-perishable artifacts will be washed prior to cataloguing; fragile remains such as non-human bone are cleaned without water, while bulk soil and charcoal samples are simply repackaged into more permanent containers. As with ground stone or any formal lithics, prehistoric pottery is not initially cleaned to preserve the possibility that surface residues can be either dated or identified via chemical testing.

4.2.2.1. Cataloging and Basic Processing

Catalogs are generated using the Microsoft Access relational database program and contain pertinent information regarding the context and composition of all materials. Attendant paper documentation (level records, feature records, mapping data, etc.) and digital photographs will be inventoried and organized in preparation for eventual curation. The unique number used for each artifact is the accession number for the collection, trinomial number for the site, followed in turn by a lot number (1 for surface material, 10 for subsurface), and individual catalog designation. Formed artifacts (flaked, ground, and battered stone) are assigned individual numbers, while bulk materials (debitage, bone, etc.) are given one number per provenience unit. Samples intended for special studies will be assigned unique catalogue designations as well. All artifacts are stored in re-sealable 4 mil plastic bags with labels printed on acid-free paper for long-term preservation.

A wide array of lithic material types is represented at project sites, including numerous variants of CCS, basalt, rhyolite, felsite, igneous, quartz, quartzite, granite, and obsidian, among others. Inasmuch as toolstone was acquired from a host of local and extra-local geological sources, it is essential that materials are consistently identified. While classification of non-cryptocrystalline materials is relatively straightforward, the segregation of cryptocrystalline types is complicated by major differences in material color, opacity, surface texture, and heat treatment. Mirroring studies done at other Mojave Desert localities (Basgall 1993; Basgall and Giambastiani 2000; Giambastiani and Basgall 1999), CCS artifacts will be separated into seven categories based on color differences: white (CCS-W), clear/chalcedony (CCS-C), brown jasper (CCS-B), red jasper (CCS-R), yellow jasper (CCS-Y), mottled (CCS-M), and other (CCS-O). Coded data is entered into a Microsoft Access database that serves as the master catalog. This catalog is subsequently exported to a Microsoft Excel spreadsheet format for purposes of analysis and printing. Entries in the master catalog include the catalog number, recovery type (e.g., SRU, TU, etc.), a provenience number, top and bottom depths of the excavation level, sorting method (e.g., 1/8-

in dry screen), class (including biface, simple flake tool, retouched flake, formed flake tool, ground stone tools, percussing tools, core, debitage, aboriginal ceramics, shell artifact, bone artifact, vertebrate faunal remains, invertebrate faunal remains, and historic artifacts), and material type (e.g., granitic, volcanic, obsidian, quartz, rhyolite).

Debitage is sorted as primary (with at least 70 percent dorsal cortex), secondary (dorsal cortex less than 70 percent), interior (no dorsal cortex), and shatter (no platform or bulb of percussion). When possible, cores will be separated by platform variability into subclasses such as multidirectional, unidirectional, and bifacial types. Percussing tools, potentially including hammers and abraders, are defined based on their morphology and the type of macroscopic use-wear they exhibit. Ground stone artifacts are classified by type, including milling stones, hand stones, and pestles. Maximum length, width, and thickness measurements were taken on all prehistoric tools.

4.2.2.2. Flaked Stone Analysis

Flaked stone artifacts will be sorted into nine general categories: projectile points, point blanks, bifaces, formed flake tools, simple flake tools, cores, core tools, assayed cobbles, and debitage. Formed artifacts and samples of debitage are assigned to discrete material types defined above. All tools received standard measurements (maximum length, maximum width, maximum thickness, and weight), are examined for the presence of use-wear (micro-chipping, edge-flaking, step-fracturing, edge-grinding or edge-dulling), and assigned a condition type (whole or near-complete, proximal, margin, distal, medial, or indeterminate end). Further characteristics specific to individual artifact categories are outlined below.

4.2.2.3. Formed Artifacts

Bifacially modified tools retaining diagnostic hafting elements such as shoulders, shaped stems, notches, or tangs, are classified as projectile points. Where possible, specimens will be placed into accepted categories consistent with other regional projects. Points are also examined for evidence related to functional trajectories, including signs of impact fractures or margin damage that might relate to use. Point blanks are percussion flakes that exhibit margin trimming to obtain greater symmetry and planar consistency. Generally affiliated with arrow point forms, in some cases these have limited bifacial retouch, but some blanks are unifacially modified or even abraded into form. The pieces are ready to be retouched across the ventral/dorsal surfaces and notched as appropriate. Point blanks are treated in the same fashion as other flake-based artifact forms, measured for dimension, characterized by flake type, and assessed for margin modification.

Artifacts displaying continuous flake removal scars along opposing surfaces and lacking diagnostic basal elements are classified as bifaces. Bifaces are assigned to one of five reduction stages based on a combination of technology and overall morphology that includes width/thickness ratio and number of arrises. Stage 1 bifaces are thick in cross section, exhibit limited planar symmetry with irregular, sinuous margins, and are shaped solely by percussion flaking. Stage 2 bifaces are also characterized by percussion flake removals, but are more symmetrical, less sinuous along margins, and slightly thinner in cross-section than Stage 1 forms. Stage 3 bifaces are preforms with good planar symmetry, regular margins, and extensive

percussion thinning, generally with flake scars that extend across the mid-section of the artifact. Stage 4 bifaces are further reduced preforms that are completely symmetrical or nearly so, have regular margins and uniform cross-sections, and are substantially retouched by pressure flaking. Finally, Stage 5 bifaces are well-refined, finished tool forms (frequently comprising fragments of projectile points) that are extensively pressure flaked, opposing surfaces showing total or near-complete coverage by closely spaced, parallel flake removal scars.

In addition to the above attributes, each biface is examined to determine its original core form (produced from a flake blank or a bifacial preform), end shape (convex-pointed, convex-rounded, rectangular, etc.), presence or absence of use-wear, spine-plane angles, and overall size (arrow point, dart point, or larger core/knife-size), providing clues to intended use and estimates of desired artifact dimensions. It is often clear that late-stage bifaces were made directly from flake blanks rather than being reduced from larger, bifacial cores.

Formed flake tools are flakes with margins that have been intentionally shaped by intrusive pressure retouch into continuous, uniform edges; these items are distinguished from simple flake tools by the heavy modification, often intentional, of flake margins. In addition to documenting morphological attributes such as flake type, generic shape (e.g., amorphous or domed), and the number of worked edges, analysis of these implements focuses on observing the general shape of edges (straight, concave, or convex with even or jagged/irregular modification), angle (in degrees), types and degree of modification (micro-chipping, step-fracturing, edge-rounding and/or battering, and unifacial or bifacial flaking, these occurring with either regular or irregular consistency), and the particular surface used for each modified edge (dorsal, ventral, or both).

Simple flake tools are more casual implements, with edge shapes conforming closely to the shape of original flake margins rather than being significantly altered. Edge modification is generally limited and, in some instances, may be a wholly unintentional consequence of use-wear. Simple flake tools are examined for a range of attributes similar to that scrutinized on formed flake tools, including type of flake used and number of worked edges, each individual edge characterized by its shape, type of modification, surface used, and angle. The distinction between simple and formed flake tools is an important one, the presence of minimal tool shaping and use damage on the former variants emphasizing their relatively expedient nature.

A core is considered to be any mass of toolstone shaped by the removal of two or more flakes from the same platform surface; these flakes subsequently serve as blanks for formed or casual implements. Each core will be assigned to a general type category based on overall configuration (having one unidirectional platform, one or more bifacial platforms [detachments from the same platform margin related to bifacial thinning], one or more bidirectional platforms [detachments from the same platform margin but unrelated to bifacial thinning], or multidirectional platform orientations), examined to assess original form (created from a tabular, globular, angular, or split cobble), and checked to determine the number of individual platform surfaces; opposing platforms, and those on the same surface but separated by an absence of removals, are considered distinct. In turn, each platform surface is characterized by configuration (unifacial, bifacial, bidirectional, or multidirectional) and platform surface type

(cortical, interior, or prepared surface); note that multidirectional cores can encompass singular examples of bifacial, unidirectional, or bidirectional platforms. The length of the largest flake removal scar is also measured on each platform face in an effort to determine the maximum flake size produced before the core was discarded. Core tools are treated in a similar manner, with additional information recorded regarding patterns of edge modification (number of discrete edges, edge angles, and kind of wear observed).

Assayed cobbles comprise masses of toolstone that have only a single flake removed from any one platform, or fewer than three flake removals overall. Besides recording information on material, dimensions, and weight of individual specimens, efforts will be made to assess possible reasons for discard, which might include poor material quality (indicated by the presence of bedding planes, fissures, cracks, and inclusions), awkward shape of the raw material package (although the material may be of suitable flaking quality, an irregular form can make further reduction problematic).

4.2.2.4. Debitage

Debitage includes all flaking debris resulting from the manufacture, use, and repair of chipped stone tools. For the most part, this detritus results from the manufacture of flaked stone implements only, but for certain materials (e.g., granite) it may comprise waste from the intentional thinning or use-related breakage of ground and battered stone tools. All flakes will be sorted by material type, counted, and weighed by recovery unit (surface collection cell or excavation level). A sample from each site or depositional locus will then be subjected to fine-grained technological analysis, wherein each flake was assigned a specific material type according to the classification key, sorted into a general size category (<1.0 cm, 1.0-2.0 cm, 2.0-3.0 cm, 3.0-5.0 cm, >5.0 cm), and evaluated for technological (reduction) affinity.

Fifteen technological flake types are recognized during this analysis: (1) primary decortication, any flake with more than 70% dorsal cortex; (2) secondary decortication, any flake with less than 70% cortex or only a cortical platform; (3) cortical shatter, small, chunky pieces of debitage that retain any cortex; (4) simple interior percussion, flakes straight in cross-section, with one dorsal arris; (5) complex interior percussion, flakes straight in cross-section, with more than one dorsal arris; (6) linear interior percussion, any flake straight in cross-section, twice as long as wide, with one linear arris, and without cortex; (7) early biface thinning, flakes curved in longitudinal-section with one or two dorsal arrises; (8) late biface thinning, any flake curved in long-section, with more than two dorsal arrises; (9) angular percussion, cuboidal or chunky pieces of shatter without cortex; (10) percussion fragments, sections of percussion flakes lacking other diagnostic attributes; (11) edge preparation/pressure, small flakes retaining remnants of tool or core margins with complex dorsal surfaces that cannot be definitively related to pressure-retouch; (12) linear pressure, small flakes with greater length than width, one linear dorsal arris and a well-defined platform; (13) rounded pressure, small pressure flakes with round or amorphous outlines and simple dorsal surfaces; (14) indeterminate percussion, whole percussion flakes that cannot be typed due to weathering or other fragmentation; and (15) indeterminate pressure, complete or broken pressure flakes that cannot be assigned to categories 11-13. Indeterminate percussion and pressure flakes (types 14 and 15) are differentiated because the latter reflect observer constraints in the classification process rather

than the effects of fragmentation; similarly, the frequency of type 11 flakes may be diagnostic of certain reduction activities and contributing proportions of pressure versus edge preparation debris can often be inferred on other technological criteria.

For comparative purposes, these flake types can be combined into six broader groups: decortication, interior percussion, biface thinning, and pressure flakes; percussion fragments; and indeterminate. The first four are considered to reflect sequential "stages" of lithic reduction, the latter two are considered non-diagnostic groupings. These more inclusive categories help bolster sample sizes and allow inferences concerning: (1) the use of different materials (including CCS color variants) at project sites; (2) which materials were reduced locally and which were worked prior to arrival in the study area; and (3) the range of stone working activities represented at particular locations. Decortication flakes include flake types 1, 2, and 3, and represent debris from primary cobble/core reduction. Interior percussion debris includes flake types 4, 5, and 6, waste produced from secondary reduction and shaping of core masses. Biface thinning flakes includes types 7 and 8, detritus from the reduction of bifacial cores or platforms. Pressure flakes include types 11, 12, 13, 15, and contain debris from activities such as platform preparation, tool edge resharpening and maintenance, and pressure retouch finishing. Percussion fragments that include flake types 9 and 10 (angular shatter and unclassifiable percussion fragments), and the indeterminate group (type 14) includes all other unclassifiable percussion flaking debris.

4.2.2.5. Ground and Battered Stone Analysis

Apart from standard morphological characterizations of the ground and battered stone (dimensions, weight, condition, and material composition), attributes will be examined that might aid in assessing how such tools were made, used, and incorporated into regular toolkits. Inasmuch as utilitarian technologies of this sort are likely influenced more by functional and situational issues than by social or stylistic parameters (Basgall 1988, 2008; Basgall and Hall 1994; Nelson and Lippmeier 1993; Noble 2011), variables relating to the acquisition, form, use, condition, and discard of these tools offer useful measures of how the technology was organized as part of routine subsistence-settlement practices (Hale 2001, 2009). Several types of ground and battered stone might be expected at sites in the Project APE, hand stones, milling stones, pestles, mortars, cobble tools, and miscellaneous ground fragments.

Hand stones are typically categorized into three basic groups based on their degree of formalization (shaped, unshaped, or indeterminate). This allows analysts to examine wear patterns in relation to the degree of modification for each class of hand stone. Worn surface textures are described as either smooth or irregular, where smooth forms maintain continuous, worn working surfaces and irregular surfaces exhibit restricted and often discontinuous, patchy facets. Ground surface shapes are considered either flat, slightly convex, or irregular. Degree of wear and evidence of reuse is further characterized by observing the number of ground surfaces, presence or absence of burning, signs of surface resharpening via pecking, and indications of secondary use-wear (e.g., batter/grinding on broken edges).

Milling stones are generally large flat to concave stones used in conjunction with a hand stone or cobble tool to grind plant, animal, or mineral resources. They are separated into three size

variants: thin slabs attaining a maximum thickness of 6.0 cm, thick variants measuring from 6.0 to 13.0 cm, and block specimens over 13 cm thick. Only artifacts with intact dorsal and ventral surfaces are classified by size, all others are put into an indeterminate category. These thickness categories follow those employed at other Mojave Desert localities (e.g., Fort Irwin, China Lake, Twentynine Palms) and were used during previous studies in Bissell Basin and Rosamond Dry Lake (Basgall and Overly 2004; Giambastiani and Basgall 1999). Thickness has a strong correlation with the mass of the specimen and hence on the relative portability of such artifacts. Other observations made on milling stones include margin modification or shaping (via pecking, battering, or grinding), surface frequency, overall surface shape (slightly concave, concave, slightly convex, and flat), surface texture (smooth or irregular), the presence of pecking related to surface rejuvenation, secondary or multiple use signatures (burning or ancillary modification), and discard condition. These attributes provide important information regarding the intensity of milling stone use and, quite possibly, the duration of which they were retained in the toolkit.

Both pestles and mortars may occur infrequently at project sites, a technology used to pulverize food resources. Such implements were used to process various nut and seed crops (e.g. mesquite beans, acorns, pine nuts), but also soft resources like roots/tubers and small animals. Analysis will focus on artifact form, the location and nature of use-wear, tool condition, and lithological composition. Given their expected scarcity in the EUL, pieces will be described individually as appropriate.

Miscellaneous ground stone consists of fragments too small to be classified with confidence. As most of these pieces likely represent standard kinds of utilitarian ground stone (hand stones, milling stones, etc.), they are subject to similar morphological and surface analysis. Provisional determination of original tool form is made when possible. Standard attributes include the absence or presence of shaping, ground surface frequency, use-wear attributes (surface configuration, texture, and resharpening), burning, and secondary use-wear.

Cobble tools can express damage strictly on natural or cortical surfaces, usually angular margins or ends. Observations will be made regarding the general shape of the cobble, the position and extent of battering, and evidence for ancillary grinding or other secondary modification such as burning. The amount and location of battering is presumed to have strong functional connotations, edge-damaged cobbles more suitable for chopping activities than artifacts damaged strictly on cortical surfaces.

4.2.2.6. Ceramics

Ceramics recovered from the field will be washed to remove dirt and sorted into three types: rim sherds, general body sherds, and others (to include special items such as pipes, beads, and figurines). Samples identified in the field or lab for residue analysis and radiocarbon dating will not be washed on the surface to be tested; soil will be gently removed to expose the material/surface to be tested; the other surface will be dry brushed. Upon cleaning, these samples will be placed in clean aluminum foil to prevent contamination.

Ceramic analysis generally focuses on identifying vessel forms and fabric types in order to identify the types of activities for which ceramic vessels were used, production techniques, and

when possible, source location for vessel constituents. The first step in ceramic analysis is to differentiate the traditionally defined buffware and brownware fabrics, and to differentiate, when possible, Tizon Brown from Salton Brown. Macroscopic and microscopic visual analysis is performed, using the presence (Tizon) or absence (Salton) of amphibole (hornblende) as the distinguishing characteristic between the brownwares (Gallucci 2004). Differentiating between brownwares macroscopically is difficult at best, and even low-powered magnification has been shown to be much less accurate than microscopic analysis (Gallucci 2004; Hildebrand et al. 2002). Differentiation between brownwares and buffwares is determined by a variety of characteristics, such as clay type, the size and abundance of quartz inclusions in the fabric, and color.

Vessel forms are distinguished primarily through rim sherd analysis, as it is unusual to recover sherds sufficiently large enough to clearly identify the vessel. Rim sherd diameter and form are documented following Cook (1987) and Waters (1982). Other distinguishing production characteristics and modifications noted during analysis include slips, decorations (e.g., paint, incisions, and etching), repair, evidence of burning, and evidence of production methods (e.g., basket imprints, finder pints, remnant coils). Reconstruction (refitting) of vessels will focus primarily on rims sherds, bases, and decorated/modified body sherds to aid the identification of vessel types.

Depending upon the types and quantities of sherds recovered, additional analytical methods may be employed, including ceramic petrography, x-ray fluorescence, and thermoluminescence dating. Ceramic petrography is used to identify numerous characteristics within ceramic sherds, including production techniques (coiling, paddle and anvil, wheel thrown), firing method and conditions, differentiating natural inclusions from added inclusions (temper), amongst others, in order to determine the provenance of materials and vessels and to understand the technological choices of the potters and the distribution of their wares through space and time. X-ray fluorescence can be used to identify chemical variations in ceramic fabrics, which can help identify the provenance of clay sources and other materials in the vessel.

4.2.2.7. Analysis of Other Artifacts

Although likely present in all small numbers at scattered locations, a variety of other artifact classes will almost certainly occur in the project area. These include such items as modified stone and bone (e.g., bone awls, atlatl weights, tablets or pendants), glass, stone, and shell ornaments; some of these artifacts may have important temporal or cultural affinities and can provide insight into regional exchange and social interaction. Such objects will be fully described and compared to appropriate regional typologies; observations will be made on overall morphology, methods of production, and wear patterns. This group could also include otherwise unmodified objects such as obsidian pebbles, rock crystals, and the like that are obviously introduced to the sites from exotic source areas. Lastly, ethnohistoric accounts indicate Native American presence in the project area during the 19th century; these occupations may have produced assemblages of Euroamerican artifacts that were appropriated and used by Native people (e.g., modified metal cans, buttons, worked bottle glass). Like other of these mostly unique items, analyses will conform to the nature of the object.

4.2.2.8. Treatment of Items of Cultural Patrimony or of Other Special Tribal Significance

Analysis of any item identified by Consulting Tribes as having cultural significance beyond basic utilitarian function will be directed by FRA in coordination with Consulting Tribes, including specified recording, analysis, collection or storage. Moreover, any items identified as having been ritually decommissioned may not be subject to standard analytical protocol, but their treatment will be directed by FRA in coordination with Consulting Tribes.

4.2.2.9. Fauna

Vertebrate and invertebrate faunal remains provide one of the more direct measures of prehistoric subsistence activities and how past populations responded to variation in ecological conditions. It is expected that the latter will be rare in excavated archaeological deposits, though small quantities of marine shell could be encountered in select circumstances, such as within the CLAD. Even vertebrate fauna will be less than ubiquitous given the poor organic preservation characteristic of Mojave Desert sites; this makes it all the more important to maximize the recovery of animal bone from both screen-derived contexts and flotation/soil samples.

Faunal analysis essentially involves determining the taxonomic composition of bone samples and then quantifying those data in an accurate fashion. After cataloguing, recovered animal bone will be sorted into identifiable and unidentifiable categories; the former skeletal elements will retain features that permit accurate assignment to particular animal forms. Unidentifiable fauna generally represent small fragments of nondescript that can at best be size-classed. All faunal debris will be assigned to the finest taxonomic class possible, species or genus if possible, but to family or order if necessary. Identifications will be made via comparative skeletal collections as well published osteological manuals. Specimens that cannot be assigned to at least order are further segregated into size classes for generic mammals, birds, and general vertebrates; these classes include large (artiodactyl-size forms), medium (jackrabbit to coyote size), and small (rodent size). Modification attributes noted during the identification process include evidence of burning, gnawing marks, and more generic weathering, data that help indicate whether the fauna were introduced into site deposits by cultural actions or natural processes. Finally, faunal data will be quantified by taxon to facilitate comparisons across sites, temporal periods, or discrete depositional contexts. Depending on sample size, samples will be quantified via minimum number of individuals (MNI), number of identifiable specimens (NISP), and raw bone weight (cf. Grayson 1984).

Any faunal remains identified by Consulting Tribes as having cultural significance apart from standard economic representation may not be treated according to standard analytical protocol; their treatment will be directed by Consulting Tribes. Such remains may include worked items or rare faunal material often not present in the region or known for subsistence and may signal ceremonial activities or representation.

4.2.2.10. Paleobotanical Remains

Carbonized plant remains, seeds, nutshells, and even root/tuber fragments, are occasionally found in standard field screens, but most such data are recovered via flotation of bulk soil

samples from cultural features or discrete midden deposits. This is largely a consequence of the minute size of many seeds and seed fragments that are not captured by 1/8" screen mesh; as with fauna, reviewed above, paleobotanical data from the larger Mojave Desert region are limited due to issues of poor preservation. The field investigations will, therefore, prioritize collection of flotation samples from good chronostratigraphic contexts. These will mostly comprise buried features like hearths, rock lined ovens, and living surfaces, but will include discrete midden horizons that lack obvious structural integrity.

Bulk sediments in these samples are first measured for volumetric size (liters of soil), which is then placed in a basin of water that floats out the lighter constituents (mostly carbonized wood and seed/nut parts) and also captures the heavier fraction (tiny flakes and bone fragments). Light fraction materials are recovered using 40/in scoops (carburetor mesh) and heavier constituents with 1/16" (window screen) mesh. Both fractions are then subject to further sorting and analysis. After drying, light fractions are sieved through 10/in, 16/in, 24/in, 35/in, and 40/in screens; contents then need to be sorted using a dissecting microscope (7X magnification), which is time-consuming due to the quantities of wood charcoal and modern plant debris contained in many light fractions. Wood and shrub charcoal is often identifiable to plant taxon, and can provide insight into local habitat structure, but it is usually the economic seeds that are the target of flotation studies.

This typically means that light fraction size-grades are sampled. Where overall samples are small, it is efficient to sort all grades in their entirety, but otherwise sorting is targeted according to screen size and associated time-investment. Thus, 100% of the 10/in fraction would be fully sorted, 50% of the 16/in, and 25% of the 24/in; where seed recovery is high, these proportions can be easily increased. Plant macrofossils then require taxonomic identification, a procedure facilitated by comparative native plant collections at academic institutions (e.g., UCLA, CSU Sacramento), the California Department of Food and Agriculture seed herbarium, and a series of photographic atlases. After identification, seed quantities are corrected to reflect the volume of the initial sediment size and any adjustments made due to sampling proportions; these standardized values allow comparison of macrofossil quantity across temporal and spatial contexts. As with faunal remains, taxonomic assignments are as precise as possible, usually to the family level but to genus and species where possible.

4.2.2.11. Special Studies

A battery of special studies will augment the mostly in-house analyses reviewed in previous sections; these will be performed by outside consultants with recognized expertise in their fields, providing important information regarding chronology (radiocarbon and obsidian hydration dates), raw material sourcing (obsidian and fine-grained volcanics), prehistoric diets (starch grain and protein residue analysis), and paleoenvironmental reconstruction (pollen studies of core samples). Specific consultants will be identified during the course of the project as the particular needs emerge. Any analysis that diminishes the physical integrity of an artifact will first be approved by Consulting Tribes.

Radiocarbon Dating

Radiocarbon dating of old organic remains comprises the most reliable means of assessing the age of archaeological and non-archaeological deposits. Accuracy is dependent on good contextual controls and understanding the origin of dated materials, which can include charcoal, bone, shell, and organic sediments. Project samples will derive only from discrete cultural constructions such as hearths, ovens, and living surfaces, or from intact sediment horizons in other contexts. Charcoal is often present in other subsurface situations but cannot be linked to particular events or temporal intervals.

Obsidian Hydration

The obsidian hydration technique offers another important dating option, providing temporal estimates for individual tools or flakes in even disturbed archaeological contexts. Most obsidian at Project sites likely derives from the Coso Volcanic Field but volcanic glass has also been traced to more distant sources, or smaller local sources. While there remains debate on the hydration rate of Coso and other sources, how micron measurements correlate with calendrical ages, the issue is becoming clearer as research continues. The Project sites offer an opportunity, albeit limited, to refine these relationships and establish a firm hydration rate for Coso obsidian within the Project APE.

Raw Material Sourcing

Geochemical studies are essential for determining the geologic origin of lithic materials such as obsidian and fine-grained volcanic (FGV) rocks. Source identification is not only important in tethering hydration analyses, where rates are source-specific, but as importantly in measuring the extent and range of lithic exploitation patterns. Long-distance acquisition of toolstone might variously be accomplished via mobility and travel or through inter-group exchange with neighboring social groups, possibilities that can be assessed based on the character of artifacts in particular archaeological contexts. The current project will incorporate X-ray fluorescence techniques to trace samples of obsidian and FGV artifacts from optimal depositional contexts. Should other opportunities arise to provide raw material sourcing on other types of materials or ceramics, those studies will be developed and completed in discussion and with the approval of Consulting Tribes.

Starch Grain Analysis

Standard macro-botanical studies of carbonized plant material recovered via flotation studies are dependent on seeds being burned during the preparation process. Because not all resources have an equal chance of becoming burned, starch grain analysis has provided another measure of past plant exploitation. Starches are resilient and adhere directly to the artifacts used to process or cook the resources; they can be recovered by chemical washes of individual artifacts or milling surfaces, concentrated using centrifuges, and identified under high-powered microscopy. A select sample of ground and battered stone implements from project sites will be subject to starch analysis as a complement to traditional flotation studies. This may be especially important in documenting the extent and antiquity of mesquite exploitation in the Project area.

Protein Residue Analysis

Although still controversial is some quarters, protein residue analysis has emerged as an important means of identifying the animal and plant resources processed with particular archaeological tools. The technique relies on taxon-specific immunological reactions to remnant proteins on the artifacts to determine what resources came in contact with those surfaces. Results of previous studies have sometimes been counter-intuitive, finding traces of small animal residue on implements assumed to be related to plant processing. As with the starch grain studies, protein residues may be tested on a subset of artifacts from the project and may clarify the role of atypical subsistence practices.

4.3. Historic Period Archaeological Research Themes

The historic period research themes provided in this HPTP are limited to those that are relevant to affected NRHP-eligible historic period archaeological sites. These sites are limited to those that contain refuse deposits associated with homesteading (ICF-XW2-007), community refuse disposal (P-36-006023), and railroad construction camps (26CK5760). Early settlement is reflected in the homestead and community dump, and transportation themes are reflected in the railroad construction camp. None of the other major themes are directly implicated, such as mining, even though such activities may have been a major commercial draw to early settlement.

4.3.1. Historical Period Land Use and Settlement

The Mojave Desert is a harsh environment. That vast portions of the Project area are wholly undeveloped attests to the difficulty of settling permanently in the region by non-Native peoples. While the Native American occupants of the region developed a vast knowledge of the resources and a relationship with the harsh environment over thousands of years, non-Native people quickly moved into this land and attempted to control and harness its resources with little knowledge of its idiosyncrasies. In some cases, Spanish, Mexican, and American colonists were successful, but the desert also has evidence of the many who were not. Others still would insincerely make homestead claims or land patent claims as a means of reducing tax burden, resulting in a landscape pock marked by seemingly failed attempts to improve land (Hale et al. 2010). Despite impediments, people still settled the area contributing to an economy that grew sporadically. In some cases, this took the form of agriculture, and in others it was ranching. Towns and communities, such as Barstow, Calico, Yermo, and Baker, developed largely in relation to mining and railroad enterprises, to provide services for travelers, and for moving freight both in small and large scale. These towns and communities also provided services for those traveling by vehicles and moving freight.

Most historic period archaeological sites lacked contextual information sufficient to address research questions relating to land use and settlement and were recommended as ineligible for inclusion in the NRHP (Hale and Barton 2022a, 2022b). However, two sites in California, a large community refuse dump (P-36-006023) and the location of a homestead (ICF-XW2-007), were determined eligible for NRHP listing due to the ability of refuse deposits at those sites to inform on community consumption (P-36-006023) and early homesteading (ICF-XW2-007). Another

site in Nevada, 26CK5760, is the Eerie railroad station that contains substantial historic period worker camps and refuse deposits, including a possible Native American laborer rock ring and lithic scatter. Data recovery at these sites has the goal of extracting additional information relevant to understanding these sites in more detail.

- Can socioeconomic status be understood from refuse deposits and features. Do archaeological remnants reflect the nature life for farming, ranching, mining, or transportation support?
- What is the relationship between the homestead and town of Yermo with food production or consumption and/or transportation routes?
- Does the archaeological material provide insights into the ethnicity of the settlers that occupied these sites? Can Native American labor be inferred from the potential Native American deposits at 26CK5760?
- How did technological advances and the development of transportation systems affect the region economically? Do we see the development of communities related to the availability of goods as a result of railroad construction? What are the relationships of small homesteads or farms/ranches to the major transportation thoroughfares?
- Is there evidence of children or elderly residents in refuse deposits at the homestead (26CK5760) or within the community dump of Yermo (P-36-006023)?

4.3.2. Site Formation

Historic period archaeological sites in the Project APE, which date to the last 130 years, have not been exposed to post-depositional processes to the extent that most prehistoric sites have. Historic period sites, dominated by refuse deposits, tend to occur as dump points that retain spatial integrity, although some can scatters have been widely distributed by aeolian and alluvial processes. Perhaps the strongest site formation process affecting historic period archaeological sites is degradation of perishable items including metal, plastic, textiles, paper, and food remains. Moreover, remote household dumping became common after the advent of the automobile and early, abandoned homesites were often the recipients of disposed refuse by residents unrelated to the dump area.

- Do refuse deposits retain enough integrity to determine the duration of occupation versus overprinting of later, unrelated dump episodes?
- Can socioeconomically distinct refuse deposits be identified between features within a single site?
- What can information distinct, overlapping refuse dumping provide regarding changing socioeconomic conditions for local residents?
- How did recreation affect the degradation of refuse deposits? Is there evidence of recreational target shooting of historic period or later refuse within the affected deposits and if so, are there temporal patterns to such activities?

4.3.3. Chronology

Historic period chronological control is much easier to assess than for prehistoric sites, primarily because the age of manufacture for most disposed items is known, even if their precise age of consumption and disposal is not. It is also true that glass bottles and other containers were often kept by the consumer for secondary use for some time after the consumption of their original contents. However, historic refuse deposits typically yield enough chronological data to place them in a 20- to 40-year period of consumption and deposition. The advent of the automobile resulted in residents packing up old trash and disposing of it with newer trash in locations away from the home (see Hale et al. 2010). While still an important historical behavior, it muddles the time depth of the refuse deposit by combining artifacts of different consumption periods and placing them together in a location away from the point of consumption.

- Do affected historic period refuse deposits retain strong chronological indicators and if so, can the age of consumption or disposal be refined through these lines of evidence?
- Do refuse deposits offer the opportunity to place consumption trends of different goods in time?
- What can be determined about socioeconomic changes among local residents by examining refuse?
- Are artifacts present at 26CK5760 that would be a strong indicator of Native American labor at the railroad camp, such as aboriginally modified Euroamerican materials, or select consumption of specific foods or goods? More archival research into Native American consumption of Euroamerican goods will be necessary to fully address these questions.

4.3.4. Subsistence

Adequate samples of the objects people made and used, the remains of food they ate, animals they raised, and crops they planted, and evidence of their dwellings or other structures and features that they built are all important for deciphering the socioeconomic conditions of people who inhabited historic period archaeological sites or discarded refuse. Additional information about the time of year in which the site was occupied and/or farmed may also be available from seasonally diagnostic animal and plant remains.

Some specific questions and goals under this domain include:

- What can be learned about economy and subsistence from refuse deposits and are there differences indicated in refuse deposit profiles?
- Is there evidence of seasonality in refuse deposits and what would that look like? Were certain foods only available or harvested at certain times of the year?

4.4. Historic Period Archaeological Site Treatment Methods

The methods proposed to mitigate adverse effects to historic period archaeological sites are intended to gather information from myriad sources and often from complex deposits. Much of

the refuse is confined to near surface contexts and requires careful analysis of artifacts on the surface. However, some refuse is buried, such as in privies or from overlapping dump episodes, requiring careful excavation to differentiate between periods of deposition and possible changes in consumption. Overall, the approach to refuse deposit mitigation is built first on extensive archival research and followed by fieldwork that has the goal of capturing the socioeconomic variability of all historic occupants, as well as later historic period scavenging and refuse deposal that occurred onsite.

4.4.1. Archival Research

Prior to the start of fieldwork, additional research will be conducted to better understand the homestead occupants at ICF-XW2-007, and the community composition of the town of Yermo that contributed to refuse disposal at P-36-006023. More research is also needed for the Eerie railroad station (26CK5760) to contextualize refuse deposits there and to obtain potential information on Native Americans that may have camped there during the station's operation, whether for work or otherwise. Archival research will involve talking to local historians and visiting repositories of historical documents and literature.

4.4.2. Field Methods

Field procedures at historic period homesites are similar to those used at prehistoric sites, with some important exceptions. First, SRU (surface recovery units) units will not be used, except in special circumstances because surface assemblages at historical sites are either very sparse or tightly clustered in one or more small dumps. Neither of these contexts is suited to SRU recovery; sparse deposits would yield too few artifacts and clusters would yield too many. For this reason, surface collections at historic period sites will be limited to piece-plot recovery. It is also possible to obtain needed functional and temporal data through detailed surface inventories for glass, cans, ceramics, and other kinds of artifacts. These inventories include the documentation of legible maker's marks, counts of specific artifact types, and functional assessments where warranted.

As for excavation procedures, STPs (shovel test pits) will not be used at historical sites because most refuse deposits are relatively rich in surface artifacts, particularly small constituents like glass shards, nails, wood, bits of metal, charcoal, and other similar remains. STPs are presence/absence indicator units that are appropriate for exploration, but not for sampling. In most cases, surface inventories and piece plot collection will suffice. Where excavation is necessary, sampling typically requires only one or two TUs (test units) to obtain a representative sample of artifacts. For the most part, the use of in-field inventories reduces the overall need for artifact recovery, in that many items (like cans) are of the same manufacturing type and age and others (like glass shards) provide comparatively few data by themselves. The interplay of surface analysis and excavation recovery will ensure that sufficient data are collected.

Where complex refuse accumulation is identified, backhoe trenching may be used to intersect the deposits after initial TU excavation to better define episodes of refuse disposal in an effort to identify chronological differences in consumption. This method is useful toward differentiating overprinting of historic period refuse with later deposits (historical or modern).

For the discovery of ruins, such as house foundations, TUs will be used to expose segments of the foundation in 1 m increments to identify methods of construction and to collect a sample of materials, such as mortar, for laboratory analysis on construction techniques. Contrary to prehistoric sites, 1/4" screen size may be used in TU excavation, especially when exposing foundations or other constructed features. These sample units will help clarify methods of construction that can speak to the socioeconomics of the builders.

These field methods will ensure that data are collected in ways that can help clarify research issues. In particular, site structure and integrity are crucial for understanding period of deposition and to tease apart refuse deposits that differ in age to discern changes in consumption. Methods proposed herein ensure that surface deposits are appropriately recorded and sampled (surface analysis and piece plot recovery) apart from buried refuse deposits (sampled with TUs) that require more intensive excavation. These methods will ensure that rich deposits, such as privies are treated differently than surface dumps.

4.4.3. Laboratory Methods

Laboratory methods for historic period artifacts follow the same basic processing and cataloging procedures for prehistoric artifacts. The analysis of historical artifacts has the goal of placing artifacts into broad functional and temporal classes. This is accomplished using classificatory and dating schemes contained in the Intermountain Antiquities Computer System (IMACS) handbook and in various other references concerning the identification, manufacture, and dating of historical artifacts (e.g., Fike 1987; Godden 1964; Rock 1987; Toulouse 1971). Bottle websites (such as that of BLM) and other online resources are also used to identify maker's marks and manufacturing styles. While artifact recovery generally focuses on the collection of diagnostic items, other small refuse such as glass, nails, and ceramics are also recovered in small samples, identified, classified, and analyzed either individually or in batches as deemed appropriate. Such bulk refuse will not be curated unless it represented a unique artifact class, consistent with Praetzellis and Costello (2002).

These laboratory methods are consistent with those used for previous mitigation programs in the region and are key elements of the historic thematic studies (see Peyton and Pucket 2008). They ensure consistent categorization of recovered materials in order to facilitate regional assemblage comparison while addressing research themes.

4.5. Archaeological Avoidance Measures

Prior to construction, environmentally sensitive areas (ESA) will be established within the Project APE to ensure avoidance of impacts to known historic properties. Construction personnel will be instructed to avoid ESAs through worker environmental awareness training (see Section 11.2 of this HPTP). Should avoidance be feasible for any new historic properties identified during construction, ESAs will be established around these properties to ensure that they are not inadvertently impacted by construction activities.

1. Under the supervision of the PI, archaeological monitors will flag and demarcate an area of 200 m (approximately 600 feet) around any known archaeological historic property. A Native American monitor will be present to observe demarcation of ESAs. Given special

circumstances, ESAs may require adjustment to provide for continued use of existing features or consideration of property limits. For example, where roads intersect the Project APE-ADI, ESAs may be delineated on either side of the active roads; however, grading restrictions must be clearly signed on either side. ESAs should be established using metal T-posts and rope with the intent of providing clearly recognizable limits. Posts will be marked with the following note: "ESA - No Access." Colors, materials, and styles used for demarking ESAs will not conflict with construction markings; they must be clearly visible and differentiated from construction-related marking. The areas required for demarcation of ESAs will be clearly shown on maps, digital viewers, and other media as appropriate to facilitate construction scheduling.

2. All construction personnel will be notified during the worker environmental awareness program (WEAP) presentations of the presence and location of all ESAs within the Project area and the need to maintain the integrity of the ESAs.
3. The PI, archeological monitors, and Native American monitors will communicate the archaeological sensitivity and cultural importance of the resources to construction personnel through the duration of work.
4. Construction personnel will be informed that ESAs are strictly off limits to construction, and that no entrance is allowed at any time. ESAs will not be described as archaeological sites. The exact location of archaeological resources will be confidential to the extent feasible.
5. Construction personnel will be informed that damage, defacement, unpermitted excavation or removal of artifacts, or other tampering with archaeological resources on federal land is prohibited under the Archaeological Resources Protection Act for federally administered lands (16 USC 470aa–470 mm). For lands under Nevada jurisdiction, Nevada Revised Statutes (NRS) 381.195-227, .180, and .435, and NRS 206.330 provide protections for archaeological resources and penalties for damage or destruction of such resources. For Lands under California jurisdiction, California Administrative Code, Title 14, Section 4308, Public Resources Code 5097.99, 5097.993, and 5097.994, and Health and Safety Code 7050.5, 7051 and 7052 establish protections and penalties for the disturbance or possession of archaeological materials or Native American human remains. Damage to archaeological sites is subject to civil and criminal penalties, including fines and imprisonment. Artifacts and archaeological sites are only to be handled by archaeological monitors and Native American monitors, and are not to be photographed for personal use and/or posted on social media.
6. Archaeological monitors and Native American monitors will maintain flagging/staking or exclusion fencing for ESAs to ensure that established ESAs are avoided and protected.
7. Archaeological monitors will have the authority to suspend work in the vicinity of any ESA that is disturbed by construction. The PI or archaeological monitor will also immediately report any violation of the ESA to FRA.
8. Subsequent to completion of initial earth-disturbing activities requiring monitoring, archaeological monitors will check ESAs periodically with the intent of ensuring that

ESAs remain present and related sites remain undisturbed through the duration of construction.

9. All ESA exclusionary measures will be removed at the conclusion of Project-related activities in the vicinity of an ESA that may result in ground disturbance, including pedestrian or vehicular travel in order to avoid attracting unnecessary attention to the area.
10. For known historic properties that will be mitigated within the APE-ADI, ESA exclusionary measures will be removed after FRA has determined that mitigation measures, such as data recovery, have been successfully completed to allow Project construction to occur within the ESA.
11. Exclusionary fencing for permanently avoided ESA's or portions thereof will be maintained throughout Project construction when construction activities in the vicinity of avoidance areas remains possible.
12. Temporary ESA exclusionary measures may be erected around unanticipated discoveries to ensure adequate avoidance of Project related ground disturbance until FRA has determined that treatment of the unanticipated discovery is concluded.

4.6. Resolving Effects to Tribal Values Attached to Historic Properties

FRA has determined through Tribal consultation that the following treatment measures are warranted to mitigate for adverse effects to historic properties. These measures include minimization of noise and vibration effects to the CLAD, additional survey of all known prehistoric archaeological districts in the APE-AII, and interviews with members of consulting tribes.

4.6.1. Survey of Archaeological Districts in the APE-AII

The Project Sponsor will provide for additional pedestrian survey of all known prehistoric archaeological districts (SQAD, MRLL, SRAD, CLAD, Halloran Springs Archaeological District [HSAD]) in the APE. FRA will require a Supplemental Survey Plan to address effects to broader traditional cultural landscapes known only through currently recorded prehistoric archaeological sites. Supplemental Survey Plan will be developed by the PI in consultation with FRA and the Project Sponsor and will be submitted to consulting parties for review and comment according to the timelines described in Stipulation II.A of the PA.

These surveys will be completed by the archaeological PI, accompanied by Native American monitors within the APE-AII for portions of archaeological districts where no pedestrian surveys were conducted as a part of the historic property inventory efforts. The goal of these surveys is to revisit previously recorded sites, update site records, and complete a sample survey of additional lands encompassed by the district boundaries. Additional archaeological field survey and site recording efforts for select portions of districts within the APE-AII, as determined by FRA, may provide valuable information to Consulting Tribes on the presence of prehistoric archaeological deposits as they relate to the conveyance of the traditional cultural landscape type of significance over the broader region.

Many of the archaeological site records in the APE-AII for portions of archaeological districts are dated and many are recorded on forms that preceded the standard California DPR 523 series resource records and Nevada IMACS forms. The PI will ensure that all previously recorded sites are accurately mapped in GIS, record any newly identified sites and isolates during the sample surveys, complete new site records, and prepare an addendum archaeological inventory report documenting the results.

Since these surveys will occur in areas that will not be subject to ground disturbing activities, completion of the surveys and documentation shall occur no later than 90 days before completion of Project construction. Timelines for review by FRA and consulting parties will follow the timelines in Stipulation II.A of the PA.

4.6.2. Ethnohistoric Study—Native American Interviews

FRA will require the Project Sponsor to provide for interviews of Native American members of consulting Tribes to develop an ethnohistory focusing on various broad concepts, themes, and traditional practices and beliefs expressed to FRA during Native American consultation.

The archaeological PI will oversee completion of interviews of Native Americans identified by FRA through tribal consultation. The interviews will be completed by an ethnographer that meets Secretary of Interior's Professional Qualification Standards under Archaeology with professional experience in ethnography. The goal of the interviews is to obtain first-hand information and current Native American perspectives on the Native American landscapes that intersect the Project APE. The information obtained through these interviews will be detailed in a standalone ethnohistorical report subject to Stipulation XIV (Confidentiality) of the PA.

4.6.3. Minimization of Noise and Vibration Effects to the CLAD

FRA has determined that construction related noise and vibration will adversely affect archaeological deposits to which Consulting Tribes have attached special religious and cultural significance. Specifically, as Project construction occurs within 1,500 feet either side of Basin Road, these sensitive deposits will experience adverse effects due to unusually high levels of noise and vibration generated from construction that affect the setting and feeling of the CLAD.

To resolve these effects (though transient in nature), FRA will coordinate with Consulting Tribes and the Project Sponsor to minimize noise and vibration through measures that may include, but are not limited to:

- Selection of construction equipment and methods that minimize noise and vibration
- Erection of temporary noise and vibration barriers between construction activities and the sensitive archaeological deposits
- Development and implementation of a creative planting plan between construction activities and sensitive archaeological deposits
- Monitoring of noise and vibration during construction to ensure minimization efforts are sufficient

- Erection of exclusionary barriers between sensitive deposits and activity zones with a sufficient buffer

5. Treatment of Historic Built Environment Resources

For built environment historic properties previously identified within the APE, no context or research themes for those built environment resources are included in this HPTP as the Project would not result in adverse effects for NRHP-eligible, built environment resources; thus, the properties do not require specific treatment measures other than avoidance. This chapter addresses the measures that can be undertaken to ensure the avoidance of damage, defacement, or destruction of built environment historic properties during construction. This treatment plan discusses the measures that may be implemented during construction to ensure that construction personnel and equipment operators adhere to no-work zones (ESAs) and exclusionary measures put in place by the PI.

5.1. Built Environment Historic Properties: Avoidance Measures

Any newly identified built environment historic properties would utilize already established context and research themes from the previous reports as discussed in other sections of this HPTP. As needed to resolve adverse effects to those newly recorded properties, a site-specific HPTP would be developed in accordance with the sections of this HPTP that discuss additional phased identification, evaluation, and assessment of effects. For previously identified built environment historic properties, prior to construction, ESAs will be established within the Project's APE where it has been determined by FRA to be required to ensure avoidance of impacts to known historic properties, including the historic transmission line corridors within the APE (refer to Appendices A and B for locations of these resources and historical information for each). Construction personnel will be instructed to avoid ESAs. This generally applies to all known and recorded historic properties. Should a revised Project design result in newly identified built environment historic properties, ESAs will be established around them to ensure that these properties are not inadvertently impacted by construction activities and the following steps will be taken:

1. Under the supervision of the PI, archaeological monitors will flag and demarcate an area of 5 m (approximately 16 feet) around any known built environment historic properties adjacent to or within staging areas and construction areas. ESAs may require adjustment to provide for continued use of existing features or consideration of property limits. For example, where roads intersect the Project APE-ADI, ESAs may be delineated on either side of the active roads; however, grading restrictions must be clearly signed on either side. ESAs should be established using metal T-posts and rope with the intent of providing clearly recognizable limits. Posts will be marked with the following note: "ESA - No Access." Colors, materials, and styles used for demarking ESAs will not conflict with construction markings; they must be clearly visible and differentiated from construction-related marking. The areas required for demarcation of ESAs will be clearly shown on maps, digital viewers, and other media as appropriate to facilitate construction scheduling.
2. All construction personnel will be notified during the WEAP presentations of the presence and location of all ESAs within the Project area and the need to maintain the integrity of the ESAs.

3. The PI, will communicate the historical importance of the resources to construction personnel through the duration of work.
4. Construction personnel will be informed that ESAs are strictly off limits to construction, and that no entrance is allowed at any time. ESAs will not be described as built environment or archaeological sites.
5. Construction personnel will be informed that damage, defacement, or other tampering with historic resources is prohibited.
6. Archaeological monitors will maintain flagging/staking or exclusion fencing for ESAs to ensure that established ESAs are avoided and protected.
7. Archaeological monitors will have the authority to suspend work in the vicinity of any ESA that is disturbed by construction. The PI or archaeological monitor will also immediately report any violation of the ESA to FRA.
8. All ESA exclusionary measures will be removed at the conclusion of Project-related activities in the vicinity of an ESA that may result in alteration or destruction of an historic property.
9. ESA exclusionary measures will be removed after FRA has determined that mitigation measures, such as photographic recordation, have been successfully completed to allow Project construction to occur within the ESA.
10. Exclusionary fencing for permanently avoided ESA's or portions thereof will be maintained throughout Project construction when construction activities in the vicinity of avoidance areas remains possible.
11. Temporary ESA exclusionary measures may be erected around unanticipated discoveries to ensure adequate avoidance of Project related impacts until FRA has determined that treatment of the unanticipated discovery is concluded.

6. Procedures for Resolving Adverse Effects

Implementation of procedures to resolve adverse effects will generally follow the methods identified in Chapters 4 and 5 of this HPTP for archaeological and built environment resources, respectively, or as specified in a resource-specific HPTP. Timelines for resolution of adverse effect shall follow Stipulation II.A of the PA, also summarized in Chapter 7 of the Project PA, except for inadvertent discoveries which are treated in Chapter 11 of this HPTP and conforming to Stipulation XI of the PA, or as specified in a resource-specific HPTP. The procedures for resolving adverse effects are as follows:

- For those historic properties that FRA has determined will be adversely affected by Project implementation, and for which mitigation measures have been provided, the Project Sponsor shall ensure that no Project construction with the possibility of causing effect to the historic property will occur within a reasonable buffer of the historic property, but not less than 150 feet from the known historic property boundary until FRA approves the HPTP and buffer area for construction. In consultation with the PI for archaeology or built environment, and the Project Sponsor, FRA may reduce the buffer or require additional buffer for construction activities for a specific historic property.
- FRA may require the Project Sponsor to install protective measures around the HPTP buffer, such as exclusionary fencing or avoidance signage.
- The PI (archaeological or built environment) will coordinate with the Project sponsor to determine an appropriate schedule for completing research, fieldwork, or other technical work required to resolve adverse effects and will communicate the proposed schedule to FRA.
- For archaeological historic properties, the PI will ensure that a Native American monitor is present during fieldwork according to the procedures summarized in Chapter 11 of this HPTP.
- Within 7 days of completing technical work required to resolve adverse effects, the PI shall submit to FRA a draft end of field (EOF) report to FRA for review.
- FRA and the PI will conform to the timelines for internal and consulting party review as specified in Stipulation II.A of the PA and Chapter 7 of this HPTP for known historic properties, or in Stipulation of XI of the PA and Chapter 11 of this HPTP for inadvertent discoveries, or as specified in a resource-specific HPTP.
- The Project Sponsor, in coordination with FRA, will direct that construction-related activities within the buffer zone will not occur until FRA concludes consultation on resolution of adverse effects with consulting parties.
- The Project Sponsor will provide for secure storage of recovered cultural material, excluding human remains and items of cultural patrimony. The PI may transport recovered cultural material to secure off-site storage locations or laboratories for additional analysis.

- The Project Sponsor will provide for payment and permanent curation of archaeological materials and documentation at the University of Nevada, Reno for materials recovered from archaeological sites in Nevada, and at the Western Science Center for materials recovered from archaeological sites in California. Storage or curation of materials produced from treatment of built environment historic properties will be determined in consultation with the appropriate SHPO and Consulting Parties and in conformance with guidance for any resource specific HPTP produced for that built environment historic property (since no curation of built environment materials is expected as no adverse effects to built environment historic properties is anticipated). .
- The PI shall submit final documentation of the treatment of adverse effects to historic properties and cultural resource monitoring within 180 days of the completion of all affected historic properties and all cultural resource monitoring activities for that historic property.
- These procedures shall also apply to historic properties that may be identified during inventory of new APE on non-federal lands.

7. Timeframes for Implementing Treatment of Known Historic Properties

Except for inadvertent discoveries, all review periods are concurrent and fifteen (15) days, starting on the day the documents are provided by FRA and/or the Project Sponsor to the reviewing parties electronically, which constitutes notification.

The Project Sponsor will provide draft documentation to FRA for review and approval. FRA shall review the draft documentation within fifteen (15) days. Following receipt of FRA approval, the Project Sponsor will submit documentation to the Signatories, Consulting Tribes, and other Consulting Parties for review and comment for fifteen (15) days.

All notifications will be sent by e-mail and/or other electronic means, with larger documents uploaded to a SharePoint website for access. Hard copies will be sent following notification only to those self-identified Consulting Parties.

The Project Sponsor will forward a written summary of all comments received from Signatories, Consulting Tribes, and other Consulting Parties to FRA immediately at the end of the fifteen (15) day review period. The Project Sponsor, in consultation with FRA, will ensure that any written comments received within the review timeframe are considered and incorporated, as appropriate, into the documentation. At FRA's discretion, FRA may consider comments received after the close of a comment period.

If Signatories, Consulting Tribes, or other Consulting Parties do not provide written comments within the fifteen (15) day concurrent review period or otherwise specified review period, the Project Sponsor, in coordination with FRA, may proceed to the next step of the process without taking additional steps to seek comments from any party. In the absence of comment from the CA SHPO or NV SHPO, the Project Sponsor, in coordination with FRA, will adhere to 36 CFR § 800.3(c)(4) and proceed to the next step in the process.

The Project Sponsor, in coordination with FRA, will work expeditiously to consider and resolve comments, as appropriate. The Project Sponsor and FRA may consult with Signatories, Consulting Tribes, and/or other Consulting Parties to resolve such comments. The Project Sponsor, in coordination with FRA, will inform the Signatories, Consulting Tribes, and/or other Consulting Parties of the resolution in writing.

The Project Sponsor will provide final documentation to FRA for review and approval. FRA shall review the final documentation within fifteen (15) days. Following receipt of FRA approval, the Project Sponsor will submit final documentation to the Signatories, Consulting Tribes, and other Consulting Parties.

Final documentation may include a request for review of a finding or determination by the CA SHPO or NV SHPO. If the CA SHPO or NV SHPO do not provide written comments within the fifteen (15) day concurrent review period or otherwise specified review period, the Project Sponsor, in coordination with FRA, will adhere to 36 CFR § 800.3(c)(4) and may proceed to the next step in the process without taking additional steps to seek comments from the CA SHPO or NV SHPO. In the absence of comment from the CA SHPO or NV SHPO, FRA may consider that

the CA SHPO or NV SHPO does or do not object to a finding or determination and that the final document is complete.

If comments cannot be resolved through further consultation, FRA will resolve disputes through the process outlined in Stipulation XVII of the PA, except for disputes regarding eligibility. For eligibility disputes, FRA will seek formal Determination of Eligibility from the Keeper of the NRHP (Keeper), pursuant to 36 CFR Part 63. The Keeper's determination will be considered final.

All official notices, comments, requests for further information, documentation, and other communications will be sent in writing by e-mail or other electronic means.

8. Qualifications, Permitting, and Curation

8.1. Qualifications of Personnel

All activities prescribed in this HPTP will be carried out by, or under the direct supervision of a person or persons meeting at a minimum the Secretary of Interior's Professional Qualifications Standards (48 Federal Register (FR) 44738-44739) (PQS) in the appropriate disciplines. The Principal Investigator (PI) for the archaeological fieldwork associated with treatment of historic properties in the Project APE-ADI will meet the Secretary of the Interior's Professional Qualification Standards for Archaeology and be listed as a PI on all appropriate permits. Properly supervised personnel who do not meet PQS may also participate in the completion of tasks described in this HPTP, as appropriate. Tribal observers designated by Consulting Tribes are not required to meet the Secretary of the Interior's PQS.

All activities prescribed in this HPTP will reasonably conform to applicable standards and guidelines established by the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-44740), and any other pertinent guidance available to archaeologists by state agencies.

8.2. Required Permits

All necessary permits will be obtained prior to beginning fieldwork associated with treatment of historic properties.

Prior to beginning fieldwork, an Archaeological Resources Protection Act (ARPA) Permit will be obtained from the Bureau of Land Management (BLM) for lands under BLM management. The ARPA permit is a legal document that describes the nature and location of the archaeological work to be completed under the permit, the methods of conducting the work, where curation of cultural materials and research records will be curated, and other conditions. A copy of the ARPA permit and Fieldwork Authorizations will be kept with each field crew. It is assumed that this HPTP will satisfy the research design, context and methodological requirements of the ARPA permit.

Within Caltrans and NDOT ROW, an encroachment permit will be obtained from Caltrans District 8 por NDOT rior to commencing fieldwork. The encroachment permit will include dates of fieldwork, approved activities, special provisions and requirements, and any restrictions. A copy of the encroachment permit will be placed on the dashboard of each vehicle parked on Caltrans or NDOT ROW.

If fieldwork associated with this HPTP occurs on private lands, permission to enter will be obtained from the applicable land owner.

8.3. Curation Agreement and Plan

Before fieldwork commences, the Project Archaeologist/PI will prepare a formal written curation agreement with a federally approved permanent curation facility, which will specify procedures for curating archaeological collections. If possible, the curation agreement will

include an accession number to be used for all curated cultural materials from the Project. Materials to be curated include archaeological specimens and samples, site catalogs, field notes, field and analysis forms, feature and burial records, maps, plans, profile drawings, photo logs, photographs, consultants' reports or special studies, and copies of the final technical report. These materials will be curated at a facility that meets federal standards as required in 36 CFR Part 79, Curation of Federally Owned and Administered Archaeological Collections. It is anticipated that archaeological materials collected during Project construction will be curated at a repository in southern California as close to the Project location as possible. Currently, only a few institutions that meet federal standards in southern California are accepting collections from cultural resources management projects. The University of California, Riverside, the Western Science Center for Archaeology and Paleontology, and the San Diego Archaeological Center are some institutions currently taking collections. Other alternative curation facilities could be used with the agreement of FRA, Caltrans, and consulting parties. FRA may also determine that other forms of collections disposition may be suitable, depending on the outcomes of Tribal consultation and land ownership in accordance with Stipulation XII of the PA.

Curation agreements have been established between the archaeological PI and the University of Nevada, Reno for materials recovered in Nevada, and the Western Science Center for archaeological materials recovered in California. Transference of collections generated as a result of archaeological activities completed for this Project will occur within 180 days of completion of archaeological historic property treatment and monitoring for the Project, coinciding with the finalization of archaeological documentation. These curation facilities are able to curate archaeological materials in accordance with the Secretary of the Interior's Standards for Archaeological Documentation (1983) and the California Guidelines for the Curation of Archaeological Collections (OHP 1993).

9. Treatment of Human Remains on Federally Administered Lands

In accordance with Stipulation X.I.B, for Native American human remains, associated funerary objects, and unassociated funerary objects, sacred objects, and/or objects of cultural patrimony inadvertently discovered or intentionally excavated on Federal lands, the Project Sponsor, in coordination with FRA, will follow the procedures outlined in the Native American Graves Protection and Repatriation Act (NAGPRA) 25 U.S.C. 3001-3013 and as specified in the implementing regulations at 43 CFR § 10. A NAGPRA Plan of Action will apply to discoveries that occur on Federal lands. Federal land managing agencies may also elect to follow their respective agency procedures for discoveries occurring on land where they have jurisdiction. Refer to flow charts provided in Appendix D.

9.1.1. NAGPRA Plan of Action

A NAGPRA Plan of Action (POA) has been prepared for this Project, attached to this HPTP as Appendix C. The NAGPRA POA details the procedures and notification processes for compliance in the event of a discovery subject to the requirements of NAGPRA.

9.2. Treatment of Human Remains Identified on Non-Federally-Administered Land

9.2.1. California

For any human remains and funerary objects discovered on non-federally administered lands in California during the implementation of the Project, FRA will ensure the Project Sponsor follows the requirements of §7050.5(b) of the California Health and Safety Code (HSC) and §5097.98(a) – (h) of the California Public Resources Code (PRC). Refer to flow chart for discovery of human remains on non-federal lands in California in Appendix D.

Pursuant to §7050.5(c) of the California Health and Safety Code, if the county coroner determines that the human remains are of Native American origin, the discovery shall be treated in accordance with the provisions of §5097.98(a) – (h) of the California Public Resources Code. For all discoveries of potential human remains or associated items, the following procedures shall be followed:

- If potential human remains or indicators of potential human remains, such as mortuary monuments (gravestones), or other funerary items, the archaeological monitor will stop all Project related activities in the vicinity, immediately notify the PI and establish an exclusionary buffer of 50 ft around the discovery. The PI will immediately notify FRA and the Project Sponsor.
- FRA will provide notification within 24 hours to Consulting Parties of the potential human remains discovery.
- After a review by the PI and qualified human osteologist, if necessary, the PI will immediately notify FRA of the initial determination.

- FRA will coordinate the notification process between the Project Sponsor and County Coroner, ensuring that the Coroner is notified within 24 hours of the discovery.
- If the county coroner determines that the remains are Native American, the coroner must contact the Native American Heritage Commission (NAHC). The NAHC will immediately notify the Native American group(s) that it believes is the Most Likely Descendent (MLD) of the deceased Native American(s). With the permission of the FRA and Project Sponsor, the MLD can inspect the discovery site of the remains.
- Within 48 hours of their notification, the MLD will recommend to FRA and the Project Sponsor or landowner their preferred treatment of the remains and associated grave goods (if any).
- If the discovery can be protected in place, FRA may require security personnel to ensure protection of the discovery during the proceedings on disposition. The discovery will not be touched, moved, or further disturbed.
- To the extent permitted by applicable law and regulation, the Project Sponsor or landowner must consider the views of the MLD when it makes decisions about the disposition of Native American human remains and funerary objects. The FRA will ensure the respectful treatment of each set of remains and funerary objects.
- Treatment of the Native American remains may include the following:
  - Non-destructive removal and analysis of remains and associated grave goods. Disinterment is to be conducted with dignity and in accordance with proper archaeological methods. If necessary, transport and storage of the remains to a predetermined secure location may occur.
  - Preservation of remains and associated grave goods in place, if Project Sponsor determines avoidance in place is feasible.
  - Relinquishment of remains and associated grave goods to the MLD group for reburial.
- After the treatment for the Native American remains and associated items are mutually agreed on by Project Sponsor or landowner, and the MLD, the plan will be implemented.
- In accordance with the California Public Resources Code Section 5097.98(e), if the NAHC cannot identify the Native American descendent group of the human remains, or if the MLD that has been identified fails to make a recommendation for the treatment of the remains, or if the Project Sponsor or landowner rejects the MLD's recommendation and mediation provided for in California Public Resources Code subdivision (k) of Section 5097.94 fails to provide measures acceptable to the Project Sponsor or Landowner for the treatment of the remains, the Project Sponsor or landowner shall reinter the remains and associated grave goods with appropriate dignity in an area where they will be left undisturbed in perpetuity.

- Construction activities will resume in the discovery area once all archaeological work has been completed and FRA confirms adequate conclusion of the treatment and consultation process.

9.2.2. Nevada

For any human remains and funerary objects discovered on non-federally administered lands in Nevada during the implementation of the Project, FRA will ensure the Project Sponsor follows the requirements of Nevada Revised Statutes (Section 383.160 and Section 383.170). Refer to flow chart for discovery of human remains on non-federal lands in Nevada in Appendix D.

Pursuant to NRS Section 383.160 and 383.170, upon discovery of human remains, all work in the immediate vicinity stops while the Nevada Historic Preservation Office (HPO) is notified, who then notifies the Nevada Indian Commission (NIC). The following procedures shall be followed:

- Upon discovery of human remains in an archaeological context (see NRC Sections 383.160 and 383.170), work stops in the vicinity and the find shall be protected while determination of treatment is made.
- The discovery is immediately reported to Nevada HPO, who then notifies the NIC who notifies the appropriate Indian tribe.
- The Indian tribe may, with the permission of the landowner, inspect the site and recommend an appropriate means for the treatment and disposition of the site and all artifacts and human remains associated with the site.
- If the Indian burial site is located on private land and:
- (a) The Indian tribe fails to make a recommendation within 48 hours after it receives notification pursuant to subsection 1; or (b) The landowner rejects the recommendation and mediation conducted pursuant to NRS 383.160 fails to provide measures acceptable to the landowner, the landowner shall, at his own expense, reinter with appropriate dignity all artifacts and human remains associated with the site in a location not subject to further disturbance.
- If the Indian burial site is located on public [non-federal] land and action is necessary to protect the burial site from immediate destruction, the office may cause a professional archaeologist to excavate the site and remove all artifacts and human remains associated with the site for subsequent reinterment, following scientific study, under the supervision of the Indian Tribe.
- Construction activities will resume in the discovery area once all archaeological work has been completed and FRA confirms adequate conclusion of the treatment and consultation process.

10. Inadvertent Discovery and Post Review Effects Treatment Plan

It is anticipated that inadvertent discoveries of cultural resources will occur during Project construction. These discoveries require determinations of NRHP eligibility and, if the discovery cannot be avoided, mitigation of adverse effects if the discovery is determined eligible for NRHP listing.

Should it be determined that previously avoided historic properties or portions thereof cannot be avoided and that Project construction will result in a newly identified adverse effect, treatment must follow the procedures outlined below in steps 7 and 8, , below.

10.1. Discovery of Cultural Resources

The protocol for treatment of unanticipated archaeological and built environment resources is described as follows and outlined flow charts provided in Appendix D, Cultural Resources Discovery Protocol, and as provided in Stipulation X.I of the PA.

1. Discovery. In the event that an archaeological or Native American monitor identifies a possible site or feature, or possible human remains, the monitor will notify the PI, who has the authority to divert all earth-disturbing work and project access, as appropriate for protection of the discovery. The archaeological monitor will immediately notify the PI, who will then notify FRA within 24 hours. FRA will inform the SHPO in the appropriate state and the Consulting Tribes within 24 hours of being notified of the find. The archaeological monitor will establish an ESA boundary to provide protection of the area using lathe and survey table, or other available materials. If possible, a minimum 50-foot buffer should be established, although this may be adjusted by the PI based on the work conditions and potential to impact the potential resource. Any comments provided by a Native American monitor should be documented.
2. Preliminary Inspection. Within 48 hours (2 business days), the archaeological monitor, or other qualified individual designated by the PI, will inspect the find to assess its nature and extent. The results of this inspection will be communicated to FRA and the Project Sponsor.
3. Determine Course of Action.
    - If the discovery is on federally administered lands, and if it consists of NAGPRA-regulated human remains or related items, they will be treated according to Section 9.4 of this HPTP.
    - If the discovery is on privately owned lands, and if it consists of human remains or a Native American cairn, they will be treated according to the process described in Section 9.5 of this HPTP.
4. Non-Isolate. Any non-isolate archaeological resources not covered by (3) above that are discovered will be treated in accordance with the remaining steps.

5. Assume NRHP Eligibility. FRA may assume any new sites, site components, or features identified within construction limits on BLM administered lands or private lands during work activities are eligible for the NRHP under Criterion D.

    a. Assess Feasibility of Avoidance. The Project Sponsor, in coordination with FRA and the PI will review the location relative to Project construction plans to determine the feasibility of avoidance. If avoidance is feasible, FRA, will provide notification to Consulting Parties of the discovery and avoidance measures according to the timelines stipulated in Section II of the PA.

    b. If the historic property can be avoided, no additional investigation will be required, and it will be left in place with an ESA established. The find may also be protected from future disturbance by additional measures, as needed and as potentially negotiated with the landowner at the location of the discovery. FRA will notify the SHPO, Consulting Tribes, and Consulting Parties (as appropriate and in consideration of confidentiality regarding locations of historic properties) of the outcome of NRHP eligibility and avoidance measures.

    c. If the historic property cannot be avoided, FRA will determine the nature of adverse effects and communicate with consulting parties regarding adverse effects and treatment measures according to the procedures and timelines described in Stipulation XI of the PA for the treatment of inadvertent discoveries.

        i. Resolution of adverse effects to inadvertent discoveries will follow the process identified starting in step 7, below.

6. Formal Evaluation of Significance for Inadvertent Discoveries. For inadvertent discoveries, FRA may provide formal determinations of significance and NRHP eligibility. Following notification of an unanticipated discovery or effect, the Project Sponsor will investigate the discovery site and evaluate the resource(s) in accordance with Stipulation IX.B.3 of the PA.

    a. To the extent practicable, eligibility determinations will be based on information gathered during previous inventory and identification efforts. If the information gathering during previous inventory and identification efforts is determined by FRA to be adequate to determine site boundaries and NRHP eligibility, the Project Sponsor, in coordination with FRA, will determine NRHP eligibility consistent with the HPTP.

    b. If the information gathering during previous inventory and identification efforts is determined by FRA to be inadequate to determine site boundaries or NRHP eligibility, the Project Sponsor, in coordination with FRA, will conduct additional identification and evaluation efforts for historic properties within the APE using procedures described in this HPTP.

        i. For archaeological resources, the PI will gather information about the resource to address integrity and content of deposits and their spatial extents through standard field methods described in Chapter 4 of this

HPTP. These methods may include surface documentation or subsurface exploration.

ii. For built environment resources, the PI for built environment resources will gather information about the resource to assess integrity and to document the site boundary consistent with procedures provided in Chapter 11 of this HPTP.

iii. The PI for archaeology or built environment will make a recommendation of NRHP significance to FRA following completion of data gathering following the timelines established in Stipulation XI of the PA.

c. The Project Sponsor, in coordination with FRA, will prepare and submit a written document containing a proposed determination of NRHP eligibility for the resource and/or, if relevant, an assessment of the Project's effects on historic properties as well as consideration of measures to avoid adverse effects to historic properties and/or proposed resolution of adverse effects in accordance with the this HPTP .

7. In coordination with FRA, the Project Sponsor will provide the determination of eligibility and determination of effect document for review to the applicable SHPO, seeking SHPO concurrence on these determinations, and to Consulting Parties to concurrently review and provide written comments within seven (7) days to FRA and the Project Sponsor. If the unanticipated discovery is located on land under the jurisdiction of the BLM, Caltrans, or NDOT, FRA, in coordination with the Project Sponsor, will seek comment from the applicable agency regarding the eligibility and/or effects determination. In the event that the BLM, Caltrans, or NDOT does not respond within the concurrent review period of seven (7) days, FRA may consider nonresponse as nonobjection to the eligibility and/or effects determination and proceed. If the applicable SHPO does not concur with the eligibility and/or effects determination, FRA may elect to assume eligibility and/or adverse effects for expediency. If the unanticipated discovery is determined to be eligible, or is assumed eligible for the purposes of the undertaking only, for listing in the NRHP and/or adverse effects cannot be avoided, the Project Sponsor, in coordination with FRA, will implement treatment measures in the HPTP. The Project Sponsor, in consultation with FRA, will ensure construction-related activities within the buffer zone do not proceed until consultation with the Consulting Parties, concludes with SHPO concurrence that the agreed upon treatment measures have been implemented; or it has been agreed that the treatment measures provided in the HPTP can be completed within a specified time period after construction-related activities have resumed.

a. Should FRA determine that a resource-specific HPTP is required to address effects to the inadvertent discovery of a historic property, the timelines for submission and review shall follow Stipulation X.I of the PA.

11. Phased Identification and Evaluation, and Assessment of Effects to Historic Properties

11.1. Combined Inventory, Evaluation, and Assessment of Effect

FRA anticipates that there may be refinement to the Project design as it is further developed and to the Project description as design refinements are proposed. The PA outlines requirements for amending the APE in Stipulation VII. Changes to the APE may result in changes to the APE-ADI and APE-AII which may require additional historic property identification efforts. Refer to flow chart of phased identification, evaluation and assessment of effects in Appendix D.

Once the APE has been amended pursuant to Stipulation VII, the Project Sponsor, in coordination with FRA, will identify and evaluate historic properties that may be affected by the Undertaking within the amended APE. The Project Sponsor, in coordination with FRA, will document these efforts for the amended APE in an addendum to the already finalized Archaeological Inventory Reports and Historic Built Environmental Technical reports for California and Nevada. In this post-review process, efforts to identify and evaluate historic properties (36 CFR § 800.4) and assess adverse effects (36 CFR § 800.5) will be combined within the amended and existing APE consistent with 36 CFR § 800.3(g).

11.2. Post-Review Inventory of Historic Properties

An inventory of historic properties will be completed within the APE, consistent with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 Fed. Reg. 44716-44742, Sept. 29, 1983) and 36 CFR § 800.4. Although identification and evaluation of historic properties has occurred within the APE, FRA acknowledges that previously unidentified historic properties, or historic properties (including TCLs) with previously unknown eligibility under the NRHP criteria, or cultural resources that have recently reached the age threshold for consideration for eligibility for listing in the NRHP may be identified within the APE, as described in Stipulation I.X.B of the PA.

This inventory will be documented in Addendum Technical Reports for the amended APE separately for archaeological and historic built environment resources in accordance with procedures and timelines described in Stipulation II and Stipulation X.I of the PA, or as otherwise specified in a resource-specific HPTP, should FRA require one.

11.2.1. Inventory Methodology

11.2.1.1. Archival Research

- Archaeology: Prior to initiating fieldwork, the PI will determine if existing archival records searches have been completed to provide adequate coverage for the amended APE. It is likely that existing records searches are sufficient to document any changes to the APE-ADI due to the previous 1 mile buffer. The PI will coordinate this determination of adequacy with FRA.Built Environment: Prior to initiating fieldwork, the PI will

determine if existing archival records searches have been completed to provide adequate coverage for the amended APE and the original APE based on the new age range cutoff for resources. The PI will coordinate this determination of adequacy with FRA. However, the PI will utilize tax assessor data to incorporate resources in both the amended APE and original APE that may have come of age since historic property identification efforts were initially conducted and thus were previously not recorded.

11.2.1.2. Field Survey

Archaeology: Survey methods shall generally be consistent with the methods used to survey the APE-ADI as documented in the Archaeological Technical Reports (ICF and HNTB 2022; Hale et al. 2022; ICF and Dudek 2022). Prior to initiating survey, the PI will determine if the amended APE consists of previously disturbed or developed areas, or if native ground surfaces are present.

- **Amended APE is developed**: If the amended APE is previously developed and either paved or consisting completely of fill material or roadbed, no pedestrian survey will be required. The PI will document the findings of archival research confirmation and determination of survey suitability in a brief memo to FRA using the template provided in Appendix E of this HPTP. No further identification efforts will be required.
- **Amended APE is disturbed but contains native sediments:** If the Amended APE is disturbed but contains native sediments, and is not developed through previous construction, a reconnaissance level pedestrian survey will be completed and documented in a brief memo to FRA using the template provided in Appendix E of this HPTP. Reconnaissance methods consist of direct observation of the ground surface in the amended APE, but do not require intensive level, spaced survey transects.
- **Amended APE is relatively undisturbed:** If the Amended APE is relatively undisturbed, an intensive level pedestrian survey will be completed, consisting of pedestrian survey transects spaced appropriately to the size and shape of the Amended APE, but spaced no more than 15 m apart. Survey efforts will be initially reported to FRA using a brief memo template provided in Appendix E of this HPTP.

Survey documentation shall include features, isolates, and re-recordation of previously recorded sites, as necessary. Methods used in resource documentation will be consistent with the methods used in the archaeological Technical Reports prepared for this Project (ICF and HNTB 2022; Hale et al. 2022; ICF and Dudek 2022). The survey will ensure that potential historic properties such as landscapes, viewsheds, and traditional cultural properties (TCPs) and TCLs with significance to Tribes are recorded in addition to archeological sites. Recordation of historic structures, objects, and sites will be in conformance with the applicable state standards as described in Stipulation V of the PA, and in conformance with Nevada and California standards, as applicable.

Built Environment: Survey methods of the amended APE and original APE shall generally be consistent with the methods used to survey the original APE as documented in the Built Environment Technical Reports (ICF and HNTB 2022). These methods in Chapter 6 of both the technical reports for California and Nevada will account for built environment resources in the

amended APE and original APE that have come of age for consideration for eligibility, post review.

Survey documentation shall include recordation of historic structures, buildings, engineering features, landscapes, objects, and sites in conformance with the applicable state standards as described in Stipulation V of the PA, and in conformance with Nevada and California standards, as applicable. The survey shall be either reconnaissance or intensive level depending on the characteristics of the amended APE.

11.2.1.3. Significance Evaluation

Any cultural resources identified in the inventory of an amended APE and newly identified in the original APE (in accordance with Stipulation IX.B) will require evaluation of significance under Section 106, consistent with 36 CFR. § 800.4 using the methods to determine significance as documented in the archaeological and built environment Technical Reports prepared for this Project (ICF and HNTB 2022; Hale et al. 2022; ICF and Dudek 2022), or may be assumed eligible for the NRHP per 36 CFR Part 800.13(c).

Archaeology: For archaeological resources, sufficient information may be obtained through surface observation to make a significance determination. Should FRA determine, after SHPO and Consulting Party review, that subsurface excavations are necessary to generate information pursuant to an eligibility determination for an archaeological resource, excavation methods shall generally conform to the methods described in Chapter 4 of this report, and procedures shall generally conform to those described in Chapter 9 of this HPTP, section 9.1, parts 6 and 7. Evaluation methods and levels of effort will be appropriately scaled to the nature and scale of the archaeological resource requiring evaluation. t.

The archaeological PI will submit a memo, following templates provided in Appendix E of this HPTP, documenting data gathering efforts and providing recommendations for determination of eligibility and determination of effect, along with proposed methods for resolving adverse effects, should it be an eligible resource. FRA will provide the memo for Consulting Party review and SHPO concurrence following the timelines described in Stipulation II or Stipulation IX. of the PA.

Built Environment: For built environment resources, FRA will evaluate the inventoried resources for NRHP eligibility, consistent with Stipulation IX. of the PA. The PI for built environment will prepare a memo for FRA, following templates provided in Appendix E of this HPTP, describing findings and recommendations which FRA will provide to SHPO and Consulting Parties for review and comment according to the timelines described in Stipulation II or Stipulation IX of the PA.

11.2.1.4. Assessment of Effects

For newly identified historic properties, whether in an amended APE, or those identified through ongoing Tribal Consultation or that have come of age, as described in Stipulation IX.A and IX.B, assessments of effect will be documented in an Addendum Technical Report that combines results of inventory, determinations of eligibility, assessment of effect, and methods to avoid, minimize or resolve adverse effects, including cumulative effects, by applying the

Criteria of Adverse Effect pursuant to 36 CFR § 800.5. The Finding of Effect (FOE) may vary in content and length and may rely on information from other FOE reports depending on the needs of the assessment for the historic properties identified in the amended APE. The FOE will assess potential adverse effects to historic properties resulting from the Undertaking and identify mitigation measures that would eliminate or minimize such effects. The formal Addendum Technical Report will be prepared and submitted to FRA within 90 days of completion of fieldwork at the affected historic property.

Timeframes

The Project Sponsor will not commence ground disturbing and/or construction activities within any portion of the amended APE or boundary of any newly identified historic properties that has been determined to be adversely affected prior to resolution of effects.

Timelines for consultation on effects to historic properties will follow Stipulation II or Stipulation IX of the PA, as appropriate, or those provided in a resource-specific HPTP.

Once the treatment of historic properties has been completed, the PI will submit an End of Field (EOF) memo documenting completion of treatment, including sufficient data, imagery, maps, and a summary of findings to FRA for review. After FRA review and necessary changes to the EOF are made, FRA will distribute the EOF to Consulting Parties for review and comment according to the timelines described in Stipulation II or Stipulation IX of the PA, or as provided in a resource-specific HPTP. If FRA receives no objections to the findings, avoidance measures can be removed and construction can resume in the avoided area following resource-specific measures required by FRA (e.g., archaeological and tribal monitoring).

11.2.1.5. Resource Specific HPTP

FRA, in consultation with the Project Sponsor and PI, may determine that a separate, site specific HPTP is required to properly treat historic properties identified in an amended APE, and newly identified historic properties in the original APE (in accordance with Stipulation IX.B). Development of a separate HPTP will generally follow the methods, procedures, and timelines identified in Stipulation II and Stipulation IX of the PA, as appropriate.

Timeframes

FRA will follow the timelines described in Stipulation II of the PA for review and comment on resource-specific HPTPs. The PI for archaeology and/or built environment, in coordination with FRA, will ensure that each HPTP is finalized prior to the commencement of the construction activity or activities posing the identified adverse effect. The HPTP will require a schedule for completion of the prescribed treatment(s), which, depending on the historic property type and nature of the treatment, may occur before, during or after construction takes place.

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12. Monitoring Plan

Archaeological monitoring and Native American monitoring must occur during Project construction to ensure the appropriate treatment of historic properties and resources that hold Native American value, regardless of NRHP eligibility status. The Project Sponsor, in coordination with FRA, will identify consulting Tribes that wish to provide Tribal monitors during fieldwork, treatment of historic properties, and Project construction. FRA will work with the Project Sponsor and PI to develop a Tribal monitor rotation schedule prior to construction.

Archaeological monitoring personnel will include the Secretary of the Interior-qualified PI, a lead archaeological monitor, and other archaeological monitors as the construction schedule requires. The archaeological monitors will be present during ground-disturbing activities with potential to disturb known and unanticipated archaeological resources. The Project Sponsor shall provide for archaeological and Native American monitoring to occur during activities involving ground disturbance. The Project Sponsor will work with the PI to provide FRA and Consulting Tribes a tentative construction schedule 1 to 2 weeks prior to the initiation of construction-related earth-disturbing activities requiring monitoring. During ongoing construction, the Project Sponsor, or designated representative will establish a Tribal monitor rotation schedule that provides equal opportunity to Native American monitors identified on the Tribal monitor rotations schedule. The schedule will provide at least one week advance notice for the need to monitor. Changes to work schedules will require no less than 48-hours' notice prior to initiating work.

12.1. Monitoring

The following list outlines the responsibilities of the archaeological monitors.

1. Archaeological monitors will maintain a daily work log to include the following:
    a. Date and time of work
    b. Area of work, including historic property, as applicable
    c. Type of work and equipment present
    d. Construction activities performed
    e. Monitoring activities performed
    f. Archaeological finds observed
    g. Description of any disturbance to established buffers around historic properties
    h. Name of the archaeological monitor and/or Native American monitor
2. If previously unknown archaeological resources or new components of previously documented archaeological resources are encountered during monitoring, monitors will follow the procedures presented in Chapter 10 of this HPTP.
3. Daily logs will be transmitted to the PI, who will provide weekly summaries to FRA and the Project Sponsor. Distribution of logs will be left to the discretion of FRA and may be

subject to specific confidentiality restrictions. The Project Sponsor will develop a list of tribal contacts to receive daily logs prior to construction. Any unanticipated finds will be communicated in accordance with Chapters 10 and 11 of this HPTP. Unanticipated finds will also be documented in the weekly summaries.

4. If isolates are exposed during monitoring, they will be mapped in situ by the archaeological monitor using a GPS unit and recorded on appropriate resource records. Isolates will not require formal notification but will be documented on daily logs that will be available for inspection by Consulting Parties upon request, and distributed to Consulting Parties in weekly summaries.
5. If a resource is exposed or otherwise encountered during monitoring, they will be mapped in situ by the archaeological monitor using a GPS unit and recorded on appropriate resource records, and notification will follow the timelines identified in Chapters 10 and 11 of this HPTP and Stipulations IX and XI of the PA.
6. If a non-isolate archaeological entity (e.g., cluster of in situ artifacts, intact hearth, historic foundation) is exposed during construction, the provisions in Chapter 10 of this HPTP are to be followed, and notification and treatment will follow the procedures and timelines identified in Stipulations IX and XI of the PA.
7. FRA will coordinate all discoveries of human remains according to land ownership pursuant to Chapter 9, Sections 8.4 and 8.5 of this HPTP.

12.1.1. Prior to Construction—Archaeological Monitoring Exhibit (AME)

Prior to the start of construction, FRA will designate areas that require archaeological and Native American monitoring in consultation with Native American Tribes. Archaeological and Native American monitoring will occur in areas that are to be disturbed if there is a clear indication that archaeological materials may exist or have been exposed within a specific area since the initial site surveys, or in areas identified as particularly sensitive by Consulting Tribes. Areas that FRA designates for monitoring will be documented on an Archaeological and Native American Monitoring Exhibit (AME) and provided to Consulting Parties for review and comment following timelines provided in Stipulation II of the PA. The AME will clearly differentiate areas requiring monitoring, versus those that do not. FRA may identify levels of monitoring effort for different parts of the APE, such as intermittent spot-checking, areas that require sample screening of disturbed matrix, areas that require incremental earth moving to allow for more intense inspection, or other methodologies that FRA may identify during consultation on the AME.

The AME may be updated based on an amended APE, or newly identified historic properties. Updates to the AME will conform to the timelines established in Stipulation II or Stipulation XI of the PA, as appropriate.

12.1.2. During Construction

Full-time monitoring presence during initial earth-disturbing activities will occur for earth-disturbing work in areas designated by FRA. Monitoring coverage will include, at a minimum, one archaeologist and one Native American monitor per construction crew. Monitoring

frequency should be adjusted on FRA's review of the PI's recommendation based on information gathered over the course of monitoring, such as visual inspection of exposed subsurface soil contexts and their potential to contain unanticipated resources. Floating monitors may cover multiple concurrent activities throughout the Project APE.

All archaeological and tribal monitors will adhere to site safety requirements, attend daily safety briefings, and abide by all Occupational Safety and Health Administration requirements.

12.1.2.1. Inspection of Potential Discoveries

It is anticipated that archaeological and Tribal monitors will be able to inspect earthen exposures and sediment stockpiles to determine if deposits contain archaeological or sensitive items. Archaeological and Tribal monitors may request construction personnel to temporarily divert or suspend work in a particular area to inspect potential discoveries. The Project Sponsor will ensure that all construction personnel will work together with archaeological and tribal monitors and efficiently communicate in order to allow for the integration of monitoring activities.

Should archaeological or tribal monitors require more than momentary pauses in work to inspect disturbance zones, they shall communicate their request to the archaeological monitor and PI, who will investigate the request and coordinate with the Project Sponsor and FRA to determine the validity and duration of the request.

12.2. Cultural Sensitivity Training

The PI or designated PI representative, along with designated Native American representatives, will provide a cultural resource WEAP for construction personnel describing the potential for exposing archaeological sites and procedures to treat unexpected discoveries. The cultural resources WEAP will include the following:

- Overview of the archaeological and cultural sensitivity of the area
- Regulatory context and protocols
- Identification of ESA for known and unanticipated historic properties
- Roles and responsibilities of the FRA, Project Sponsor, archaeological PI, archaeological monitors, and Native American monitors
- Authority of archaeological monitors and Native American monitors to suspend work
- General artifact recognition
- Unanticipated archaeological discovery protocols, including stop work and notification requirements
- Direction that cultural materials and human remains are not to be disturbed
- Contact information for use in the discovery protocols and notification procedures

- Statutory protection afforded to cultural resources under the Archaeological Resources Protection Act, and Nevada and California state laws, along with criminal penalties for violation

All archaeological and Native American monitors will attend safety briefings held at the beginning of each field day. These briefings will address general and specific safety topics, work areas, field conditions, and work assignments. The lead archaeological monitor will confirm monitoring locations and requirements each morning, as appropriate.

13. Summary

This Historic Properties Treatment Plan (HPTP) (Attachment 5 to the PA) provides for the treatment of historic properties identified in the APE for the Project.

Twenty-two (22) NRHP eligible archaeological sites and four (4) archaeological districts were identified in the Project APE-ADI that will be adversely affected; 14 of these are prehistoric sites that contribute to the NRHP eligibility of four archaeological districts: SQAD, MRLL, SRAD, and CLAD. The remaining eight (8) NRHP eligible archaeological sites in the APE-ADI include five (5) in California (including the prehistoric components of three individual archaeological sites unaffiliated with districts, one historic period archaeological site, and the prehistoric and historic period components of one site, P-36-006023), and three (3) sites in Nevada (including two prehistoric sites and one historic period site). Individual sites within archaeological districts were individually evaluated for NRHP significance within the APE-ADI. SQAD contained five archaeological sites that are individually eligible for NRHP listing under criteria A and D. MRLL contained five archaeological sites individually eligible for NRHP listing under criteria A and D. SRAD contained three archaeological sites individually eligible for NRHP listing under criteria A and D, and CLAD contained one archaeological site individually eligible under criteria A and D. Therefore, the Project will result in adverse effects to 26 archaeological historic properties (23 in California; 3 in Nevada).

The methods used to resolve adverse effects to archaeological historic properties outlined in this HPTP are primarily phased data recovery, focused on the scientific investigation and recovery of an archaeological sample that best represents the affected archaeological sites or portions of sites. These methods partially address adverse effects to Tribal values under Criterion A. Additional measures to resolve adverse effects under Criterion A include sample survey of portions of archaeological districts that extend into the APE-AII, completion of an ethnohistoric study, and erection of sound walls during construction, and creative planting to minimize effects due to noise and vibration during Project construction for the CLAD.

Six NRHP eligible, built environment historic properties have been identified in the Project APE. They are overhead transmission line corridors and an underpass on a previously existing, BNSF rail corridor. ESAs can be implemented to ensure that construction-related activities don't cause damage, defacement or destruction of these historic resources. If the Project design changes or new built environment historic properties are identified prior to or during construction, the treatment of these newly discovered historic properties will be consistent with the steps of the Section 106 process (36 CFR Part 800) specified in the Project's PA and this HPTP.

This HPTP provides for the treatment of unanticipated discoveries and the identification of historic properties in amended portions of the APE that may occur. Historic properties identified during construction, or through inventory of an amended APE will be documented through combined inventory, evaluation, and assessment of effect reports. Archaeological and Native American monitoring will occur in areas designated by FRA.

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Confidential Appendix A: Maps

Confidential Appendix B: Site Records

Appendix C: NAGPRA Plan of Action

Appendix D: Protocol Flow Charts

Appendix E: Reporting Templates