Appendix D-4

Segment 2 Botanical Resources Survey Report

Environmental Intelligence, LLC

BOTANICAL SURVEY REPORT

LUGO-VICTORVILLE 500-KV TRANSMISSION LINE REMEDIAL ACTION SCHEME PROJECT

BERNARDINO COUNTY, CALIFORNIA

Prepared For: Biological Resources Group
Southern California Edison
6040 Irwindale Ave, Suite A
Irwindale, CA 91702
Contact: Lori Charpentier
Lori.charpentier@sce.com
(626) 320-0316

Prepared By: Environmental Intelligence
1590 South Coast Highway, Suite 17
Laguna Beach, CA 92651
Contact: Travis Kegel
TravisKegel@enviro-intel.com
(949) 497-0931

Date: July 12, 2017

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1.0 INTRODUCTION

Environmental Intelligence, LLC (EI) was retained by Southern California Edison (SCE) to conduct surveys for special-status plant species on the Lugo-Victorville 500-Kv Transmission Line Remedial Action Scheme Project (Proposed Project). The Proposed Project would require installation of a new 84-mile telecommunication path consisting of Optical Ground Wire (OPGW) between Nipton Road in Clark County, Nevada and Interstate 40 near Ludlow, California. The Proposed Project survey area totals 431 acres at 12 guard pole locations, 72 helicopter landing zones, 27 pull sites, and two material laydown yards. The new telecommunication line will follow an existing SCE right-of-way (ROW) for approximately 84 miles along Powerline Road.

The purpose of these rare plant focused surveys is to support project planning and the Mojave National Preserve's review of SCE's Special Use Permit application. This report presents the findings of focused surveys for rare plants in suitable habitat within the Proposed Project area. Suitable habitat occurs along the proposed alignment, in San Bernardino County, California and Clark County, Nevada (Exhibit 1: *Project Location*).

1.1 Project Location and Description

The Proposed Project is located within San Bernardino County, California, and Clark County, Nevada, and extends from Pisgah Substation near Interstate 40 to the California-Nevada border near Nipton Road (Exhibit 1). The Proposed Project is located within United States Geological Survey (USGS) Hector, Sleeping Beauty, Broadwell Lake, West of Broadwell Mesa, Broadwell Mesa, Soda Lake South, Cowhole Mountain, Old Dad Mountain, Indian Spring, Marl Mountains, Cima, Cima Dome, Joshua, Ivanpah, Nipton, and Crescent Peak 7.5-minute quadrangles; material laydown yards are located in Dunn and Baker 7.5-minute quadrangles.

The Proposed Project would involve installation of an 84-mile telecommunication path that extends from the California/Nevada border to Pisgah Substation and would follow an existing SCE distribution line ROW. The Project is required to reliably interconnect and integrate multiple renewable generation projects in the Southern Nevada / Eastern California area onto the electric grid. All work would occur within the existing SCE ROW and would involve bucket truck work at approximately 408 disturbed transmission tower locations, installation of guard poles at 14 locations, establishment of helicopter landing zones at 72 locations, pulling/tensioning activities at 27 locations, and mobilization activities at two material laydown yards (Exhibit 2: *Project Description*).

Land use along the Proposed Project alignment is primarily undisturbed desert scrub habitat. Topography consists of valleys, flats, alluvial fans, bajadas, rolling hills, and rocky slopes within the Proposed Project boundaries with elevations ranging from approximately 1,100 to 4,600 feet above mean sea level (amsl). The Project alignment crosses lands owned by BLM, private landowners, the State, and the National Park Service (Exhibit 3: *Land Use*).

2.0 METHODS

2.1 Literature Review

Prior to the initiation of the field surveys described in this report, several sources of available data were used to identify known and potential biological resources within the Proposed Project area and surrounding region, including published literature, field guides, previous site surveys, and public data sets. The information presented in this analysis was obtained from the following sources:

- Environmental Intelligence, LLC, 2016. Habitat and Resource Assessment: Lugo-Victorville 500-Kv Transmission Line Remedial Action Scheme Project (EI 2016).
- The California Natural Diversity Database (CNDDB), maintained by the California Department of Fish and Wildlife (CDFW), quad-level species occurrence information (CDFW 2017);
- The California Native Plant Society's (CNPS) Online Inventory of Rare and Endangered Plants of California (CNPS 2017);

- Consortium of California Herbaria (CCH 2017);
- U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) data (Natural Resources Conservation Service [NRCS] 2017);
- U.S. Fish and Wildlife Service (USFWS 2017) county-level species occurrence information;
- USGS topographic maps; and
- USFWS Critical Habitat designations.

All plant species, as described by the CNDDB, within 3 miles and centered on the Proposed Project location (i.e., Hector, Sleeping Beauty, Broadwell Lake, West of Broadwell Mesa, Boradwell Mesa, Soda Lake South, Cowhole Mountain, Old Dad Mountain, Indian Spring, Marl Mountains, Cima, Cima Dome, Joshua, Ivanpah, Nipton, Crescent Peak, Dunn, and Baker Quadrangles) were selected as potential focal survey species (Exhibit 4: *Literature Review*). A list of the special-status plant species identified by the literature search is provided as Appendix A. Special-status plants include those with federal, state, or local designations or California Rare Plant Rank (CRPR). The botanical surveys were comprehensive and floristic in nature and were not restricted to, or focused only on this list.

2.2 Regulated Species

The database search and literature review identified 7 special-status plant species occurring or having the potential to occur in the vicinity of the Proposed Project (Appendix A). Of these, none were Federal and/or State regulated species (i.e. Endangered or Threatened). Rare plant species likely to occur are highlighted below:

TABLE 1. CALIFORNIA RARE PLANT RANK SPECIES

Species	Status	Blooming Period	Habitat
Small-flowered androstephium (*Androstephium breviflorum*)	CRPR 2B.2	March – April	Desert dunes and creosote bush scrub with sandy to rocky soil. 100 – 1,600 meters.
Emory's crucifixion-thorn (*Castela emoryi*)	CRPR 2B.2	June – July	Dry, gravelly washes, low-grade alluvial slopes, and playas in Mojavean and Sonoran creosote bush scrub. 30 – 1,350 meters.
Purple-nerve cymopterus (*Cymopterus multinervatus*)	CRPR 2B.2	March – April	Mountain ranges of Eastern Mojave Desert, and on the desert slope of the San Bernardino Mountains. Gravelly and sandy slopes in Joshua tree and pinyon-juniper woodland. 630 – 1,800 meters.
Utah vine milkweed (*Cynachum utahense*)	CRPR 4.2	March – October	Sandy or gravelly habitats of Mojavean desert scrub and Sonoran desert scrub. 100 – 1,435 meters.
Matted cholla (*Grusonia parishii*)	CRPR 2B.2	May – June	Sandy, gravelly flats, generally in creosote bush/bur scrub and Joshua tree woodlands. 300 – 1,200 meters.
White-margined beartongue (*Penstemon albomarginatus*)	CRPR 1B.1	March – May	Loose desert sand, generally on stabilized dunes with creosote bush scrub. 700 – 900 meters.
Rusby's desert mallow (*Sphaeralcea rusbyi* var. *eremicola*)	CRPR 1B.2	March – June	Creosote bush scrub and Joshua tree woodlands. 1,000 – 1,500 meters.

2.3 Taxonomy and Vegetation Classification

Plant taxonomy follows The Jepson Manual (Baldwin et al. 2012). Common plant names, where not available from Baldwin et al. 2012, are taken from Abrams (1923 and 1944), Abrams and Ferris (1951 and 1960), Beauchamp (1986), Munz (1974), CNPS (2017), or Simpson and Hasenstab (2009). Vegetation

classification follows the system described in a Manual of California Vegetation, 2nd Edition (Sawyer et al. 2009). Scientific names are mentioned once in the text and common names are used thereafter.

This vegetation classification system is the preferred system of the California Native Plant Society and the California Department of Fish and Wildlife's Vegetation Classification and Mapping Program and allows for direct comparisons with other classification systems (e.g. Holland 1986). For species unidentifiable in the field, biologists took reference specimens for later identification.

2.4 Existing Vegetation

Seventeen (17) vegetation communities/land cover types, including 4 sensitive vegetation communities and 13 non-sensitive vegetation communities/land cover types were previously documented and mapped during habitat assessment studies (EI 2016) (Exhibit 2). Descriptions of the communities can be found in the Manual of California Vegetation, 2nd Edition (Sawyer et al. 2009). A description of the land cover types found within the rare plant survey areas is provided below in Table 1.

TABLE 2. VEGETATION COMMUNITY / LAND COVER TYPE AND LOCATION

Vegetation Community / Land Cover Type
Vegetation Communities
Chilopsis linearis (Desert willow woodland) Woodland Alliance (61.550.00) G4 / S3.2
Pleuraphis rigida (Big galleta shrub-steppe) Alliance (41.0303.00) G3 / S2.2
Psorothamnus spinosus (Smoke tree woodland) Woodland Alliance (61.570.00) G4 / S3.3
Yucca brevifolia (Joshua tree woodland) Woodland Alliance (33.170.00) G4 / S3.2
Non-sensitive Vegetation Communities
Acacia greggii (Catclaw acacia thorn scrub) Shrubland Alliance (33.040.00) G5 / S4
Ambrosia dumosa (White bursage scrub) Shrubland Alliance (33.060.00) G5 / S4
Ambrosia salsola (Cheesebush scrub) Shrubland Alliance (33.200.00) G5 / S4
Atriplex polycarpa (Allscale scrub) Shrubland Alliance (36.340.00) G5 / S4
Bromus (*diandrus, hordeaceus*) – *Brachypodium distachyon* (Annual brome grasslands) Semi-natural Stands (42.026.00) Non-Native / Invasive
Bromus rubens – Schismus (*arabicus, barbatus*) (Red brome or Mediterranean grass grasslands) Semi-natural Stands (42.024.00) Non-Native / Invasive
Encelia farinosa (Brittle bush scrub) Shrubland Alliance (33.030.00) G5 / S4
Larrea tridentata (Creosote bush scrub) Shrubland Alliance (33.010.00) G5 / S5
Larrea tridentata – Ambrosia dumosa (Creosote bush – white burr sage scrub) Shrubland Alliance (33.140.00) G5 / S5
Salazaria Mexicana (Bladder sage scrub) Shrubland Alliance (33.310.00) G4 / S4
Yucca schidigera (Mojave yucca scrub) Alliance (33.070.00) G4 / S4
Land Cover Types
Barren – Not Developed
Developed

Barren – Not Developed

Barren land is of limited ability to support life and in which less than one-third of the area has vegetation or other cover. Barren lands are characterized by bare rock, gravel, sand, silt, clay, or other earthen material. Such areas include dry salt flats, beaches, sandy areas, bare exposed rock, strip mines, quarries, gravel pits, and transitional areas.

Developed

Developed lands include urban or built-up areas with much of the land covered by structures. Such areas include cities, transportation, power and communications facilities, mills, shopping centers, and other

buildings that may, in some cases, be separate from urban areas. Urban or built-up land may contain a wide variety of native and non-native, ruderal and ornamental plant species.

2.5 Special-Status Plant Surveys

Timing of the surveys took into consideration documented phenology for the target species, reference populations, and weather data. The closest weather data center (Station #042257) was located approximately 25 miles west of the Proposed Project area at Daggett Airport, California. Weather data were obtained from the Western Regional Climate Center (WRCC) and the National Oceanic and Atmospheric Administration's (NOAA) National Climate Data Center (NCDC). Thirty-Year Climate Normals for Daggett Airport averaged 3.13 inches during October through June (WRCC 1981-2010). For the 2016-2017 hydrological year, total precipitation was 10 percent above average (3.44 inches) in Mojave Valley from October through June (NCDC 2017).

During onsite surveys, botanists visited reference populations for target special-status species to ensure that these species: i) emerged (if annuals), ii) showed phenological traits (e.g., fruits, flowers, etc.) necessary for identification, and/or iii) were readily identifiable with all botanists who may have less familiarity with a given species. A list of all reference population locations and results is provided below in Table 2.

TABLE 3: REFERENCE POPULATIONS SUMMARY TABLE

Species	General Location	Date Visited	Status
Small-flowered androstephium (*Androstephium breviflorum*)	Ivanpah Dry Lake Playa, 2 miles SW Primm, NV	4/17/2017	Blooming, readily identifiable
Utah vine milkweed (*Cynachum utahense*)	Railroad N side of I-40, Pisgah, CA	4/17/2017	Blooming, readily identifiable
Clokey's cryptantha (*Cryptantha clokeyi*)	Powerline Road, Lucerne Valley, CA	4/26/2017	Blooming, fruiting, readily identifiable
Mojave menodora (*Menodora spinescens* var. *mohavensis*)	North of Ord Mt. along Camp Rock Rd.	4/26/2017	Blooming, readily identifiable
Mojave monkeyflower (*Mimulus mohavensis*)	Ord Mountain Road/Daggett Wash, Barstow, CA	4/26/2017	None identified
White margined beardtongue (*Penstemon albomarginatus*)	Needles Fwy, Pisgah, CA	4/26/2017	None identified
Rusby's desert-mallow (*Sphaeralcea rusbyi* var. *eremicola*)	Rainbow Spring, Mojave National Preserve, CA	4/17/2017	Blooming, readily identifiable

Following verification at these reference populations, pedestrian surveys for special status plant species were conducted on April 17 – 22 and June 12 – June 16, 2017 by qualified botanists Doug Gordon-Blackwood, Ron Clark, Kevin Thomas, Mitchell Provance, Scott Duff, Nicole Nesball and Luis Aguilar. This botanical survey was conducted following the CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2009) and the CNPS Botanical Survey Guidelines (CNPS 2001). The survey area was defined by a 100-foot buffer around each of the Proposed Project disturbance areas (Exhibit 2). Surveys were conducted by walking transects over

the survey areas to ensure thorough coverage, noting all observed plant taxa. Focused attention, including the use of denser transect lines, was given to areas with higher potential habitat for special-status plant species. Care was taken to thoroughly search all unique features, soils, and habitats encountered that could have a higher probability for occurrence of sensitive species. Within private property along the survey area where no access was available, surveyors used binoculars to visually assess the area for rare plants. Plants were counted individually whenever possible. When the population size, density, or other factors rendered a census impractical, counting plants in one or more representative square meter areas, and multiplying by the estimated area of the population was used to estimate the number of individuals. Photographs of special status taxa and habitat conditions are included in Appendix C: Site Photographs. The locations of all special-status species were mapped in the field using a Garmin recreational Global Positioning System (GPS) hand-held unit and on aerial photograph field maps.

3.0 RESULTS

Early and late growing season botanical surveys were conducted within the Proposed Project survey area on multiple days. Performing multiple surveys over the course of the growing season is critical for the detection of special-status plants. New occurrences were documented for special-status plant species during each survey visit. Survey dates and times are summarized below in Table 3.

TABLE 4: SURVEY DATES AND TIME

Date (2017)	Survey (Survey Type)	Survey Hours	Biologist*
April 17	Early Growing Season	07:00-17:00	DGB, RC, KT, NN
April 18	Early Growing Season	07:00-17:00	DGB, RC, KT, NN
April 19	Early Growing Season	07:00-17:00	DGB, RC, KT, NN
April 20	Early Growing Season	07:00-17:00	DGB, RC, KT, NN
April 21	Early Growing Season	07:00-17:00	DGB, RC, KT, NN
April 22	Early Growing Season	07:00-17:00	KT, NN
June 12	Late Growing Season	07:00-17:00	DGB, SD, MP, LA
June 13	Late Growing Season	07:00-17:00	DGB, SD, MP, LA
June 14	Late Growing Season	07:00-17:00	DGB, SD, MP, LA
June 15	Late Growing Season	07:00-17:00	DGB, SD, MP, LA
June 16	Late Growing Season	07:00-17:00	DGB, SD, MP, LA

* DGB – Doug Gordon Blackwood, RC – Ron Clark, KT – Kevin Thomas, NN - Nicole Nesball, SD – Scott Duff, LA – Luis Aguilar, MP – Mitch Provance

The botanical survey resulted in the detection of 254 plant species, of which 17 are non-native (Appendix B). Three (3) special status plant species, Crucifixion thorn (*Castela emoryi*, CRPR 2B.2), Matted cholla (*Grusonia parishii* CRPR 2B.2) and Purplenerve springparsley (*Cymopterus multinervatus* CRPR 2B.2), were observed within the survey area. Also, while not identified with a CRPR ranking, Mojave yucca (*Yucca schidigera*) clonal colonies which are protected by the DRECP were also documented within the survey area. Descriptions of the observed special-status plant species are provided below and their location within the alignment is provided in Exhibit 5: *Results*.

3.1 Small-Flowered Androstephium (Androstephium breviflorum, CRPR 2B.2)

Small-flowered androstephium is a perennial herb that typically blooms between March and April. This species is typically associated with desert dunes and creosote bush scrub with sandy to rocky soil at elevations between 325 – 5200 feet. A CCH record for this species (2005) occurs 100 feet south of the survey area. The species was detected during the reference site visit at record location. Surveys were conducted during the appropriate blooming season and reference populations were observed; the lack of observations within the Project survey area suggest that the species is absent from the Project site.

3.2 Crucifixion Thorn (*Castela emoryi,* CRPR 2B.2)

Crucifixion thorn is a shrub that typically blooms between June and July. This species is typically associated with creosote bush scrub at elevations between 295 to 2495 feet. Five (5) individuals were documented on gravely-wash soil within the Proposed Project survey area near Tower M88-T2, and seven (7) individuals were documented outside the survey area at 4 discrete locations (Exhibit 5, Pages 1-4) (Appendix C, Photo 5). Associated plant species included creosote (*Larrea tridentata*), *cheesebush* (*Ambrosia salsola), rayless enciela* (*Encelia frutescens*), and sweetbush (*Bebbia juncea).*

3.3 Purplenerve Springparsley (*Cymopterus multinervatus,* CRPR 2B.2)

Purplenerve springparsley is a perennial herb that typically blooms between March and April. This species is typically associated with Joshua tree woodland and pinyon-juniper woodland at elevations between 2200 to 4660 feet. Ten (10) individuals were documented on sandy-decomposed limestone soil within the Proposed Project survey area near Tower M124-T3 (Exhibit 5, Page 6) (Appendix C, Photos 7-8). Associated plant species included Joshua tree (*Yucca brevifolia),* big galleta *(Hilaria rigida),* cholla (*Cylindropuntia sp.),* creosote, non-native brome grasses (*Bromus spp.),* and Mormon tea (*Ephedra sp).*

3.4 Utah Vine Milkweed (*Cynanchum utahense,* CRPR 4.2)

Utah vine milkweed is a perennial herb that typically blooms between March and October. This species is typically associated with Mojavean and Sonoran desert scrub at elevations between 320 – 4,700 feet. CCH records for this species (2005-2009) occur within 300-600 feet of the southern Project survey area near Pisgah Substation. The species was detected during the reference site visit at record locations. Surveys were conducted during the appropriate blooming season and reference populations were observed; the lack of observations within the Project survey area suggest that the species is absent from the Project site

3.5 Matted Cholla (*Grusonia parishii,* CRPR 2B.2)

Matted cholla is a shrub that typically blooms between May and June. This species is typically associated with creosote bush scrub and Joshua tree woodland at elevations between 2920 to 4985 feet. One (1) individual was documented on coarse sand within the Proposed Project survey area near Tower M127-T6 (Exhibit 5, Page 7). Associated plant species included Joshua tree, pencil cholla (*Opuntia ramosissima*), desert olive *(Menodora spinescens var. spinescens), California buckwheat* (*Eriogonum fasciculatum*), and Cooper's goldenbush (*Ericameria cooperi*).

3.6 White-Margined Beardtongue (*Penstemon albomarginatus,* CRPR 1B.1)

White-margined beardtongue is a perennial herb that typically blooms between March and May. This species is typically associated with desert sand, generally on stabilized dunes with creosote bush scrub at elevations between 2300 – 3000 feet. CNDDB records for this species (2005-2010) occur within 500 feet of the southern Project survey area near I-40 and Pisgah. The species was not detected during the reference site visit at record locations. While surveys were conducted during the appropriate blooming season, the lack of observations at the reference population suggests that there is a possibility that the species may be present but not detectable at the time of survey.

3.7 Rusby's Desert Mallow (*Sphaeralcea rusbyi* var. *eremicola,* 1B.2)

Rusby's deseret mallow is a perennial herb that typically blooms between March and June. This species is typically associated with creosote bush scrub and Joshua tree woodlands in disturbed areas at elevations

between 3280 – 4921 feet. CNDDB records for this species (1998) occur within the Project survey area along Powerline Road access route. The species was detected during the reference site visit at record location. Surveys were conducted during the appropriate blooming season and reference populations were observed; the lack of observations within the Project survey area suggest that the species is absent from the Project site

3.8 Mohave Yucca Rings (*Yucca schidigera*)

Mohave yucca is a tree that typically blooms between April and May. This species is typically associated with chaparral and creosote bush scrub at elevations between 50 to 7450 feet. The Mojave yucca can produce clonal colonies that originate from a single ancestor. Clonal colonies are rare and can be several thousand years old (Vasek 1980). Clones were documented on dry rocky slopes within the Proposed Project survey area near Towers M108-T2 and M131-T1 (Exhibit 5, Page 5 and 8) (Appendix C, Photo 4). Each of these yucca rings had a diameter greater than 3-meters.

4.0 SUMMARY

EI conducted systematic searches for special status plant species within the survey area. Three special status plant species (Crucifixion Thorn, Purplenerve Springparsley, and Matted Cholla) and a unique vegetation stand (Mojave yucca rings) were documented in the survey area. Additionally, one rare plant species (White-Margined Beardtongue) was absent from reference population locations and may not have been visible during surveys. Nevertheless, based on the phenological characteristics of other species with similar blooming periods and observed during surveys and the identification of new and expanded special-status plant populations, the targeted plant species were expected to be evident and observable during this year's survey periods.

ENVIRONMENTAL INTELLIGENCE

Travis Kegel – Project Manager

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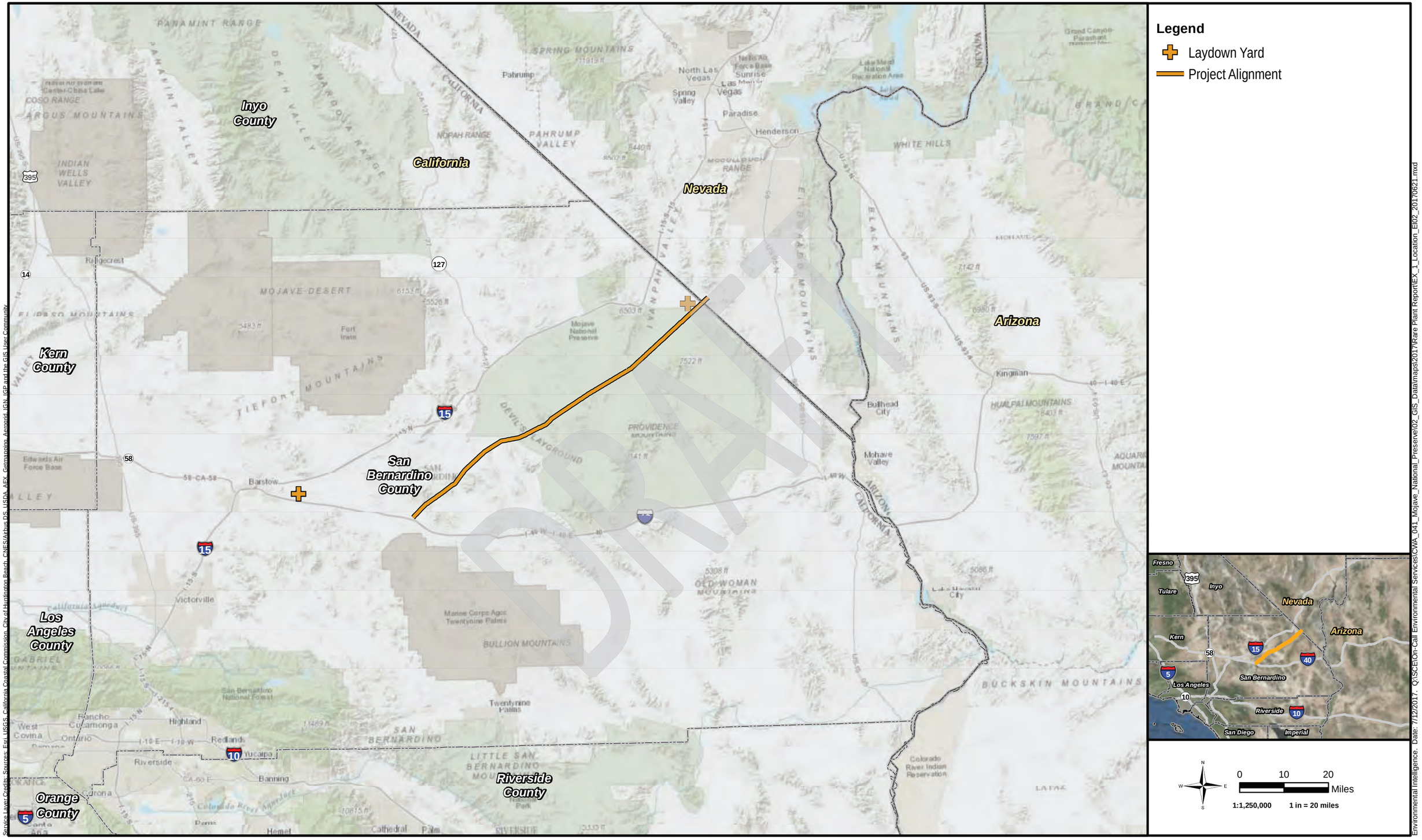


Exhibit 1. Project Vicinity

LVRAS Project | San Bernardino County, CA and Clark County, NV

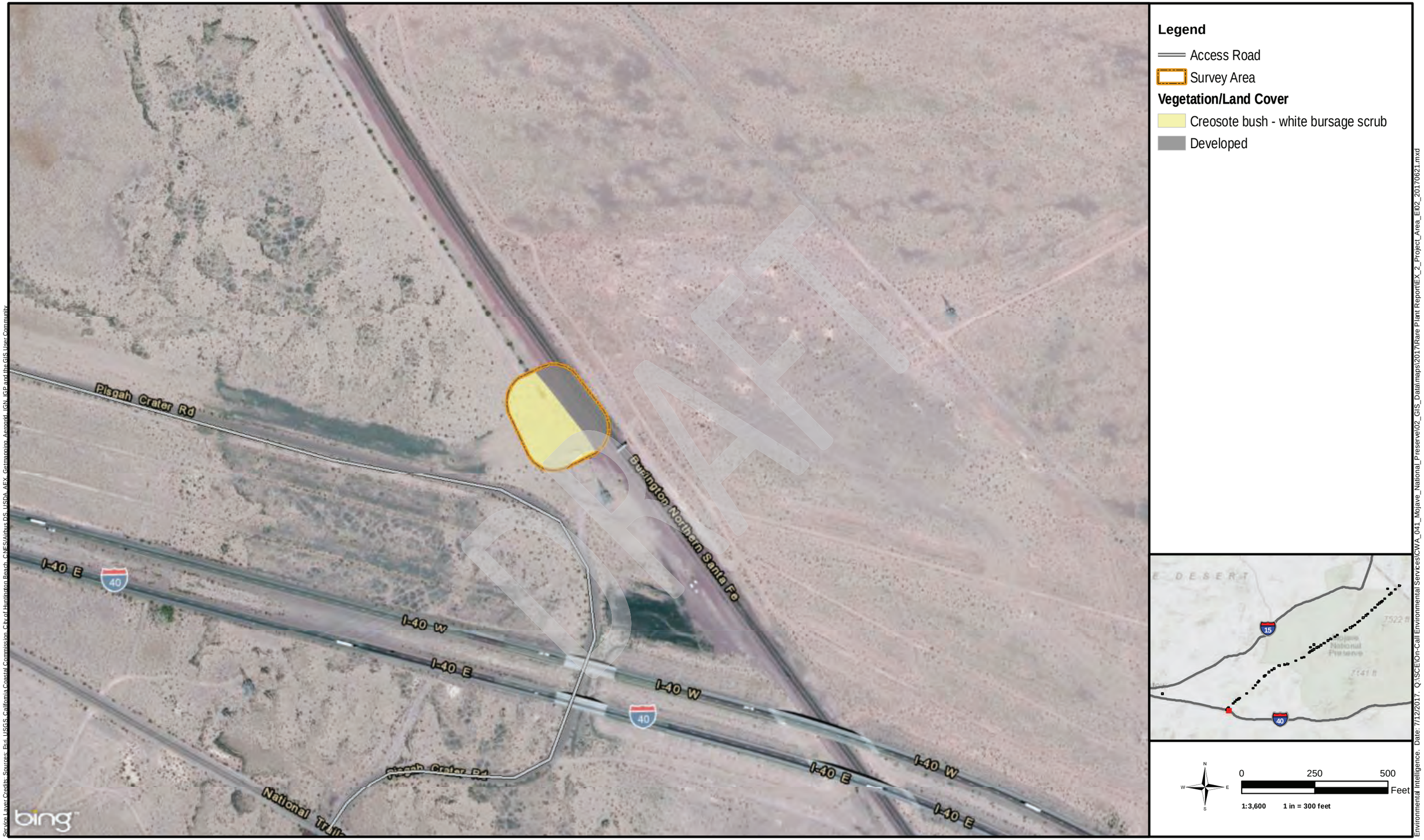


Exhibit 2. Project Area (Page 1 of 62)

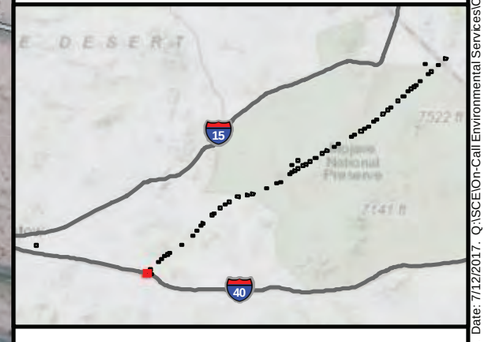
LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub
- Developed



0 250 500 Feet

1:3,600 1 in = 300 feet

Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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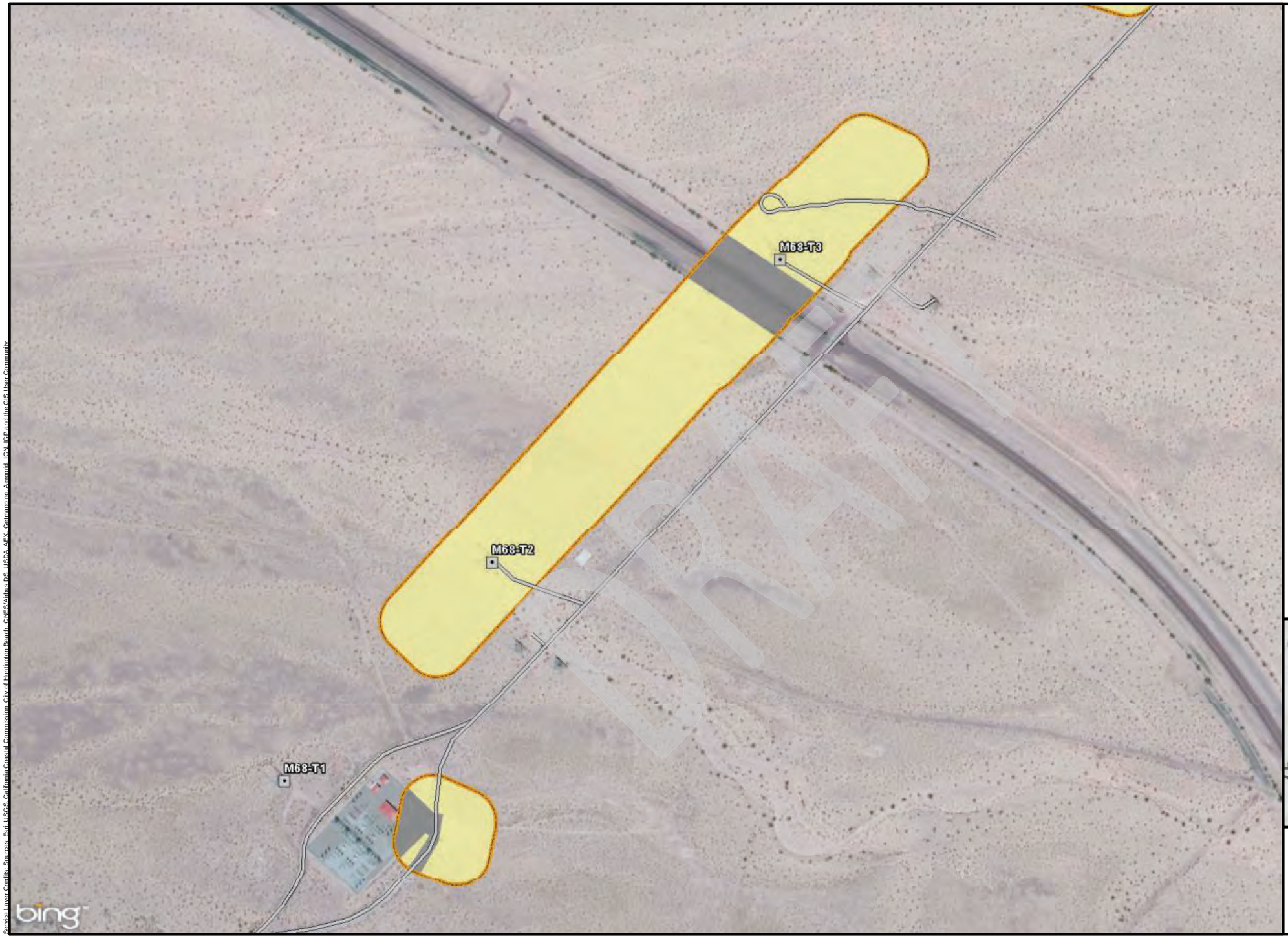
Exhibit 2. Project Area (Page 2 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub
- Developed

0 250 500 Feet

1:3,600 1 in = 300 feet

Source: Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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Exhibit 2. Project Area (Page 3 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 4 of 62)
LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 5 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

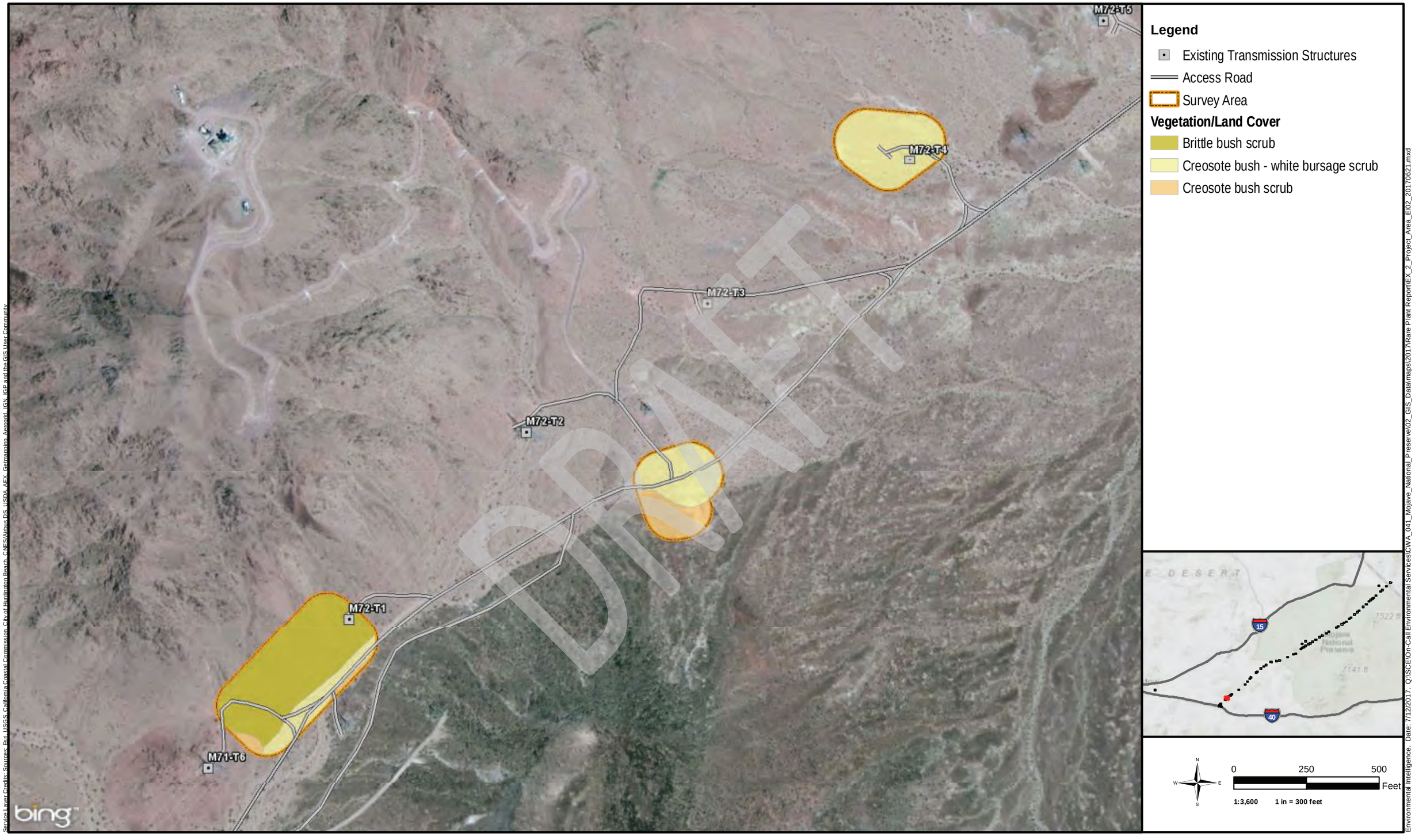


Exhibit 2. Project Area (Page 6 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub

N
W
E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

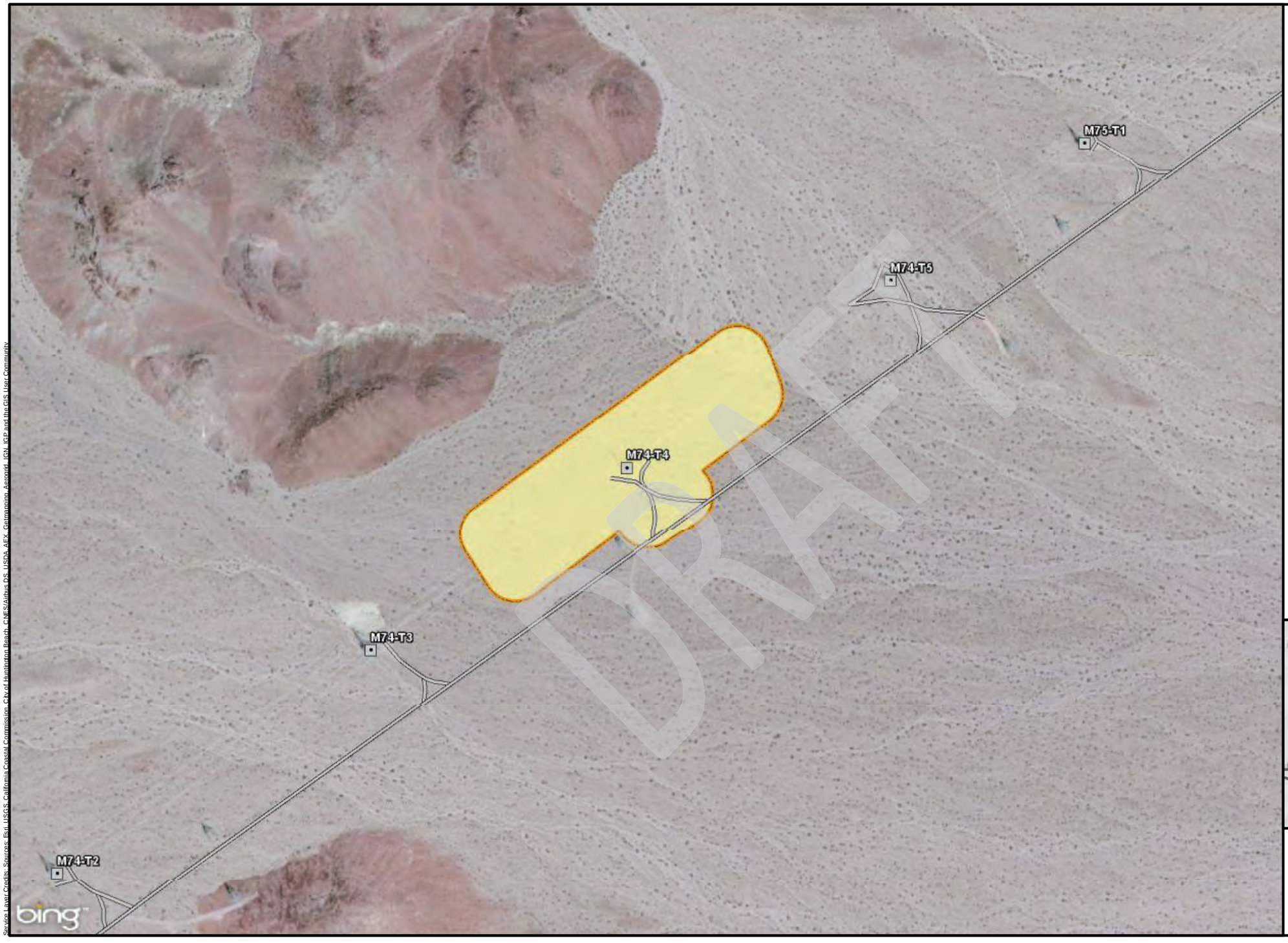
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E#02_20170621.mxd

Exhibit 2. Project Area (Page 8 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

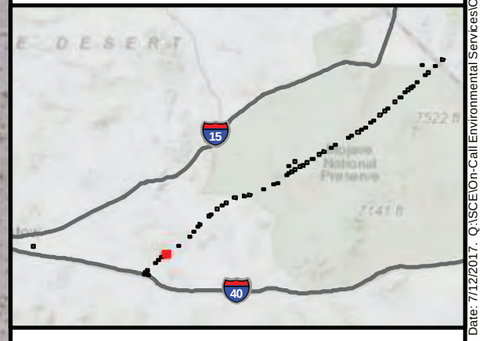


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub



N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

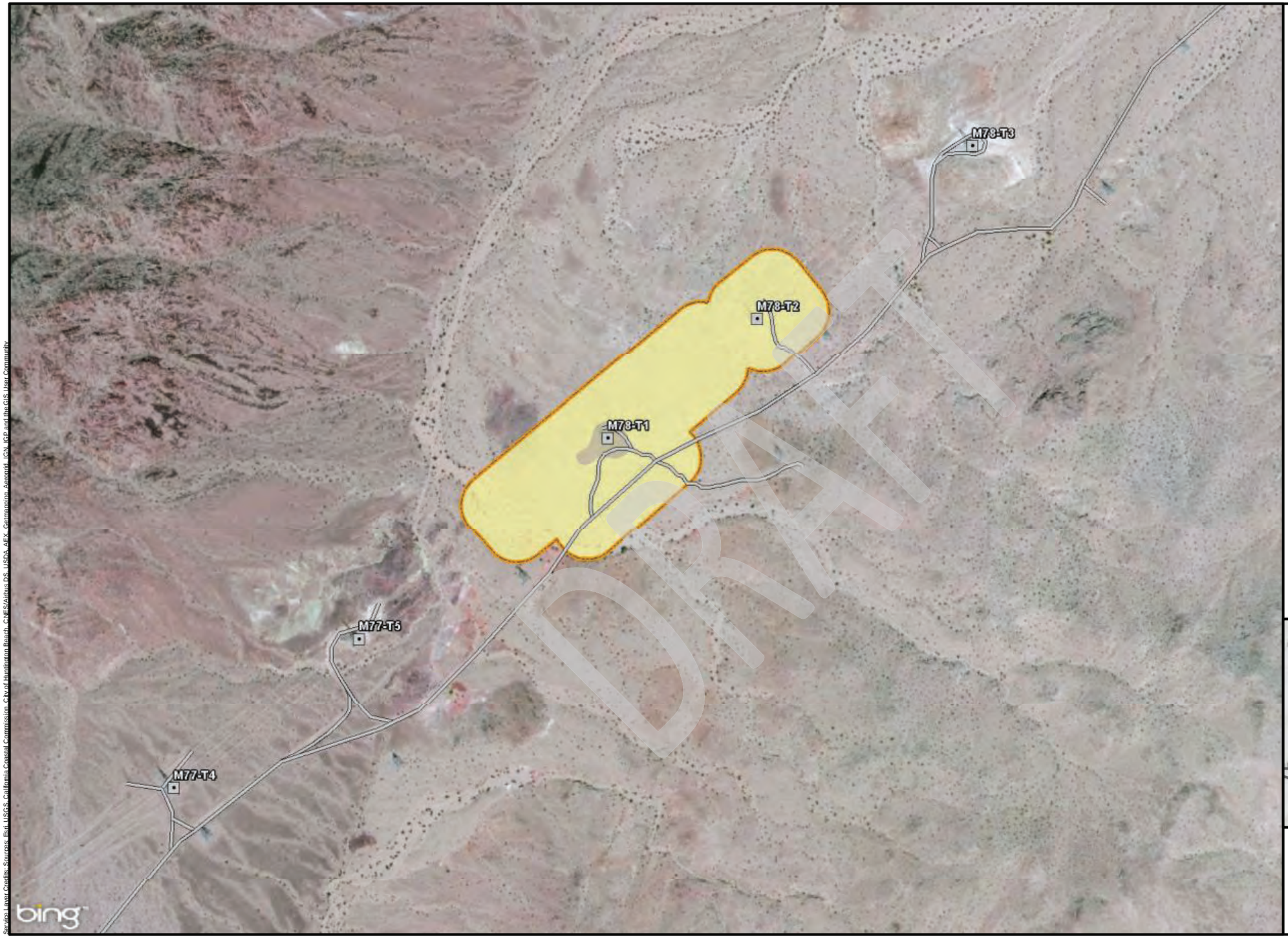
DRAFT

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_Ef02_20170621.mxd

Exhibit 2. Project Area (Page 9 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

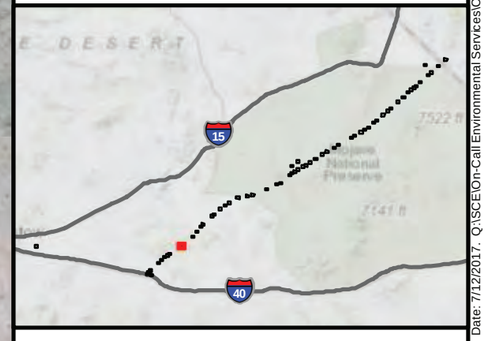


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub
- White bursage scrub



N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 10 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

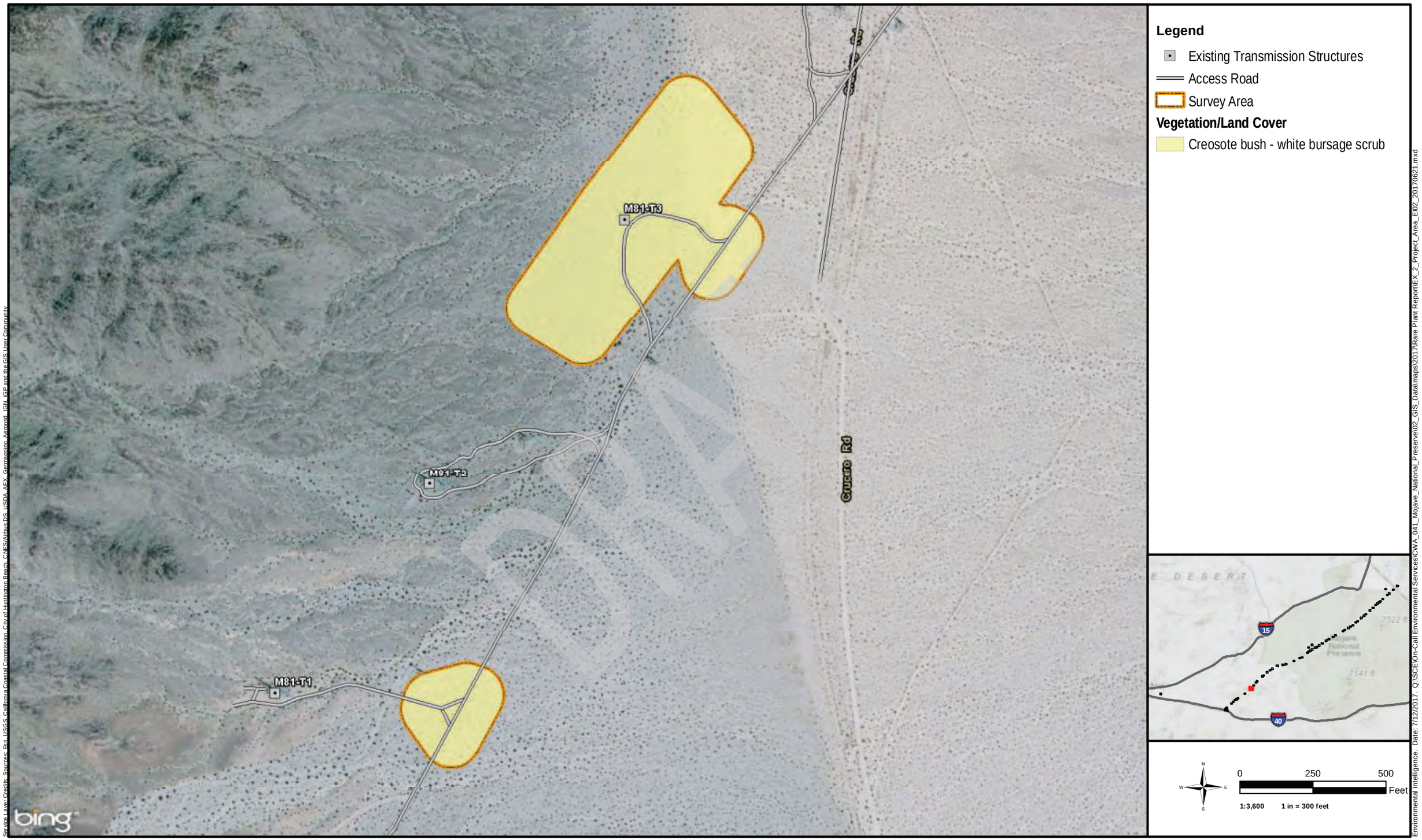


Exhibit 2. Project Area (Page 11 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV


M83-T1
M82-T5
M82-T4
M82-T3
bing
Legend
Existing Transmission Structures
Access Road
Survey Area
Vegetation/Land Cover
Creosote bush - white bursage scrub
DESERT
15
40
7522 ft
7141 ft
N
W
E
S
0
250
500
Feet
1:3,600
1 in = 300 feet
Services Layer Credits: Sources: Esri, USGS, California Coastal Commission, Garmin, GEBCO, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

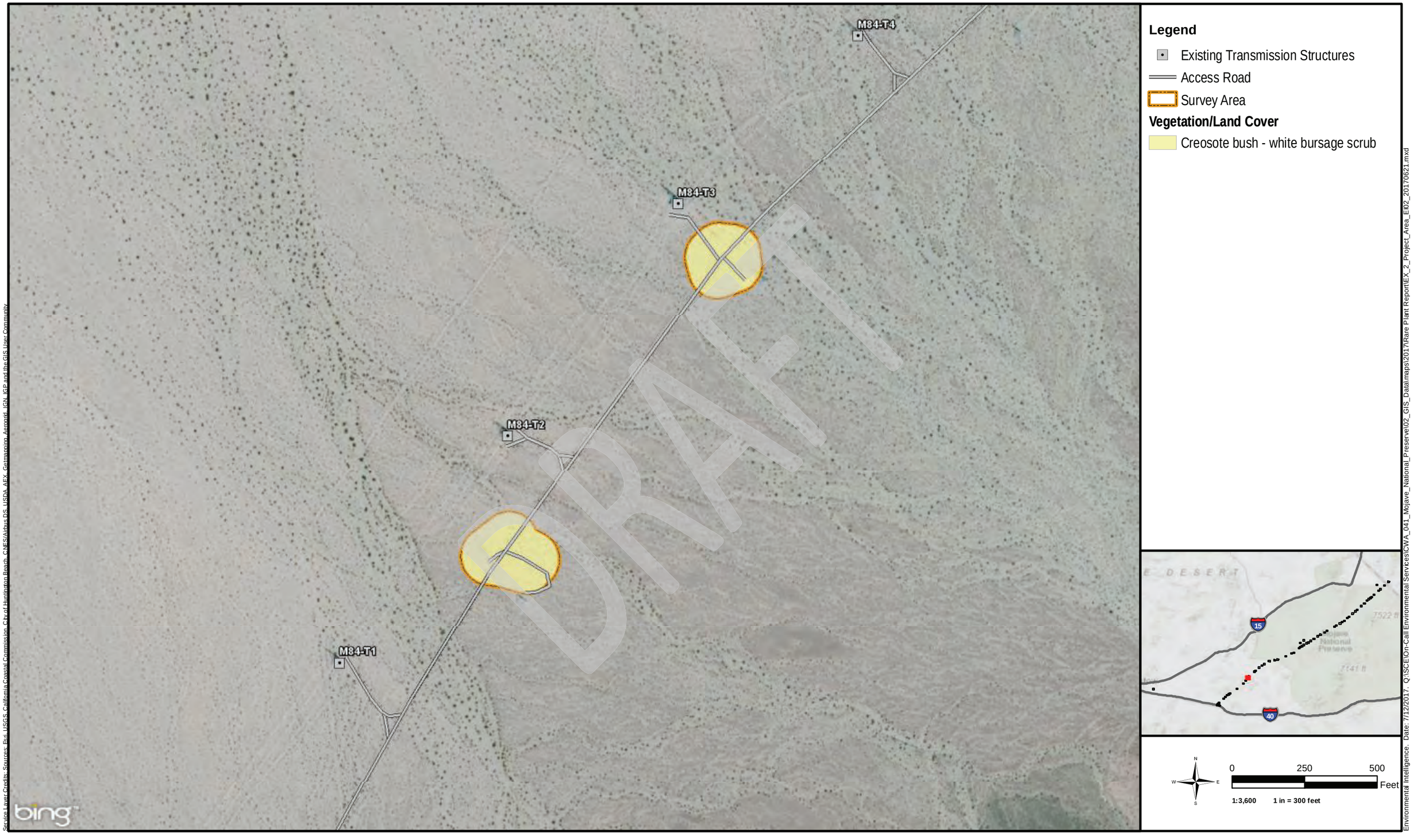


Exhibit 2. Project Area (Page 13 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

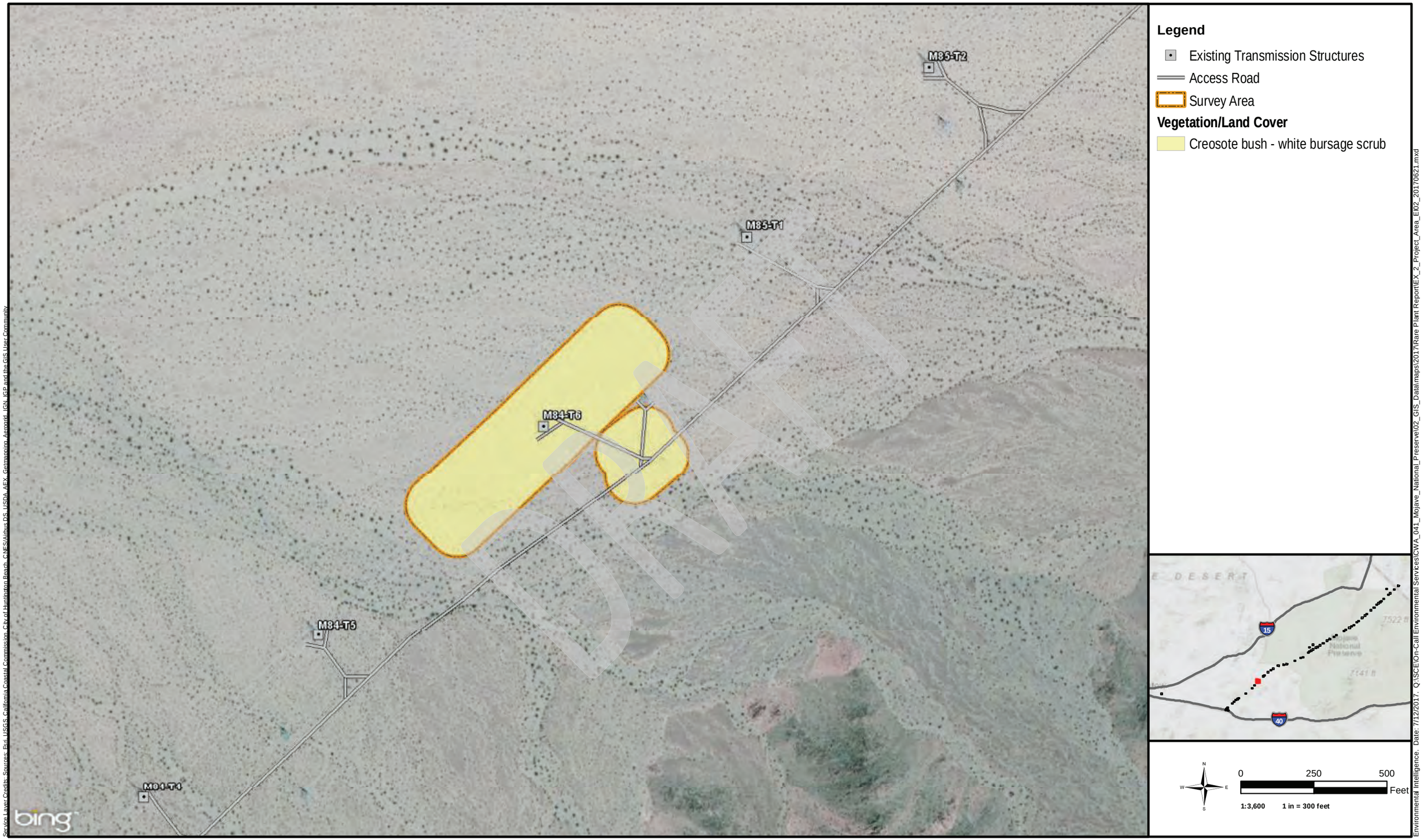
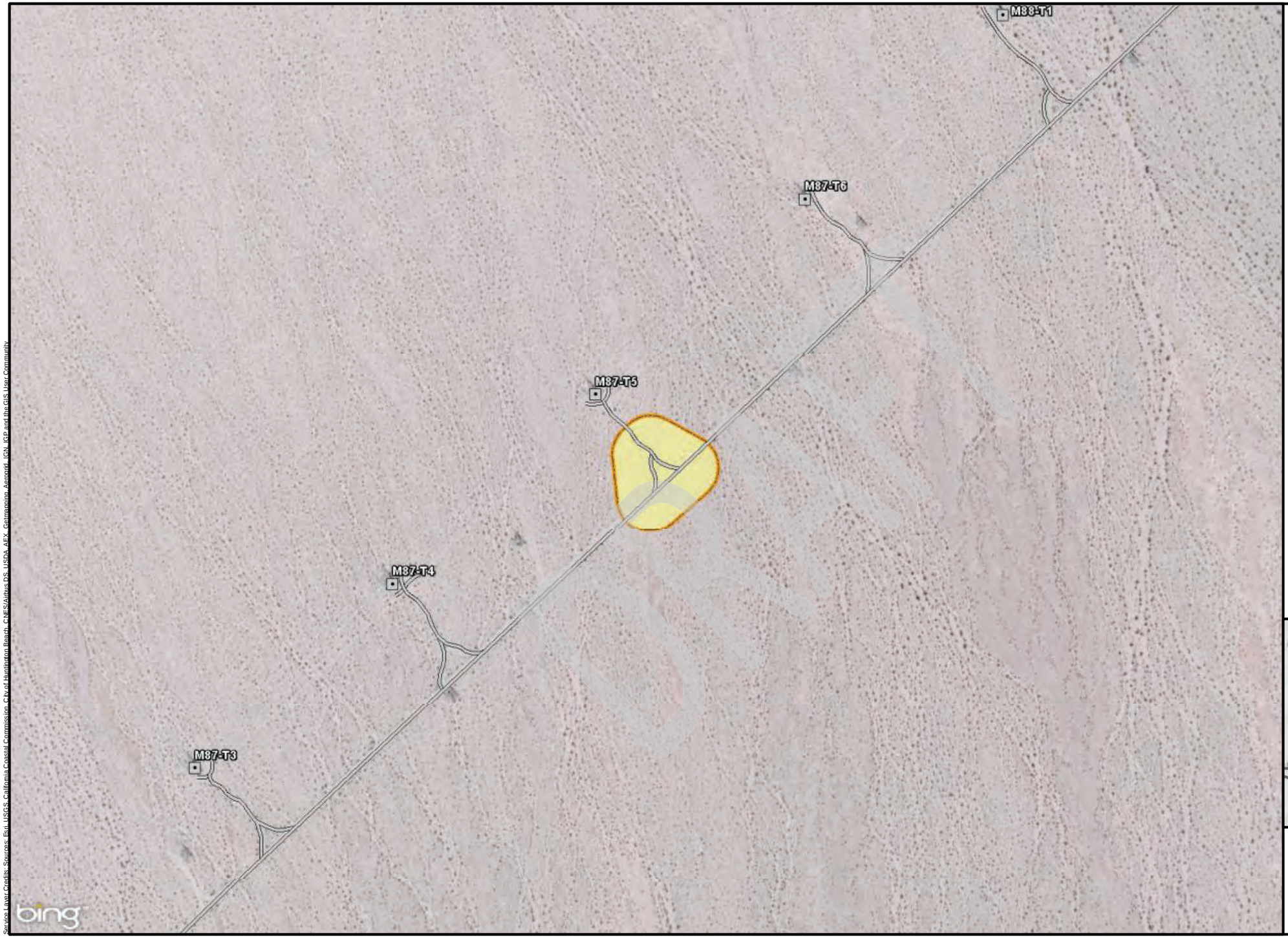


Exhibit 2. Project Area (Page 14 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

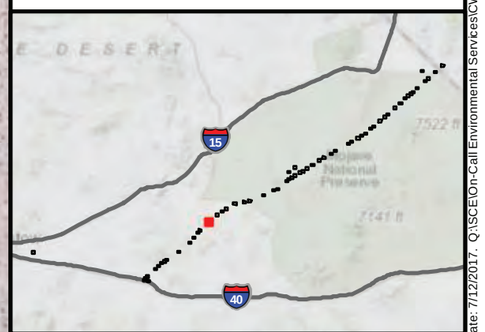


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub



N
W E
S

0 250 500 Feet

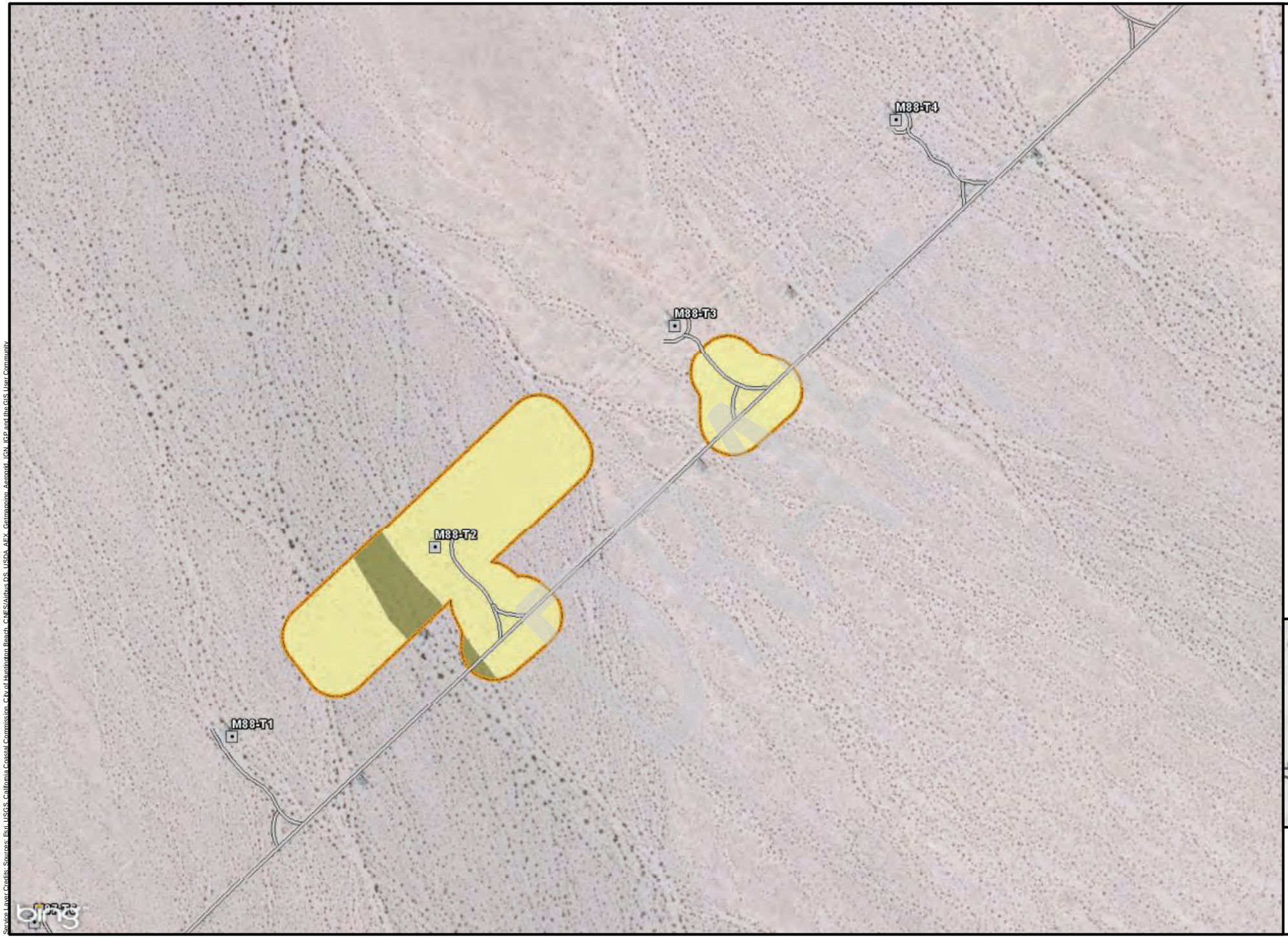
1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 15 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

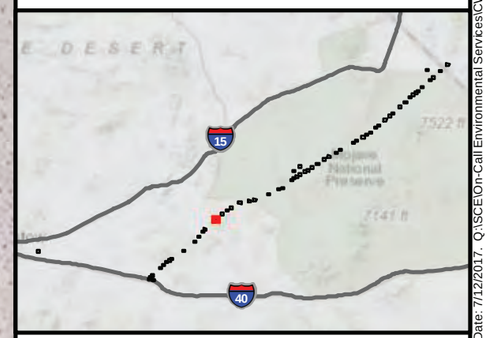


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub
- Smoke tree woodland



0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNRS/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Datalmaps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 16 of 62)

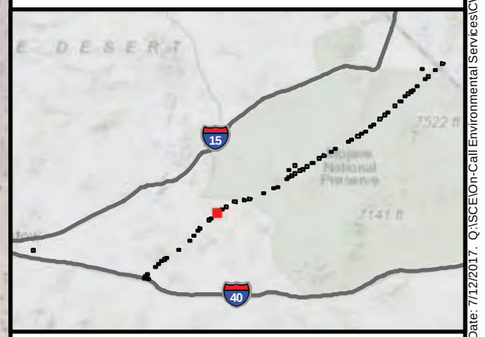
LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub



N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Source Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 17 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

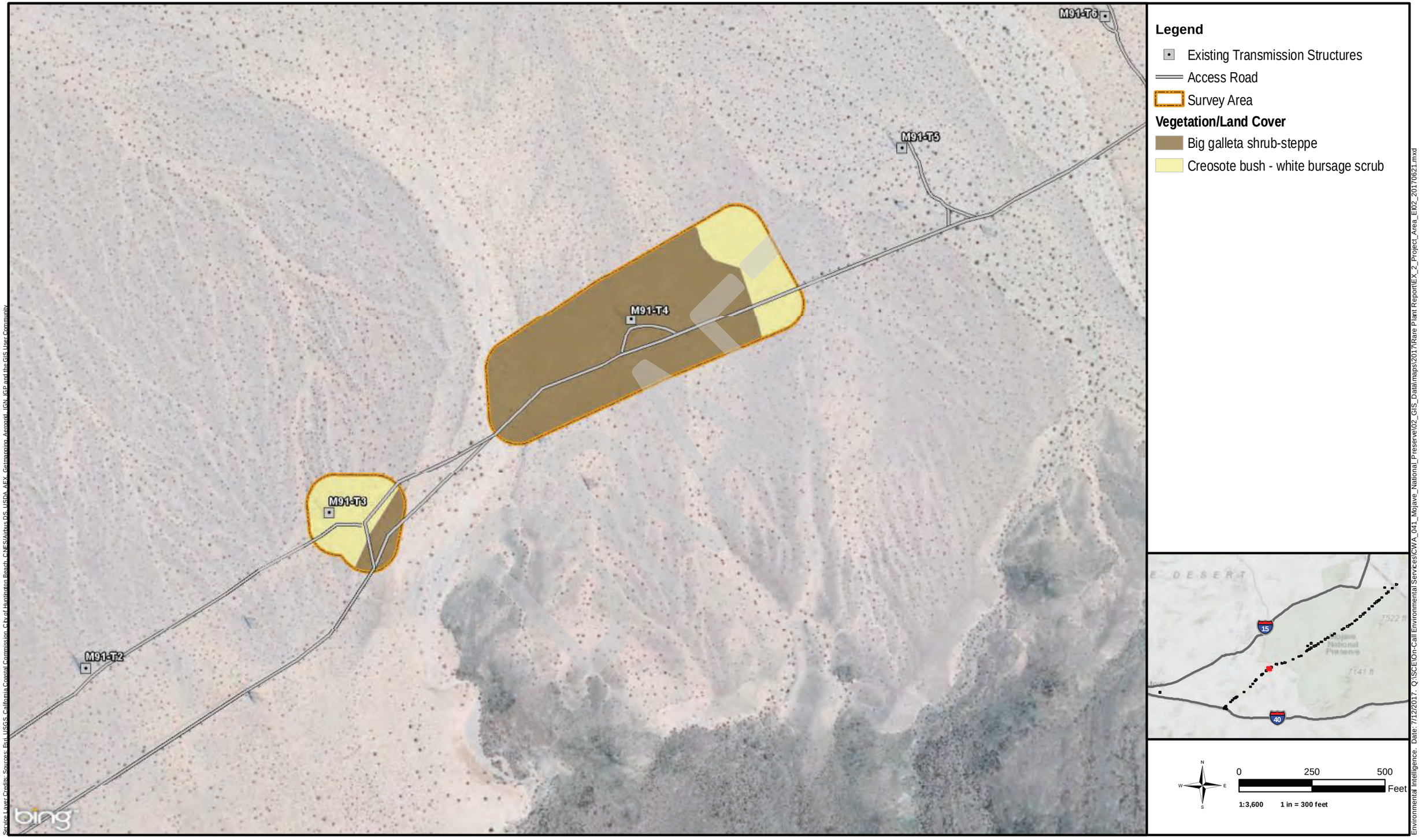


Exhibit 2. Project Area (Page 18 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 19 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

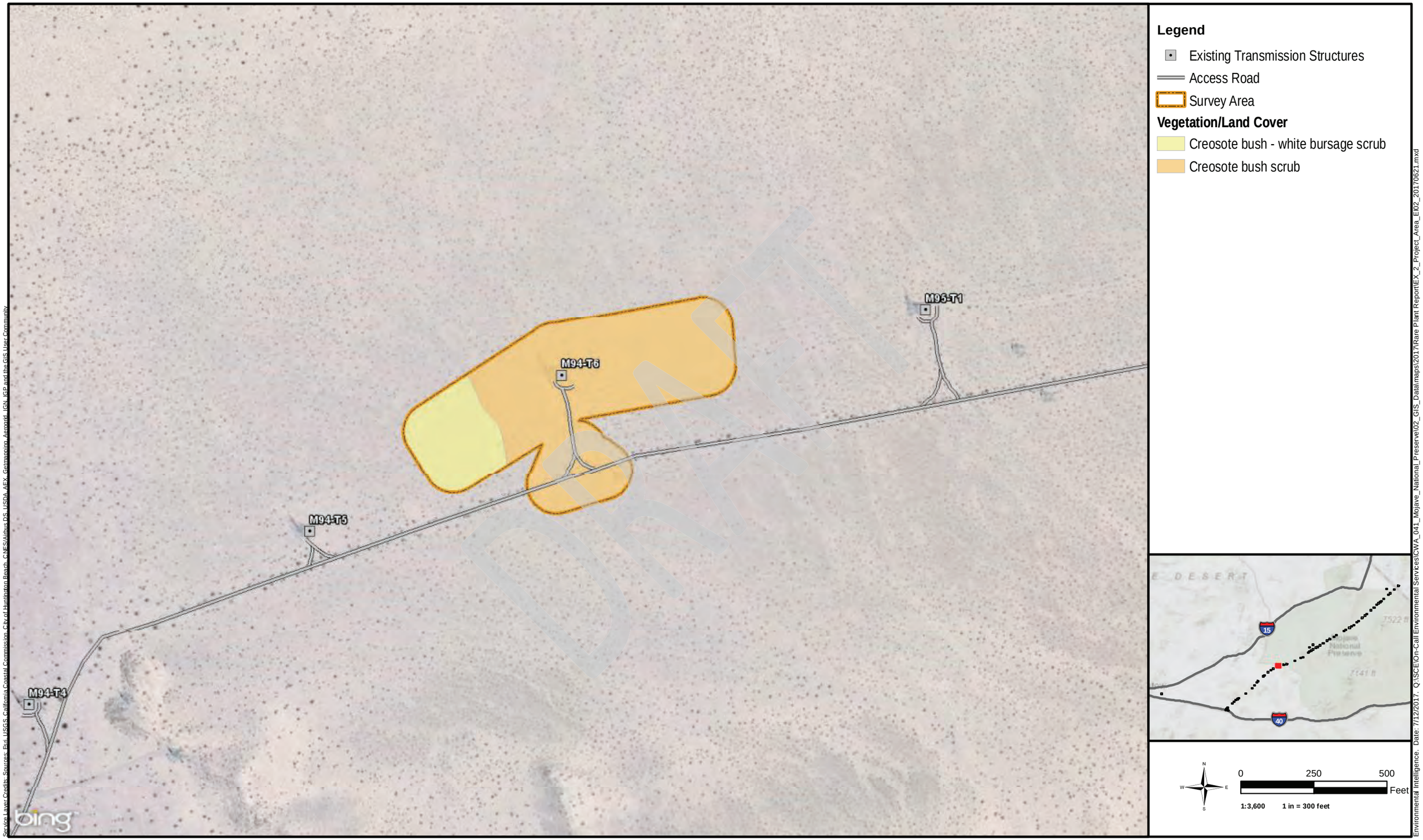


Exhibit 2. Project Area (Page 20 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 21 of 62)
LVRAS Project | San Bernardino County, CA and Clark County, NV

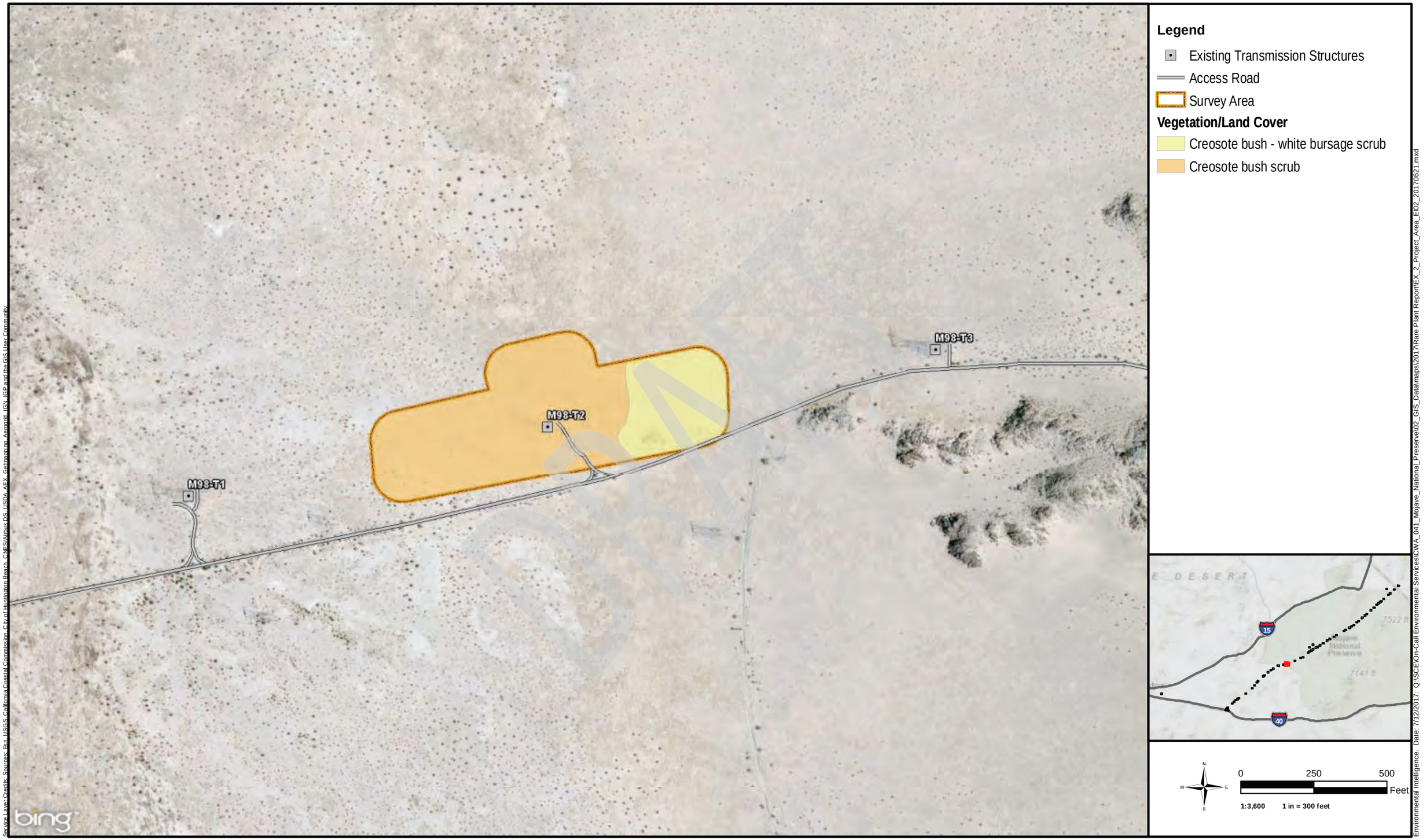


Exhibit 2. Project Area (Page 22 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

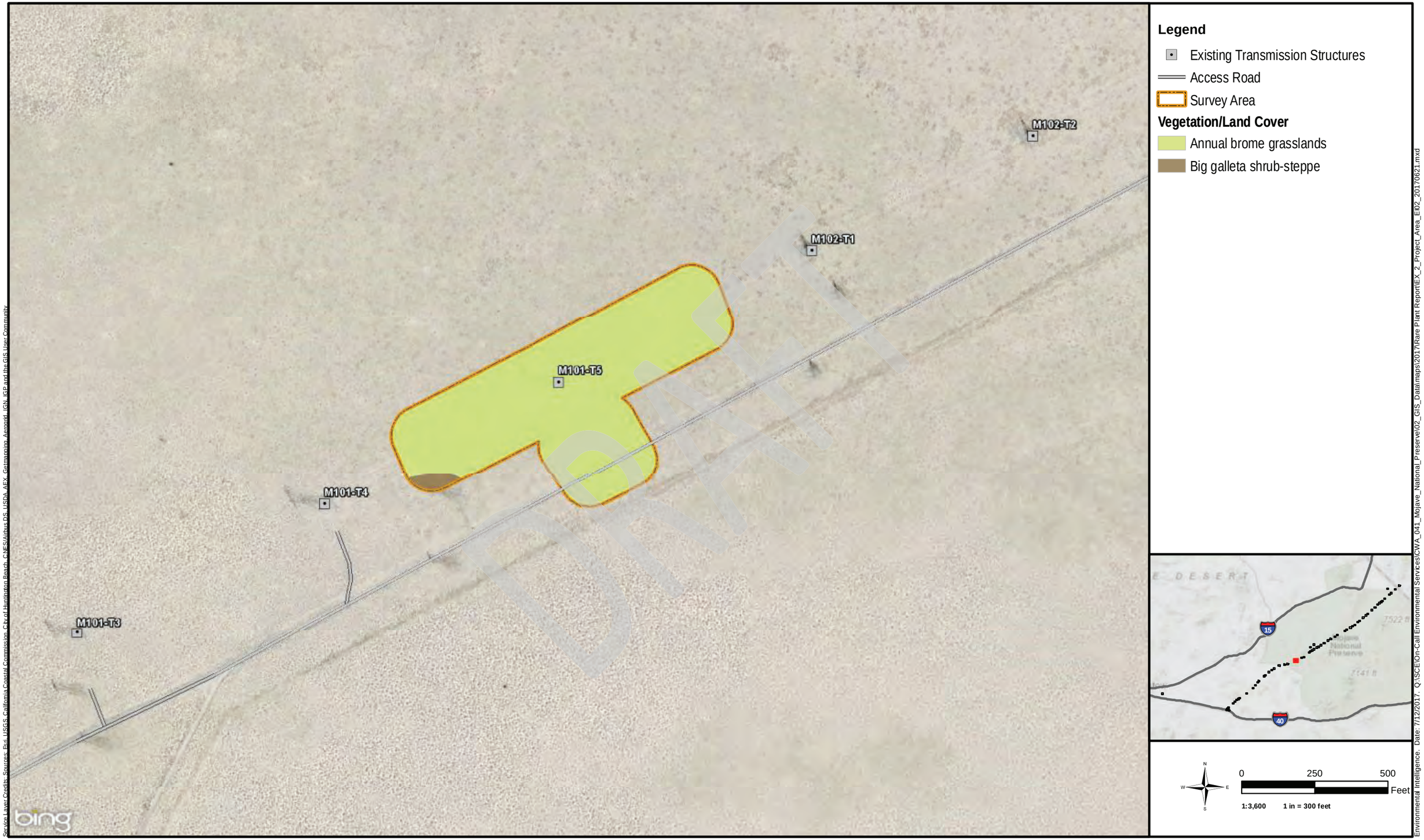
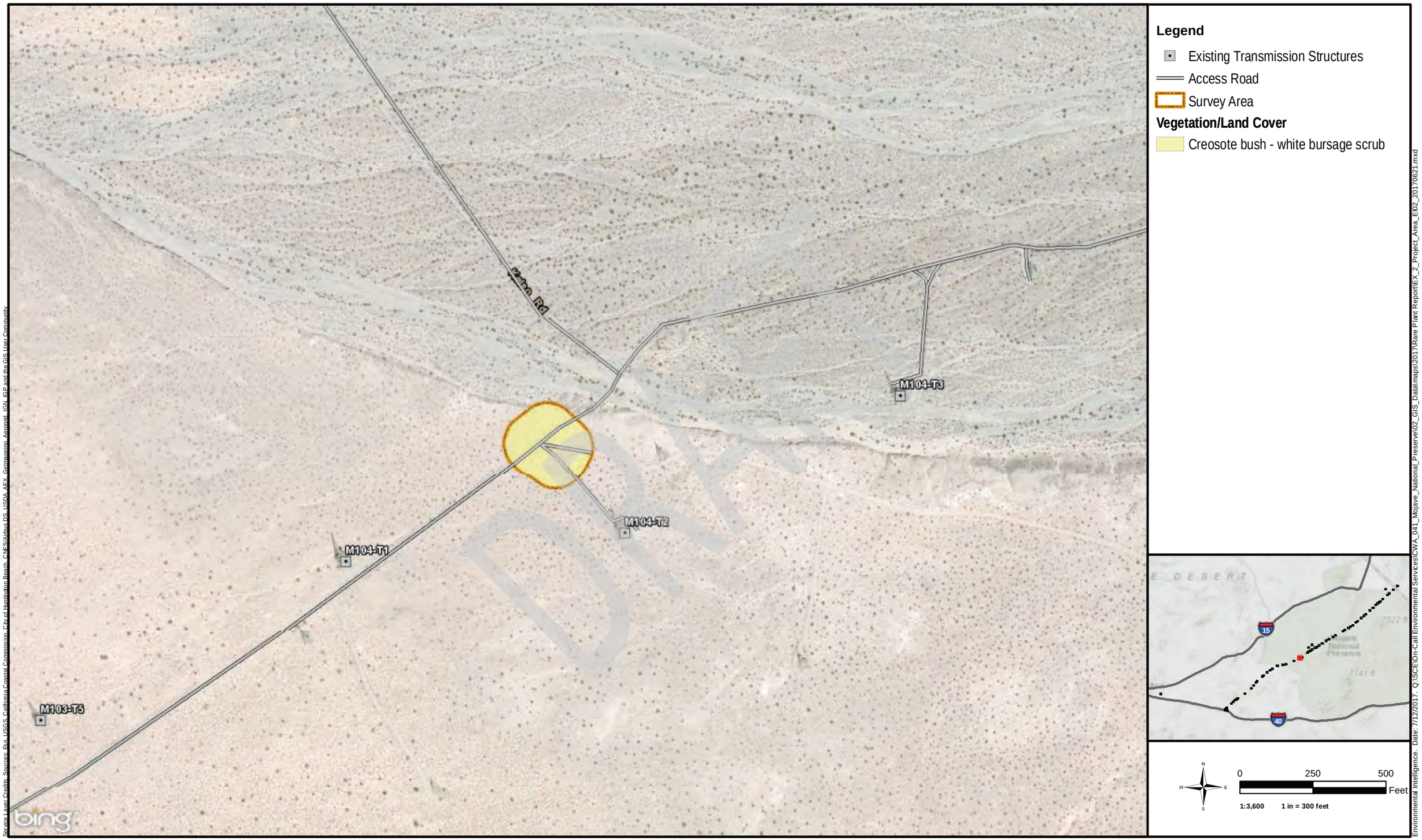


Exhibit 2. Project Area (Page 23 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

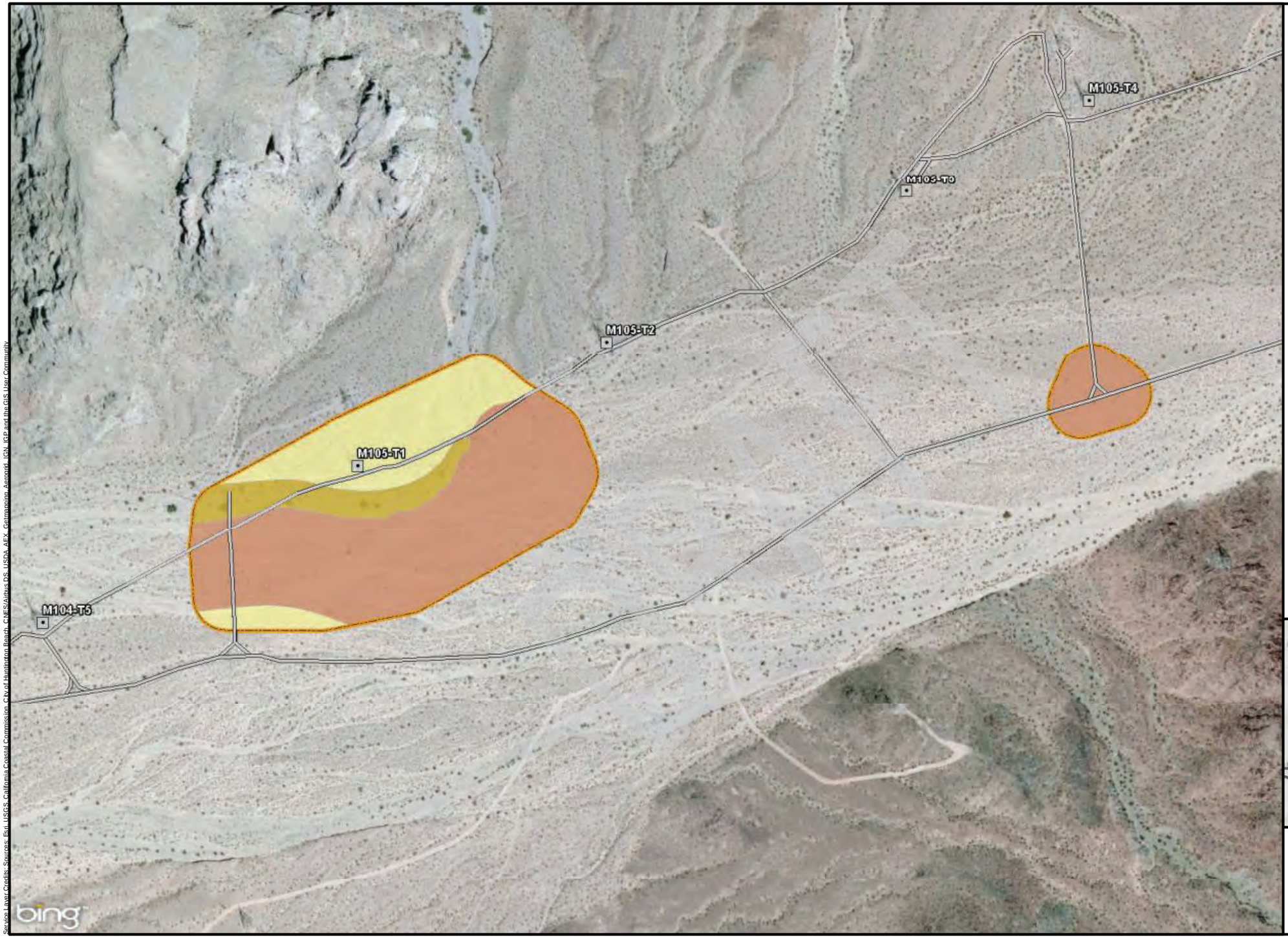


Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 24 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Cheesebush scrub
- Creosote bush - white bursage scrub
- Desert willow woodland

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping Aerogrid, IGN, IGP and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 25 of 62)
LVRAS Project | San Bernardino County, CA and Clark County, NV

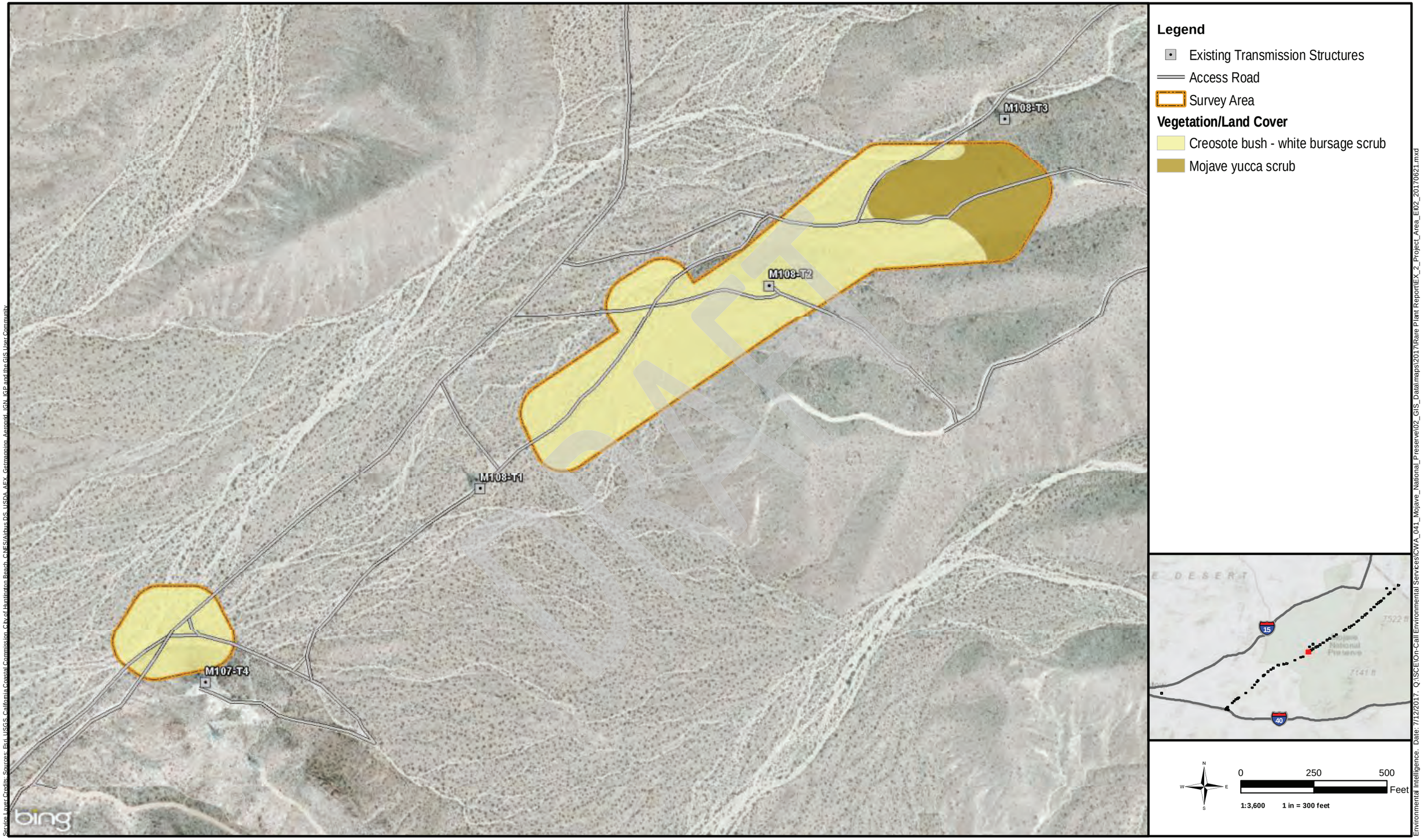


Exhibit 2. Project Area (Page 26 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

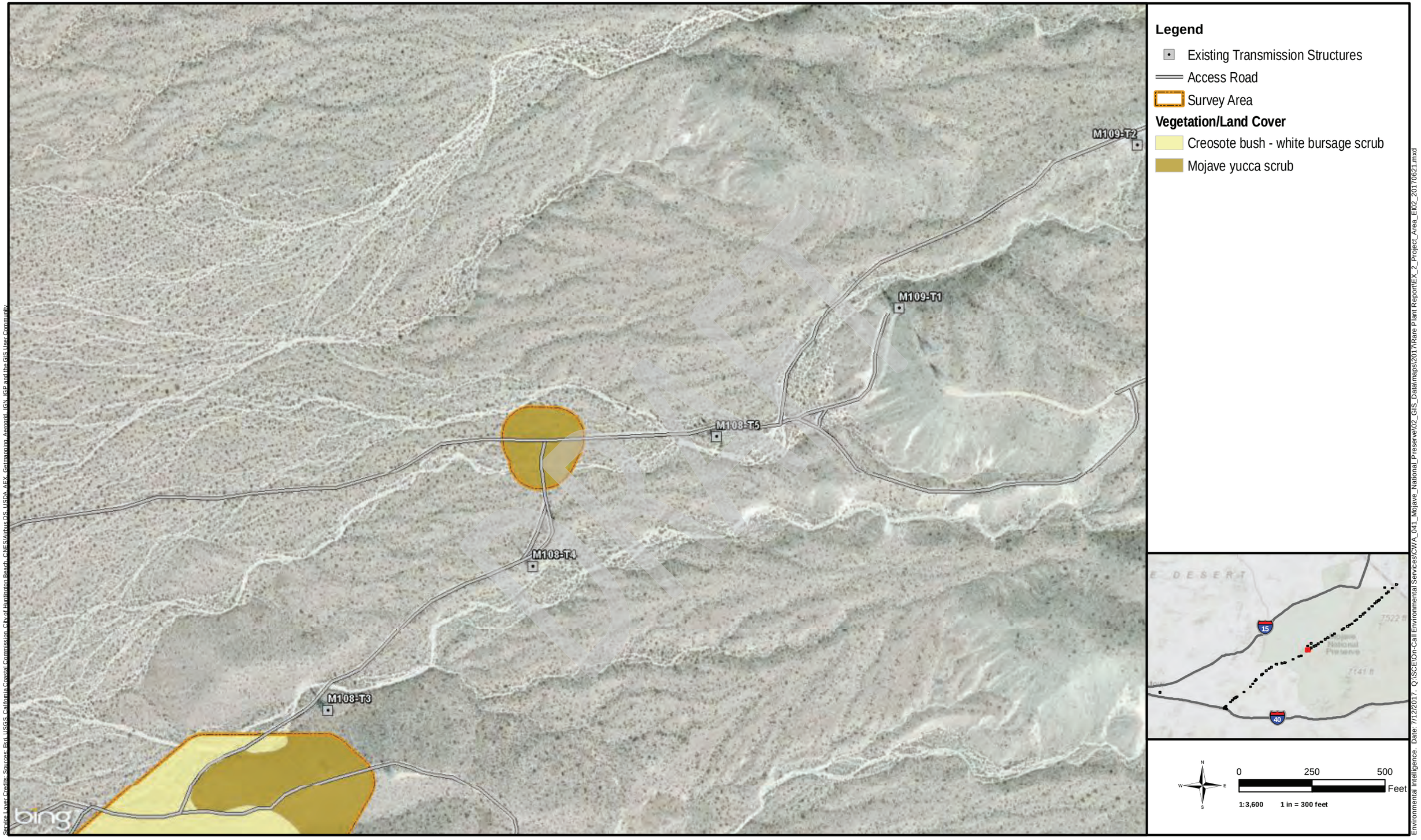
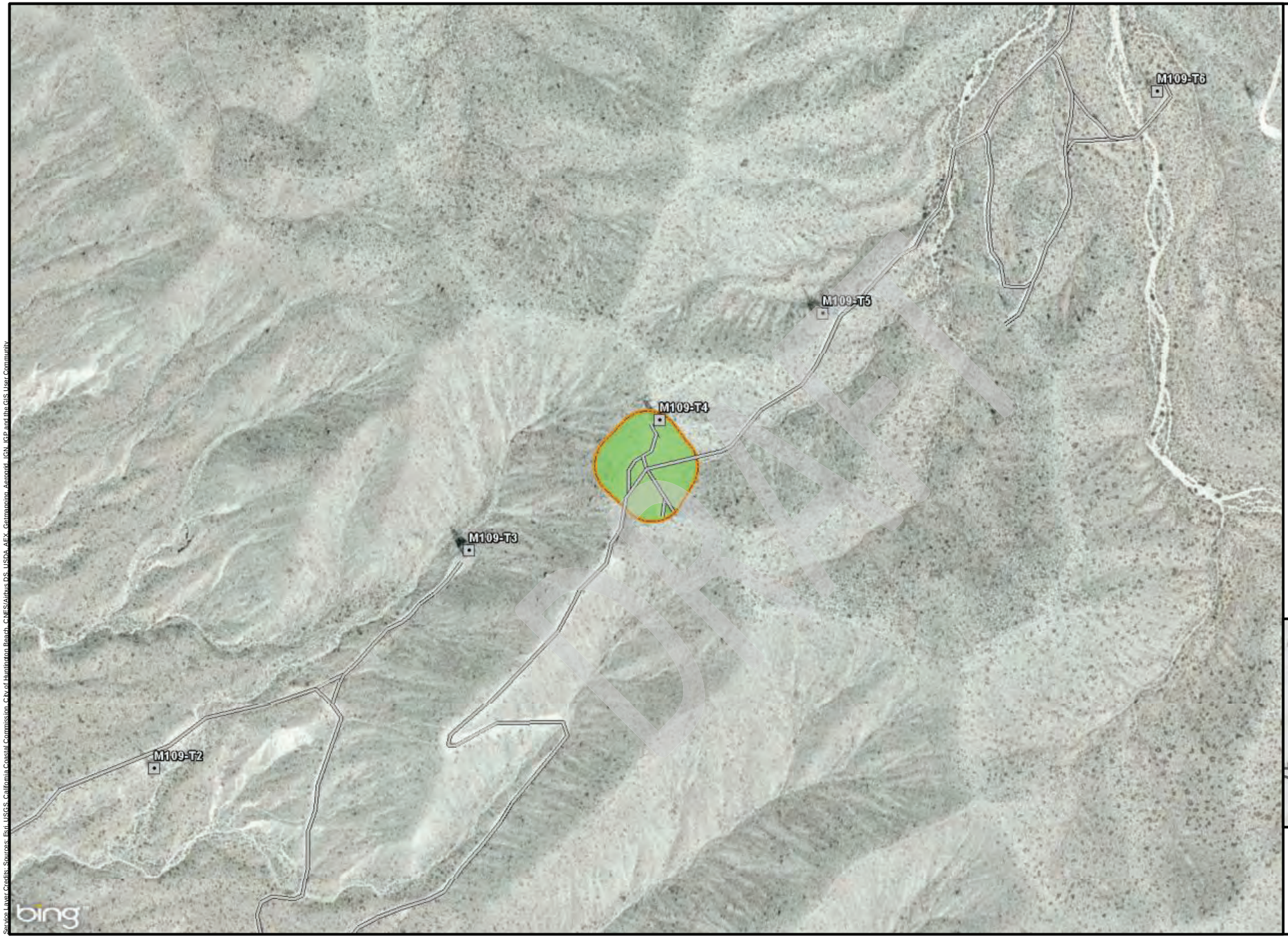


Exhibit 2. Project Area (Page 27 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Joshua tree woodland

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 28 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 29 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 30 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 31 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Joshua tree woodland

N
W
E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 32 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

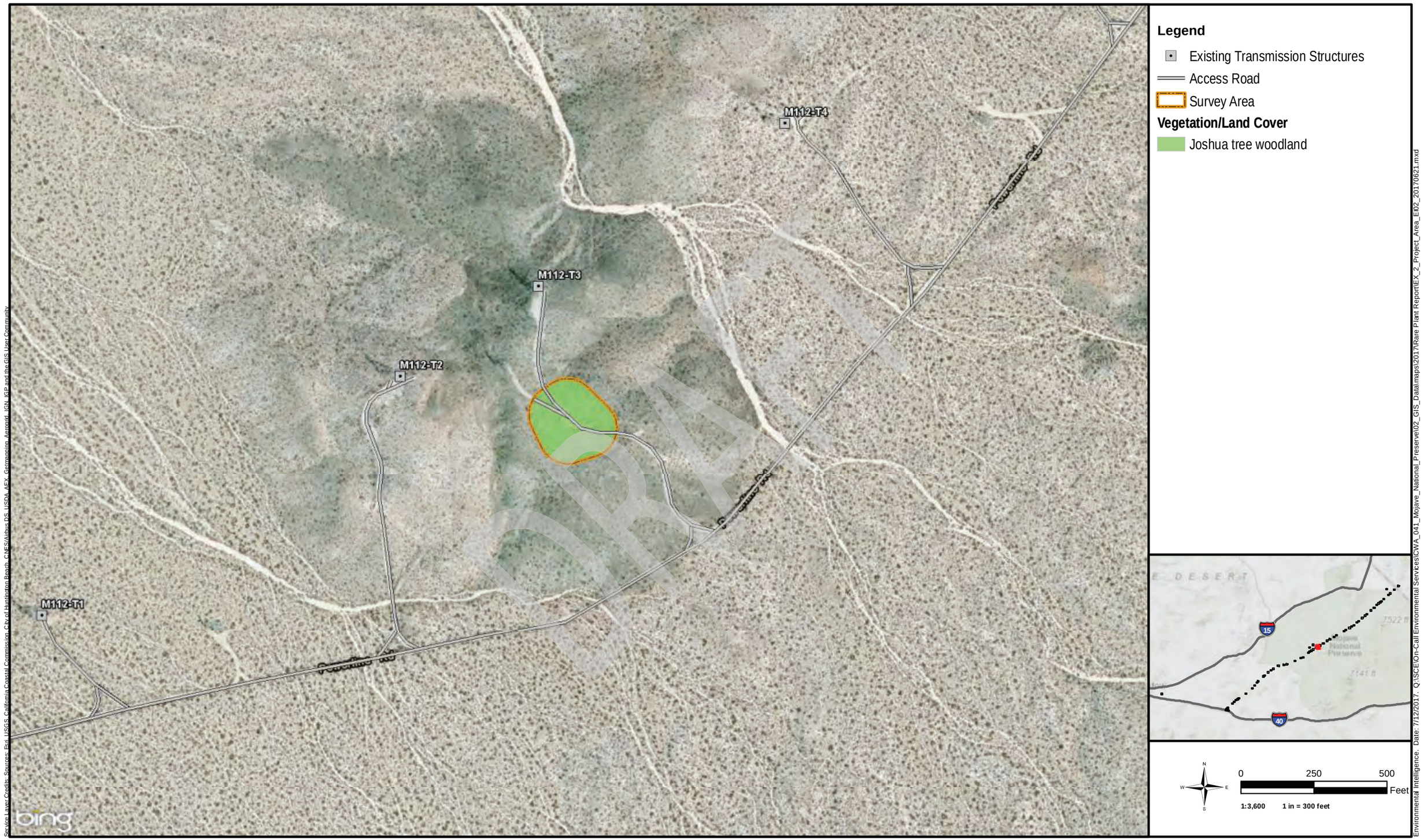


Exhibit 2. Project Area (Page 33 of 62)

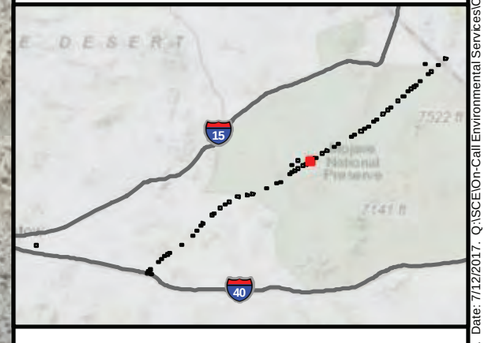
LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Developed
- Joshua tree woodland



N
W
E
S

0 250 500 Feet

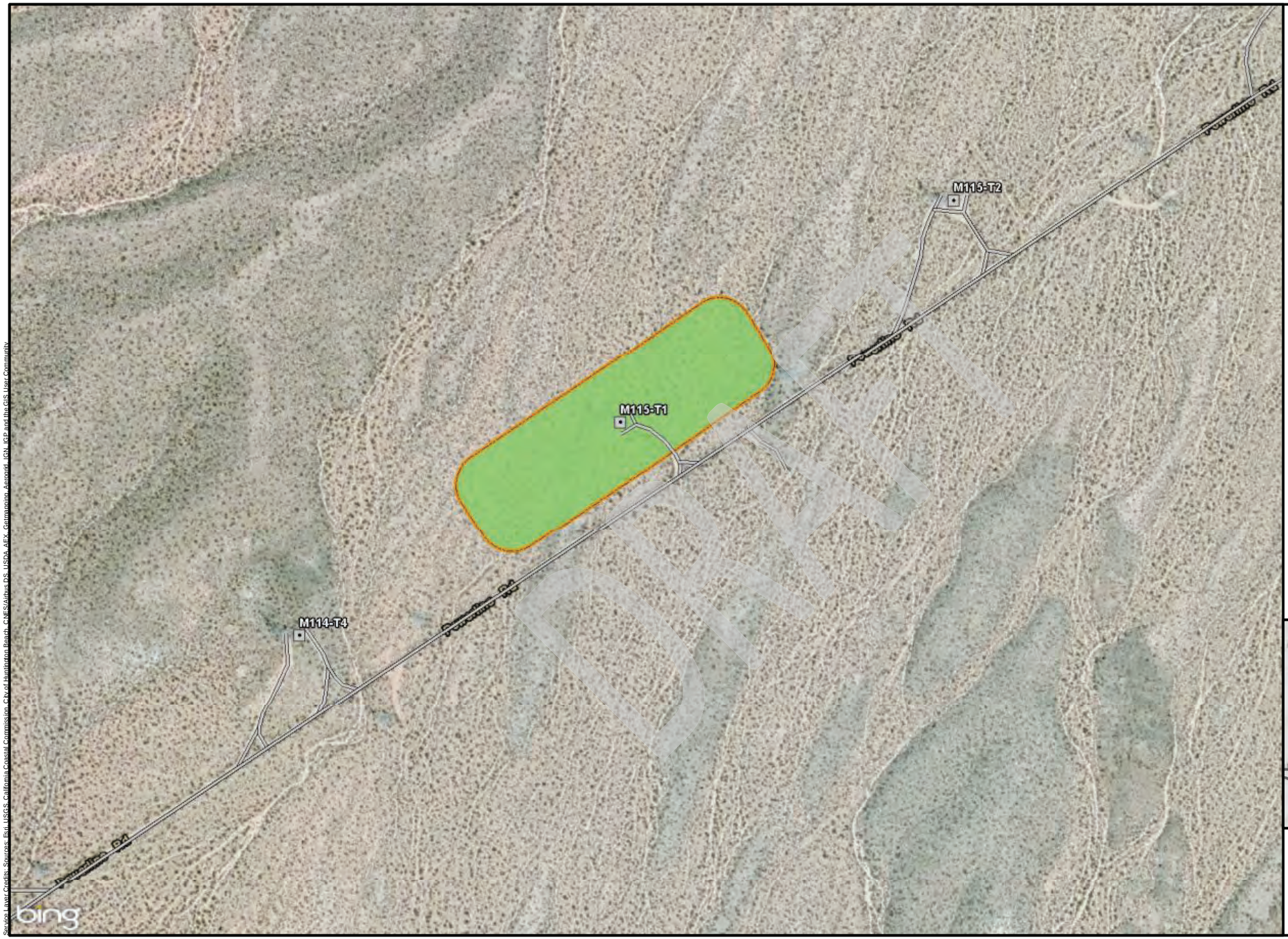
1:3,600 1 in = 300 feet

Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 34 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

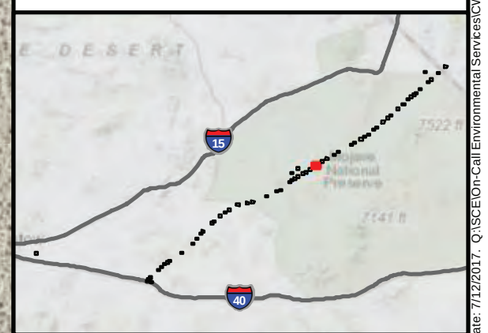


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Joshua tree woodland



0 250 500 Feet

1:3,600 1 in = 300 feet

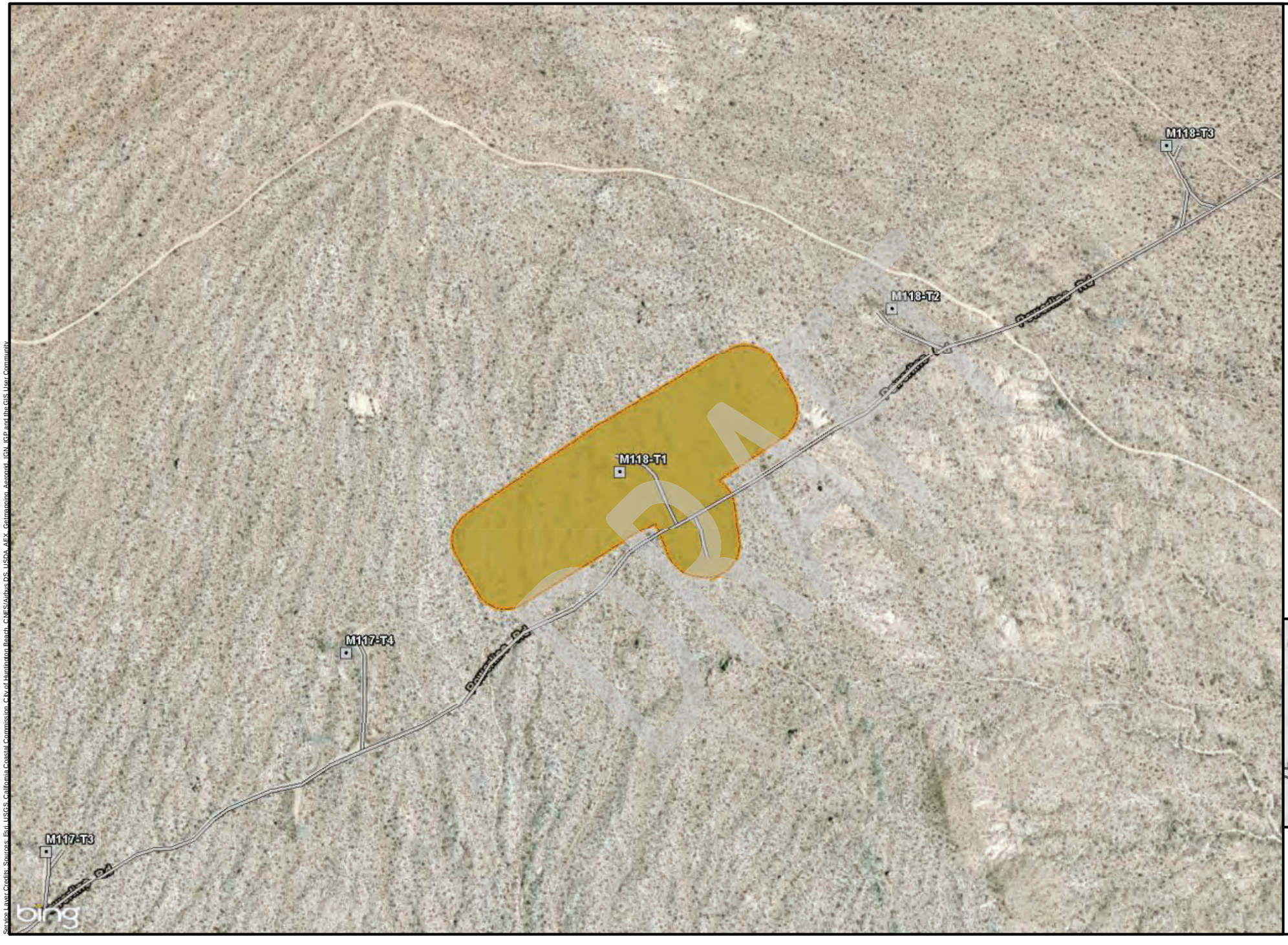
Source: Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 35 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV


M117-T1
M116-T5
M116-T4
M116-T3
Legend
Existing Transmission Structures
Access Road
Survey Area
Vegetation/Land Cover
Joshua tree woodland
Mojave yucca scrub
0
250
500
Feet
1:3,600
1 in = 300 feet
bing
Sources/Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

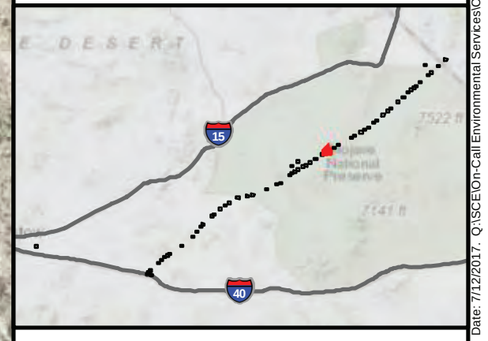


Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Mojave yucca scrub



N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 37 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 38 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 39 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

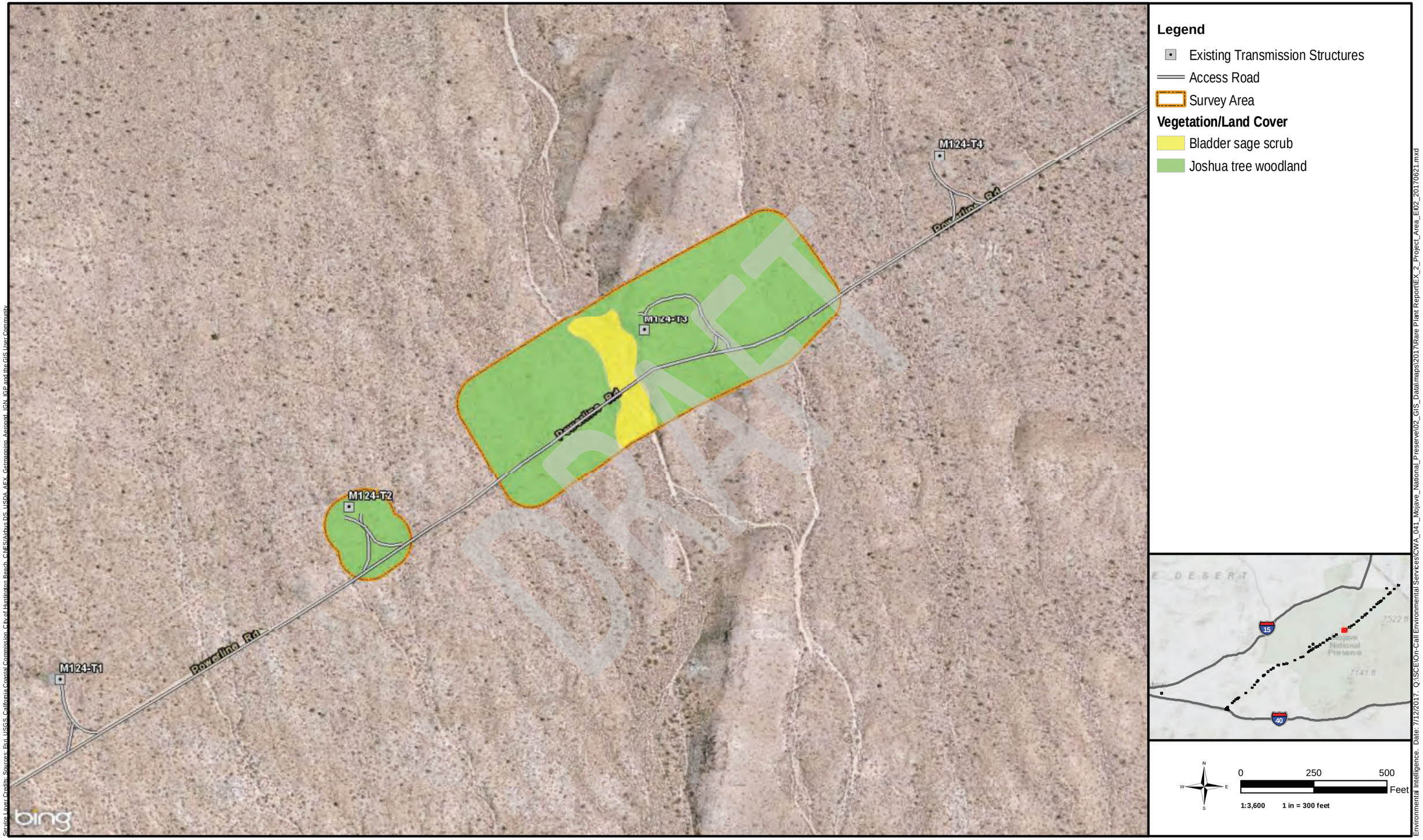


Exhibit 2. Project Area (Page 40 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 41 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Joshua tree woodland

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Grimmond, Aerogrid, IGN, IGP and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 42 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 43 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Developed
- Joshua tree woodland

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 45 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Service Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

EXHIBIT 2. PROJECT AREA (PAGE 46 OF 62)

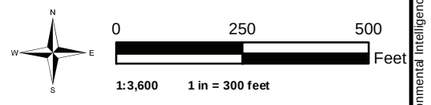
LVRAS PROJECT | SAN BERNARDINO COUNTY, CA AND CLARK COUNTY, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Catclaw acacia thorn scrub
- Joshua tree woodland



Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 47 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

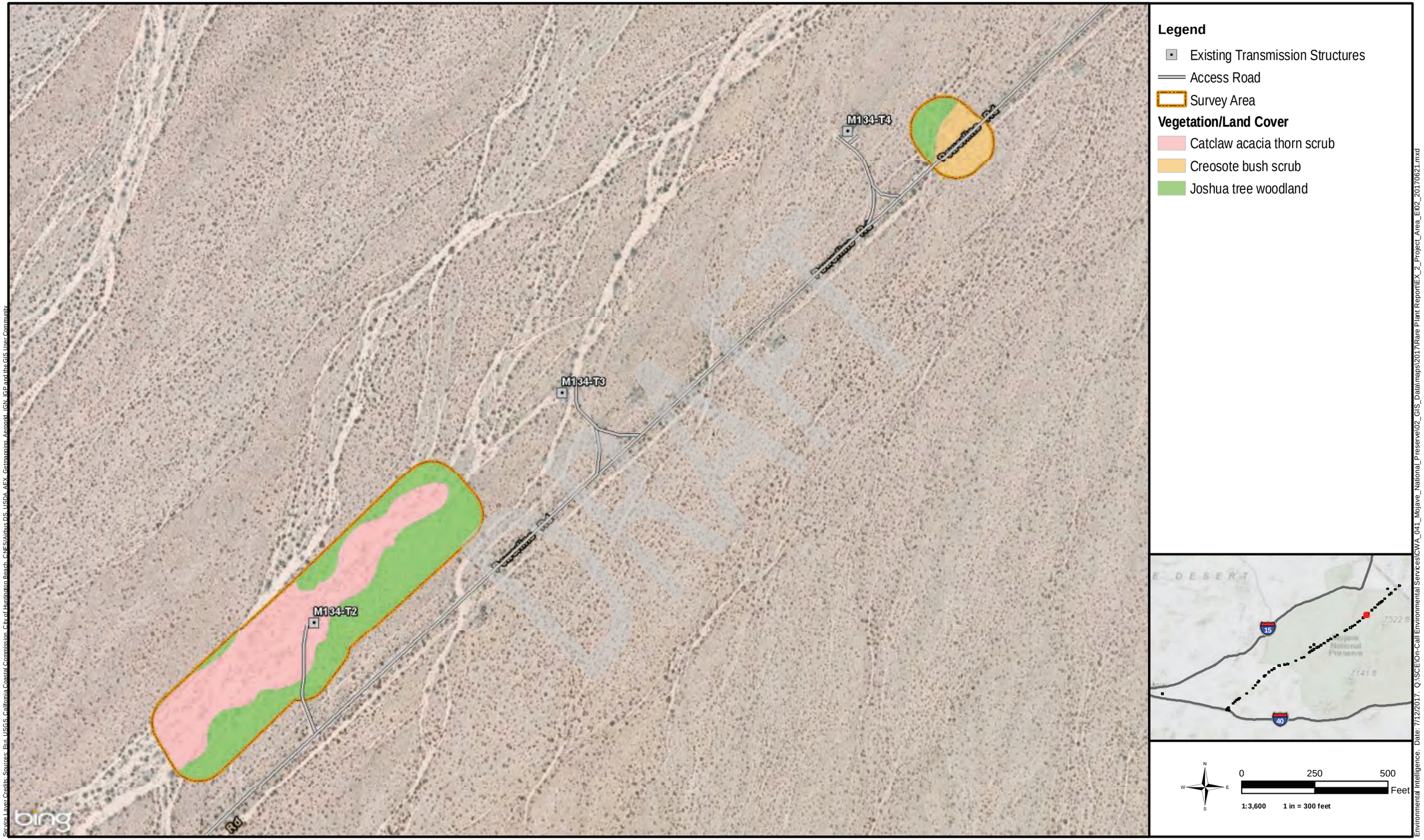


Exhibit 2. Project Area (Page 48 of 62)
LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 49 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

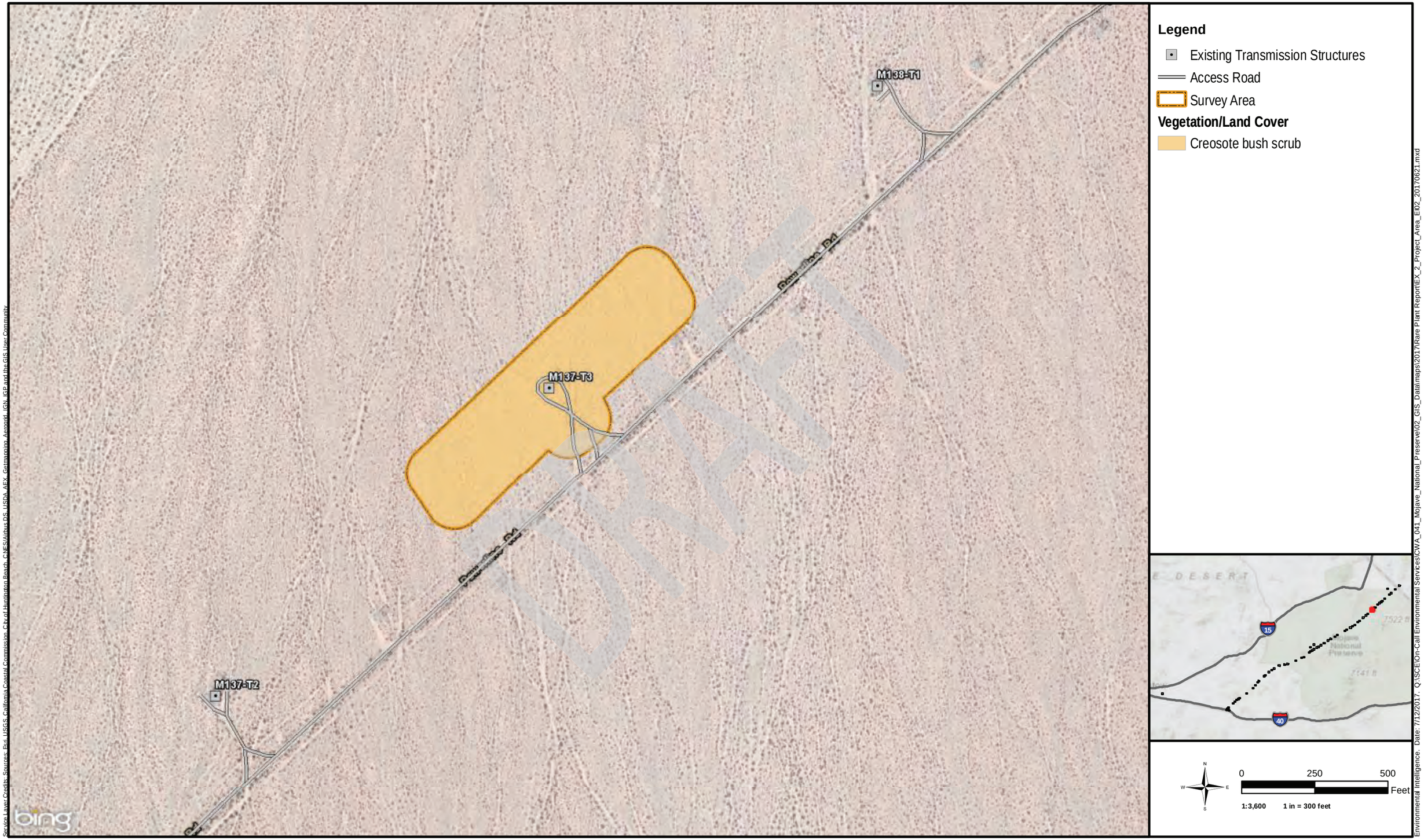


Exhibit 2. Project Area (Page 50 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

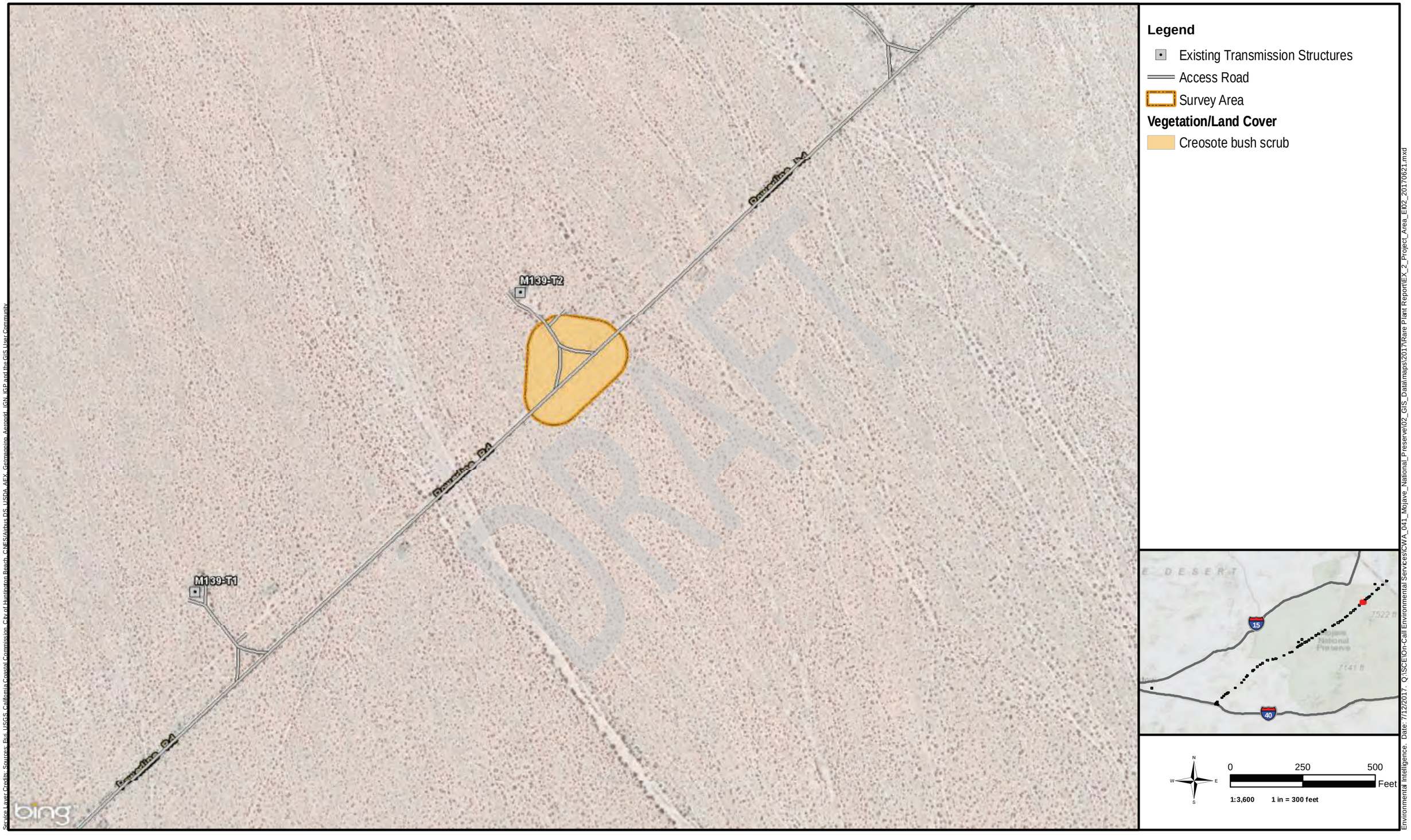
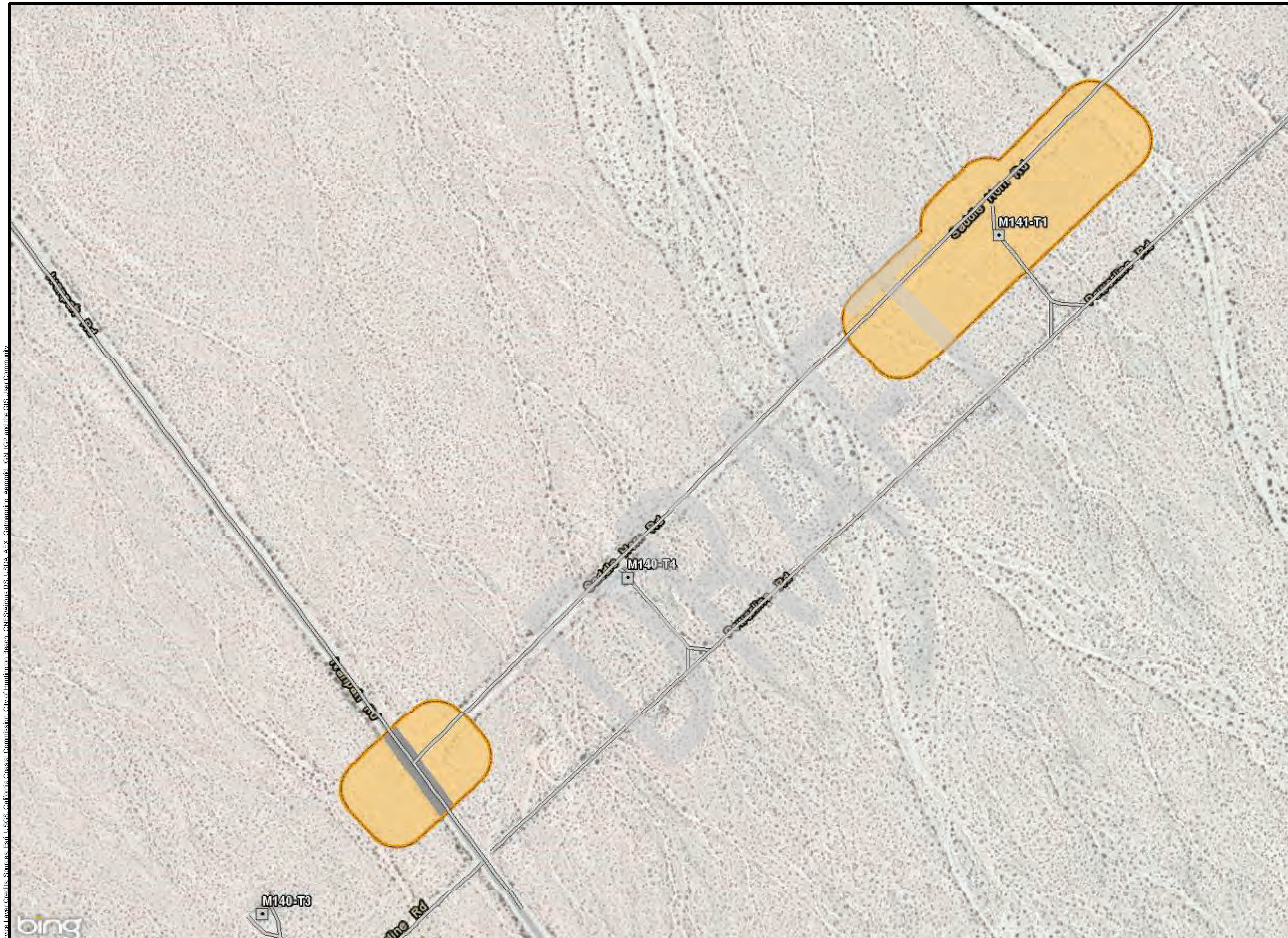


Exhibit 2. Project Area (Page 51 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush scrub
- Developed

N S W E

0 250 500 Feet

1:3,600 1 in = 300 feet

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_EI02_20170621.mxd

Exhibit 2. Project Area (Page 52 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

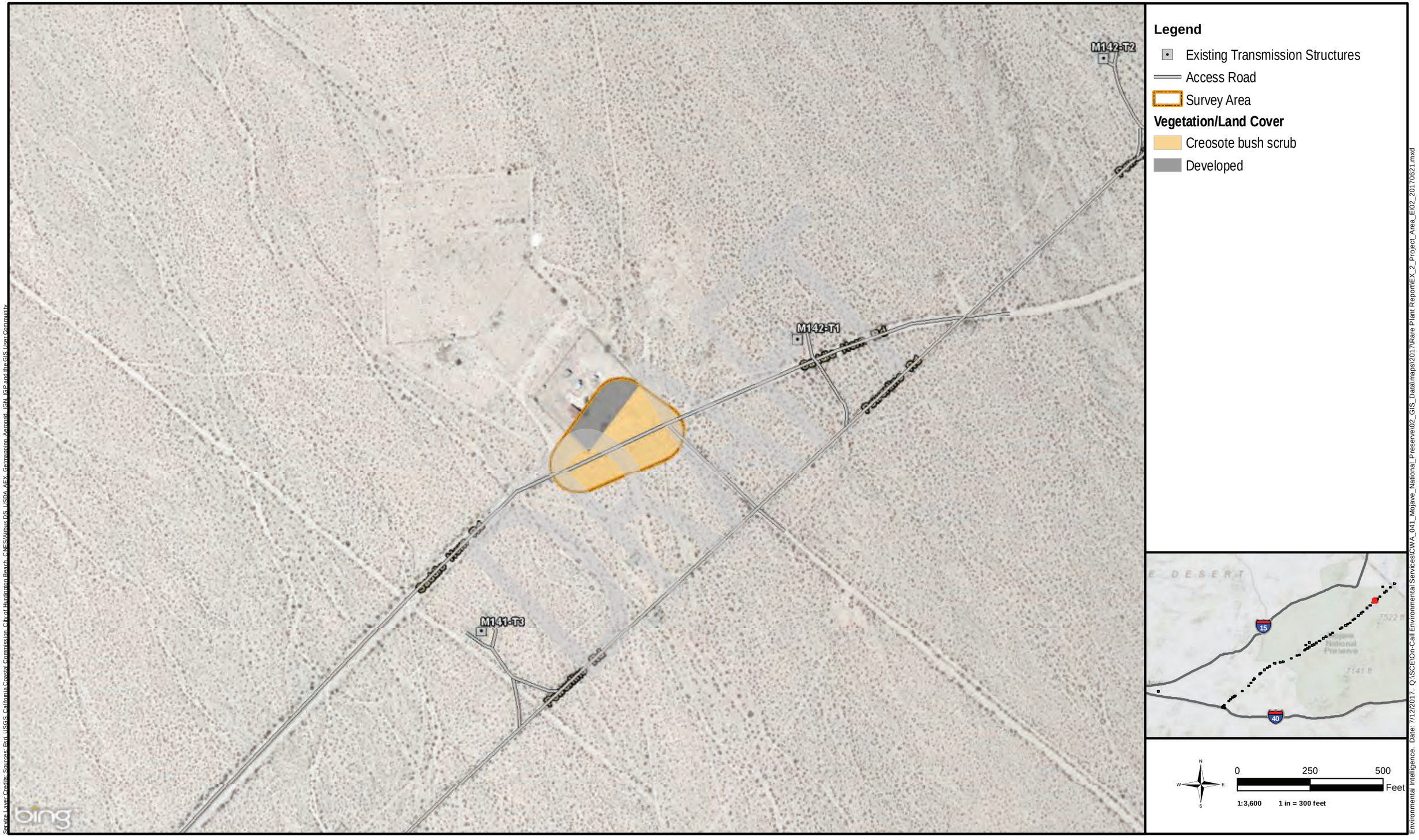


Exhibit 2. Project Area (Page 53 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 54 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

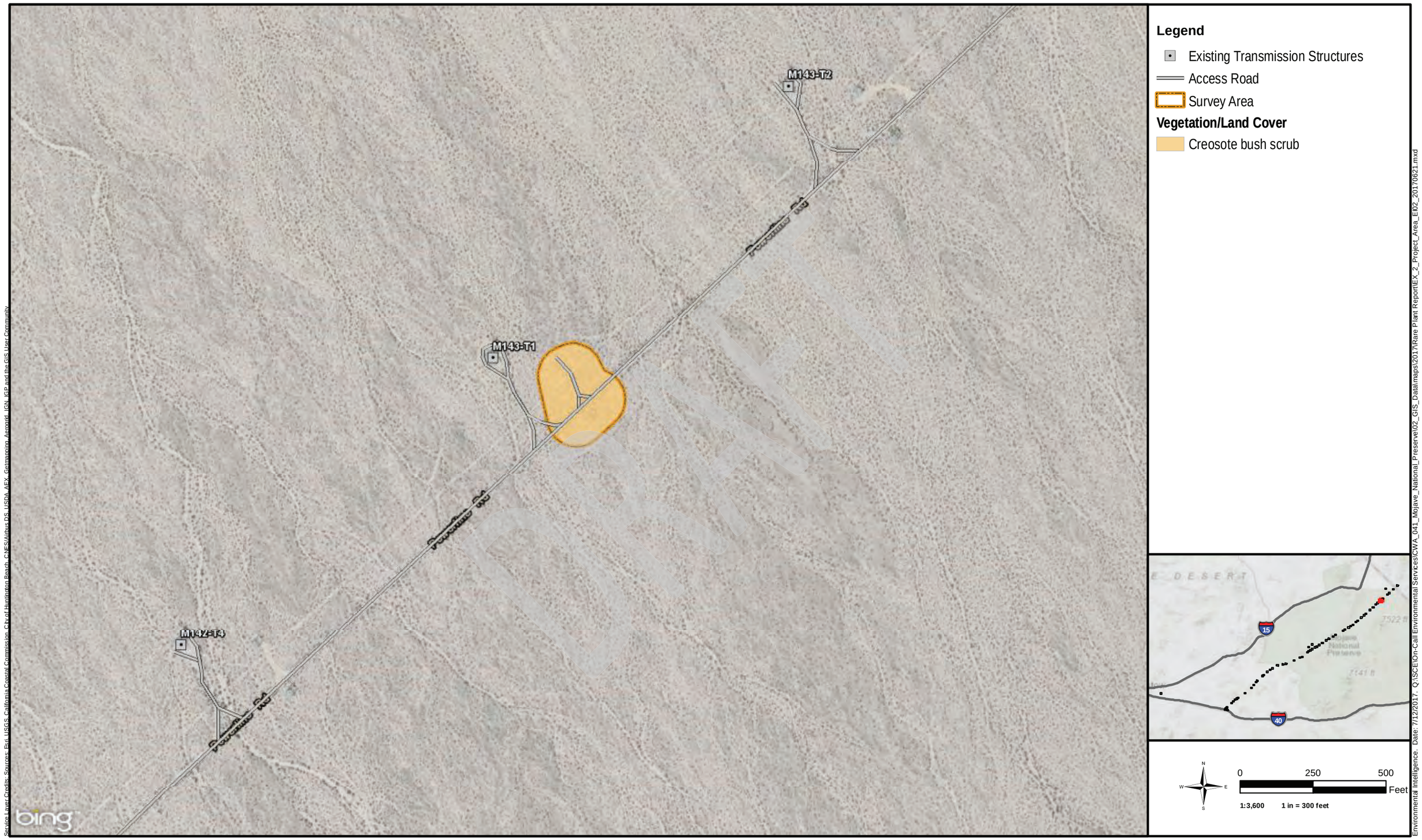
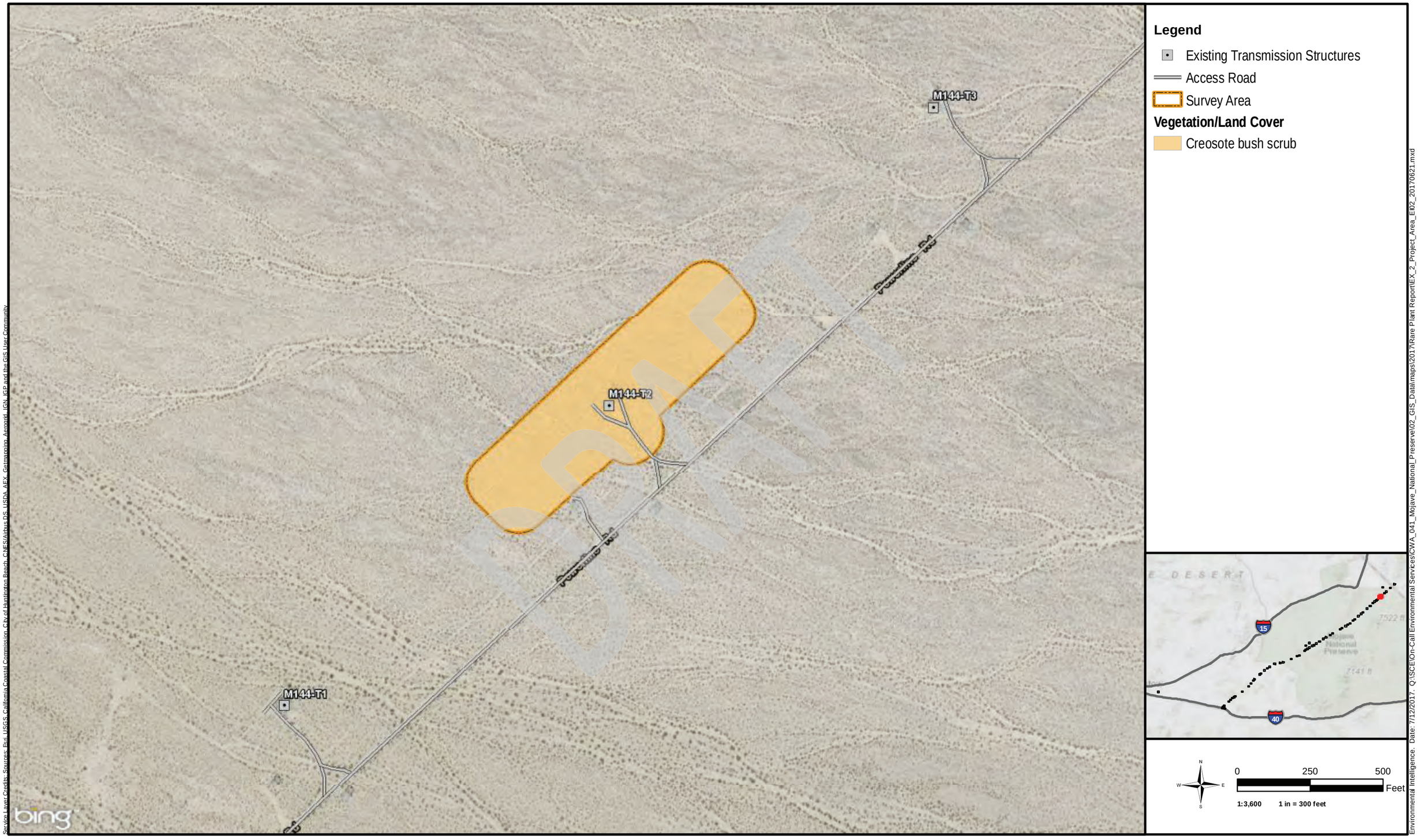


Exhibit 2. Project Area (Page 55 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV


M144-T3
M144-T2
M144-T1
Legend
Existing Transmission Structures
Access Road
Survey Area
Vegetation/Land Cover
Creosote bush scrub
DRAFT
bing
0
250
500
Feet
1:3,600
1 in = 300 feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

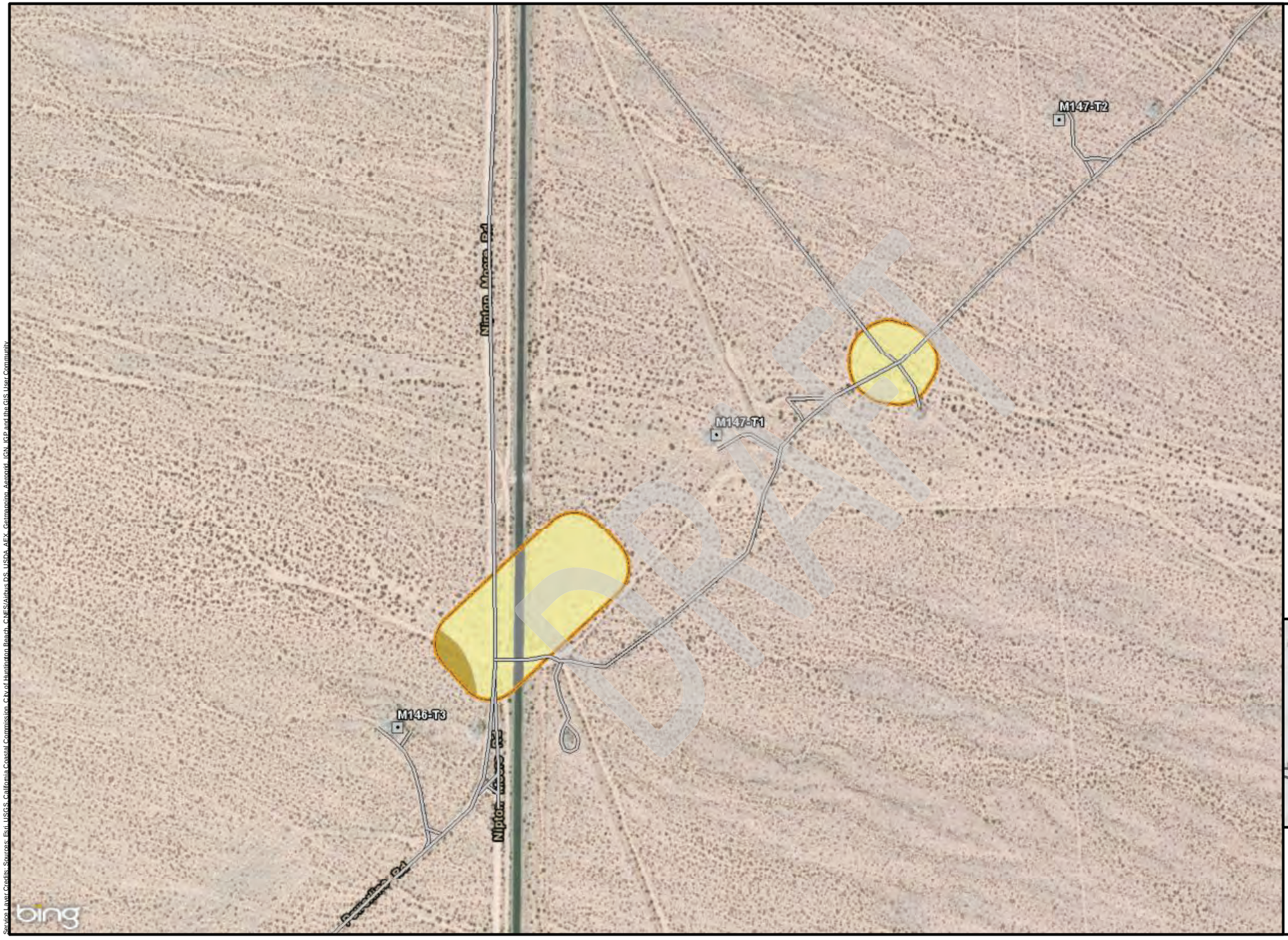


Exhibit 2. Project Area (Page 57 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush - white bursage scrub

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 58 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Transmission Structures
- Access Road
- Survey Area

Vegetation/Land Cover

- Creosote bush scrub

N
W E
S

0 250 500 Feet

1:3,600 1 in = 300 feet

Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

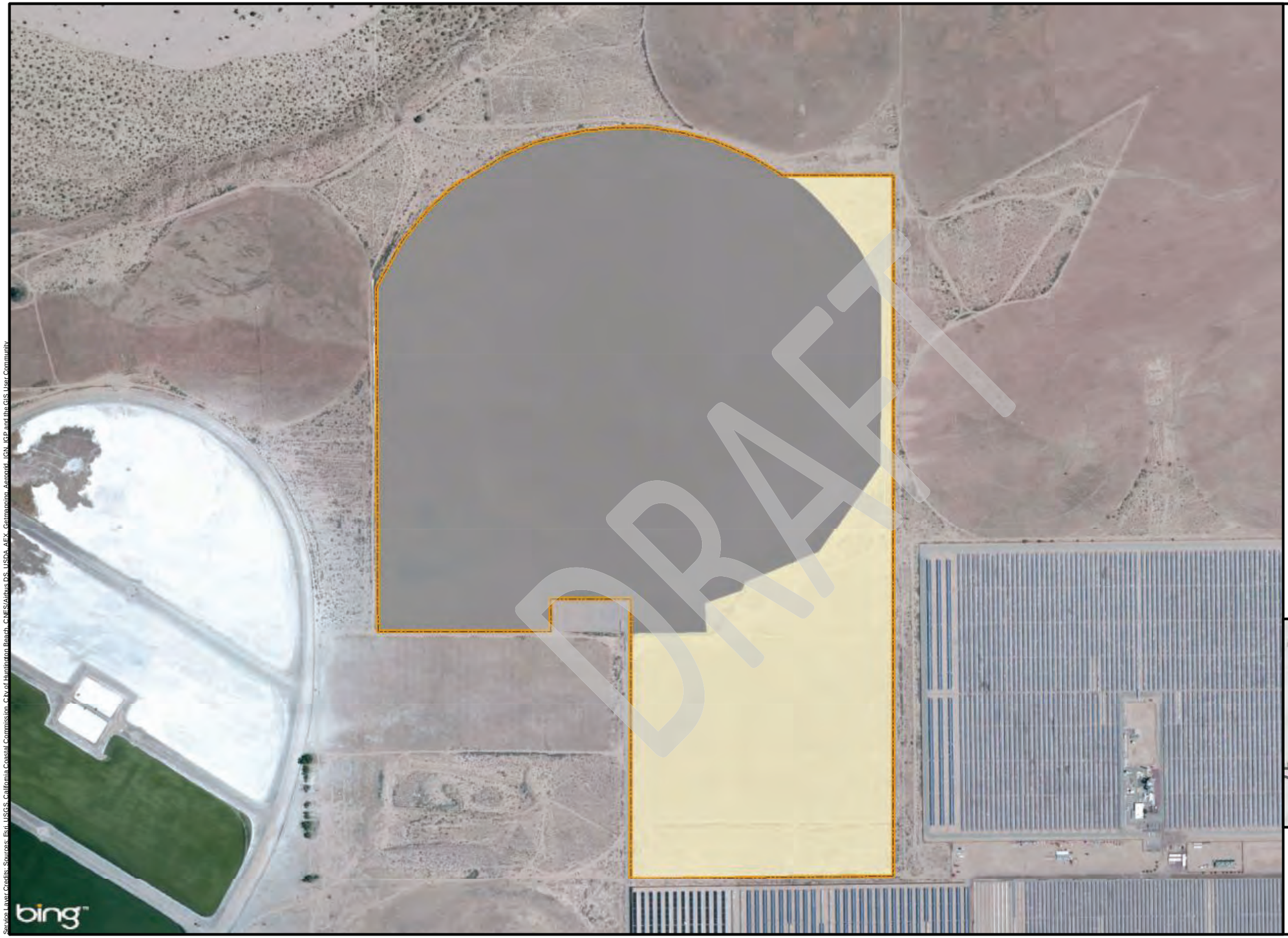
Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E02_20170621.mxd

Exhibit 2. Project Area (Page 59 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Exhibit 2. Project Area (Page 60 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 61 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Access Road
- Survey Area

Vegetation/Land Cover

- Developed

N
W
E
S

0 250 500 Feet

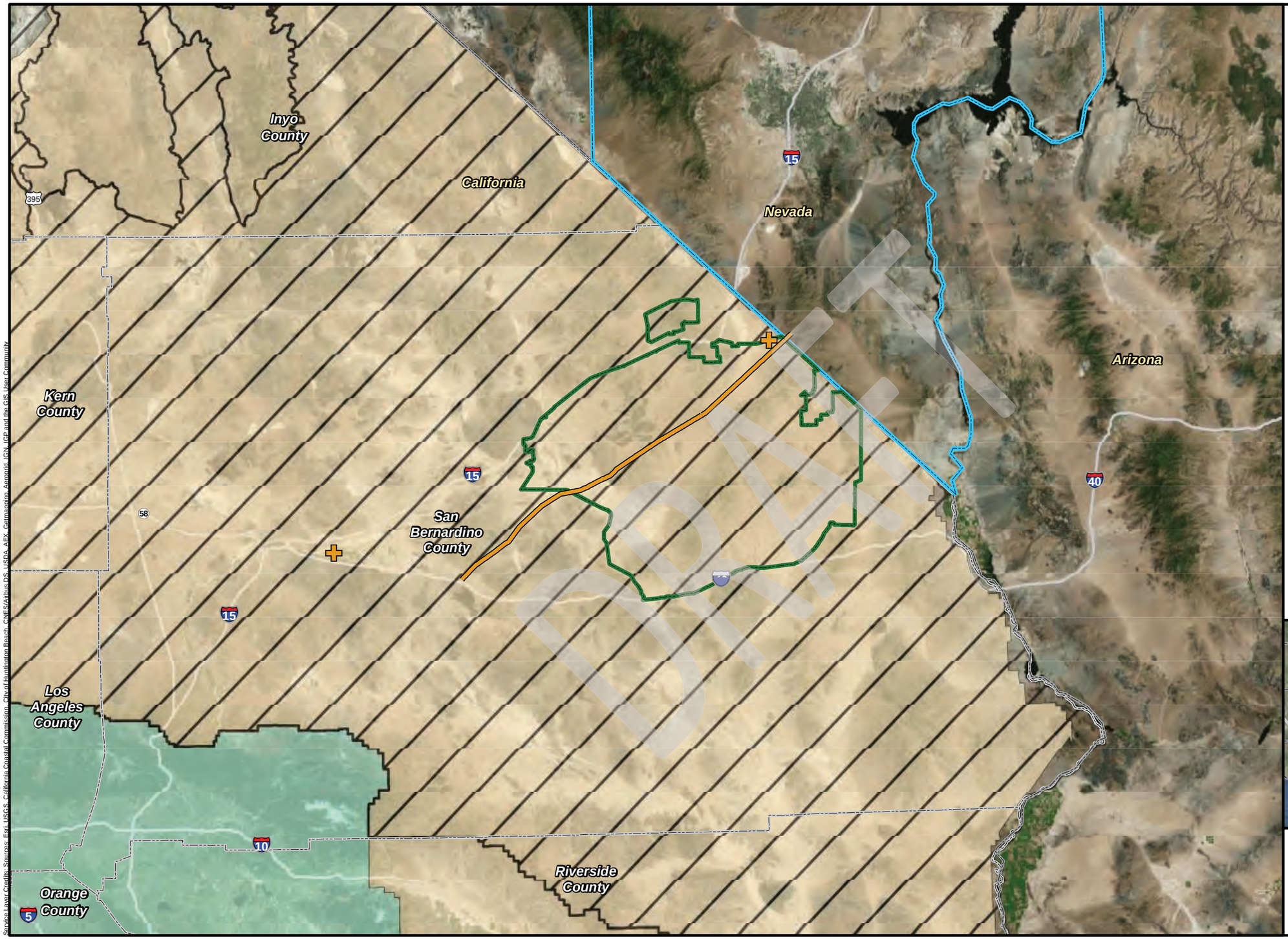
1:3,600 1 in = 300 feet

Source Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_2_Project_Area_E\02_20170621.mxd

Exhibit 2. Project Area (Page 62 of 62)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Laydown Yard
- Project Alignment
- Mojave National Preserve

Resource Management Plans

- California Desert Conservation Area
- Desert Renewable Energy Conservation Plan
- South Coast RMP
- Clark County MSHCP Boundary

N W E S

0 10 20 Miles

1:1,250,000 1 in = 20 miles

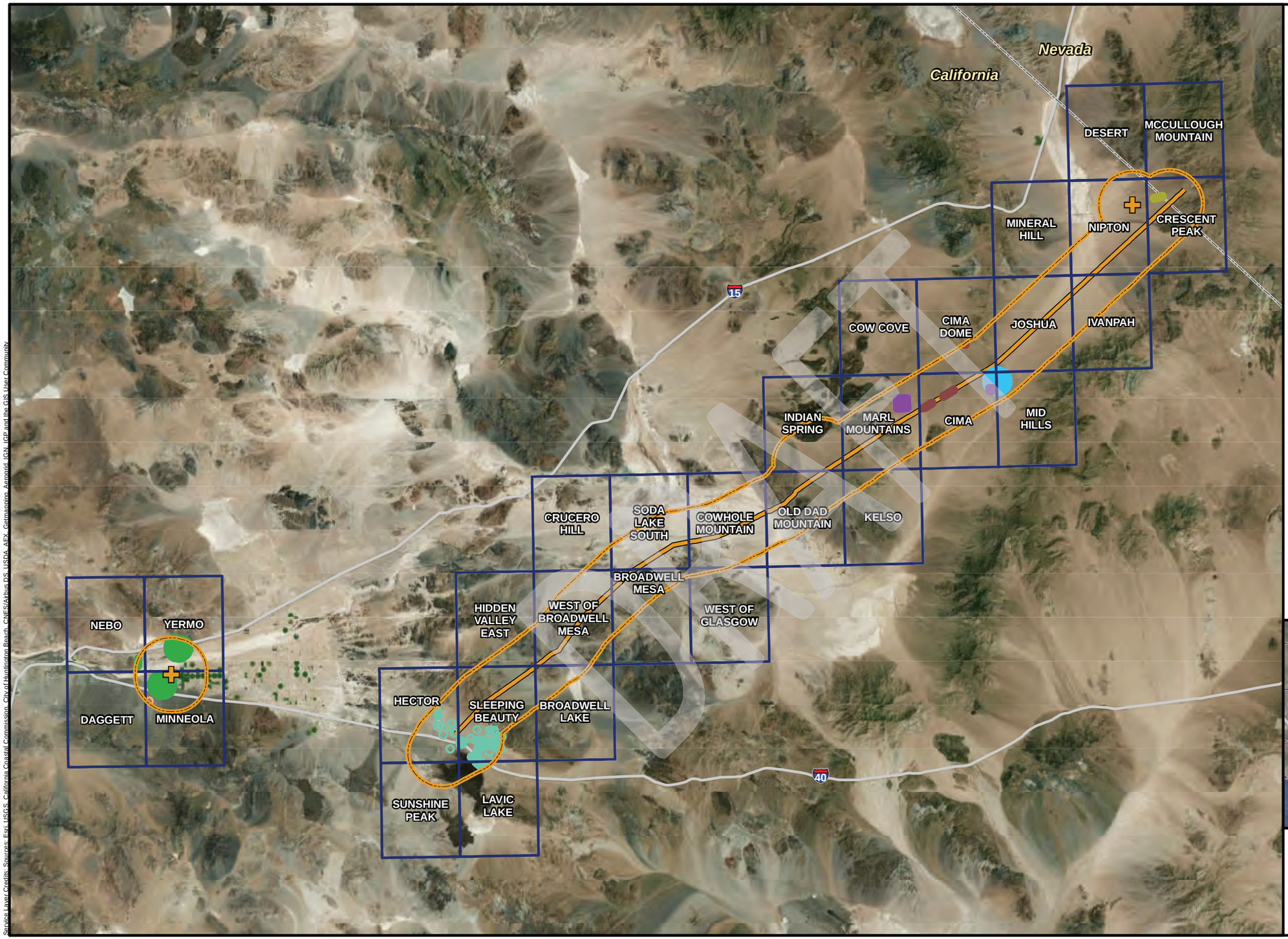
DRAFT

Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Datalmaps\2017\Rare Plant Report\EX_3_Land_Use_EI02_20170706.mxd

Exhibit 3. Land Use

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Laydown Yard
- Project Alignment
- 3-Mile Buffer
- USGS Quad Index

CNDDB Records

- Beaver Dam breadroot
- Cima milk-vetch
- Harwood's eriastrum
- Mojave monkeyflower
- Rusby's desert-mallow
- San Bernardino milk-vetch
- white-margined beardtongue

N
W E
S

0 4.5 9
Miles

1:565,000 1 in = 9 miles

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_4_Literature_Review_EI02_20170706.mxd

Exhibit 4. Literature Review

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Structures
- Project Alignment
- Survey Area
- Crucifixion Thorn
- Crucifixion Thorn

N
W E
S

0 250 500
Feet

1:6,000 1 in = 500 feet

Sources: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 1 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Structures
- Project Alignment
- Survey Area
- Crucifixion Thorn

N
W E
S

0 250 500
Feet

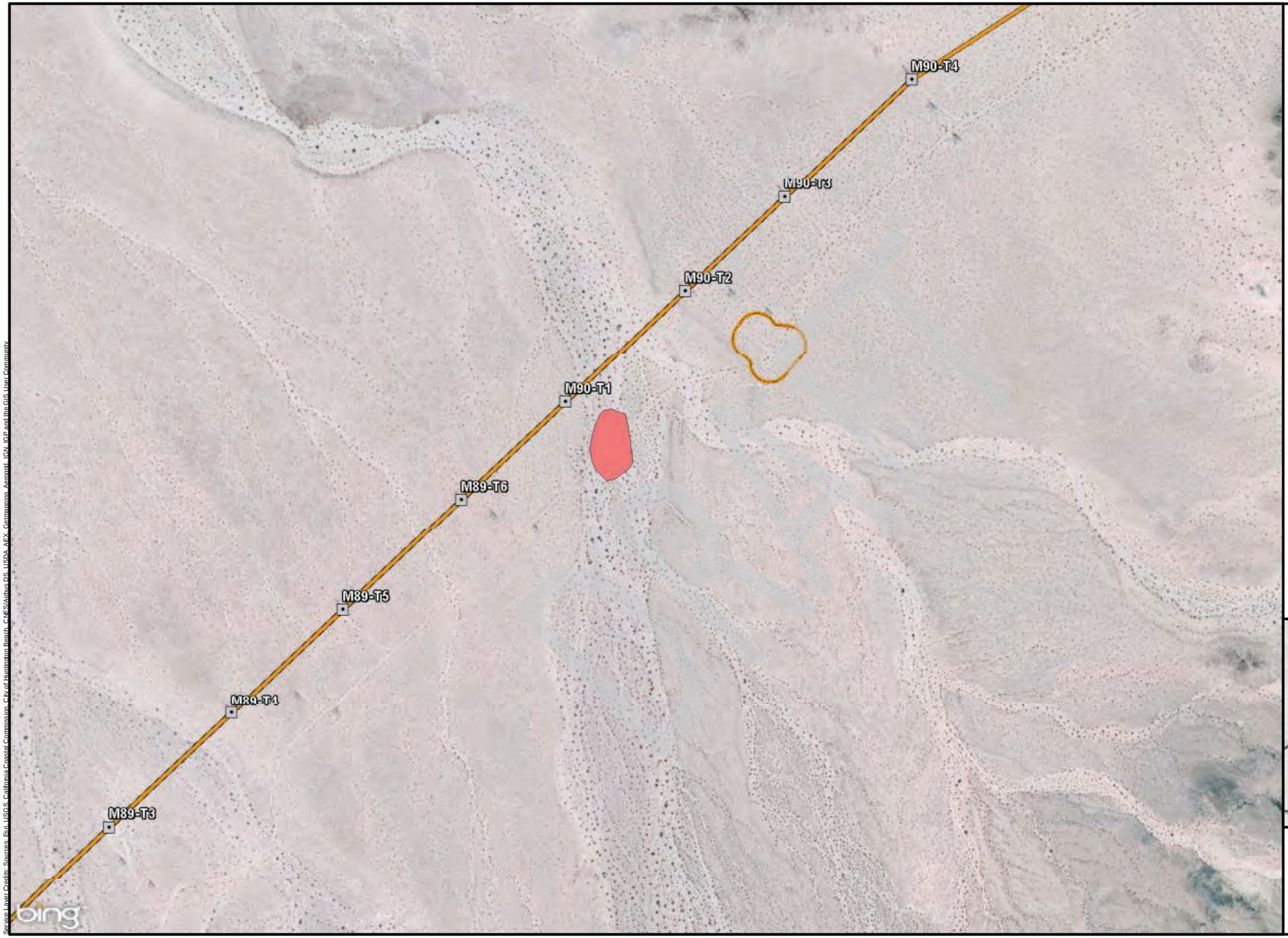
1:6,000 1 in = 500 feet

Service Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, GNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 2 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV



Legend

- Existing Structures
- Project Alignment
- Survey Area
- Crucifixion Thorn

N
W
E
S

0 250 500 Feet

1:6,000 1 in = 500 feet

Service Layer Credits: Source: Esri, USGS, California Coastal Commission, City of Huntington Beach, GNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call\Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 3 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Structures
- Project Alignment
- Survey Area
- Crucifixion Thorn

N
W E
S

0 250 500
Feet

1:6,000 1 in = 500 feet

Service Layer Credits: Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 4 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

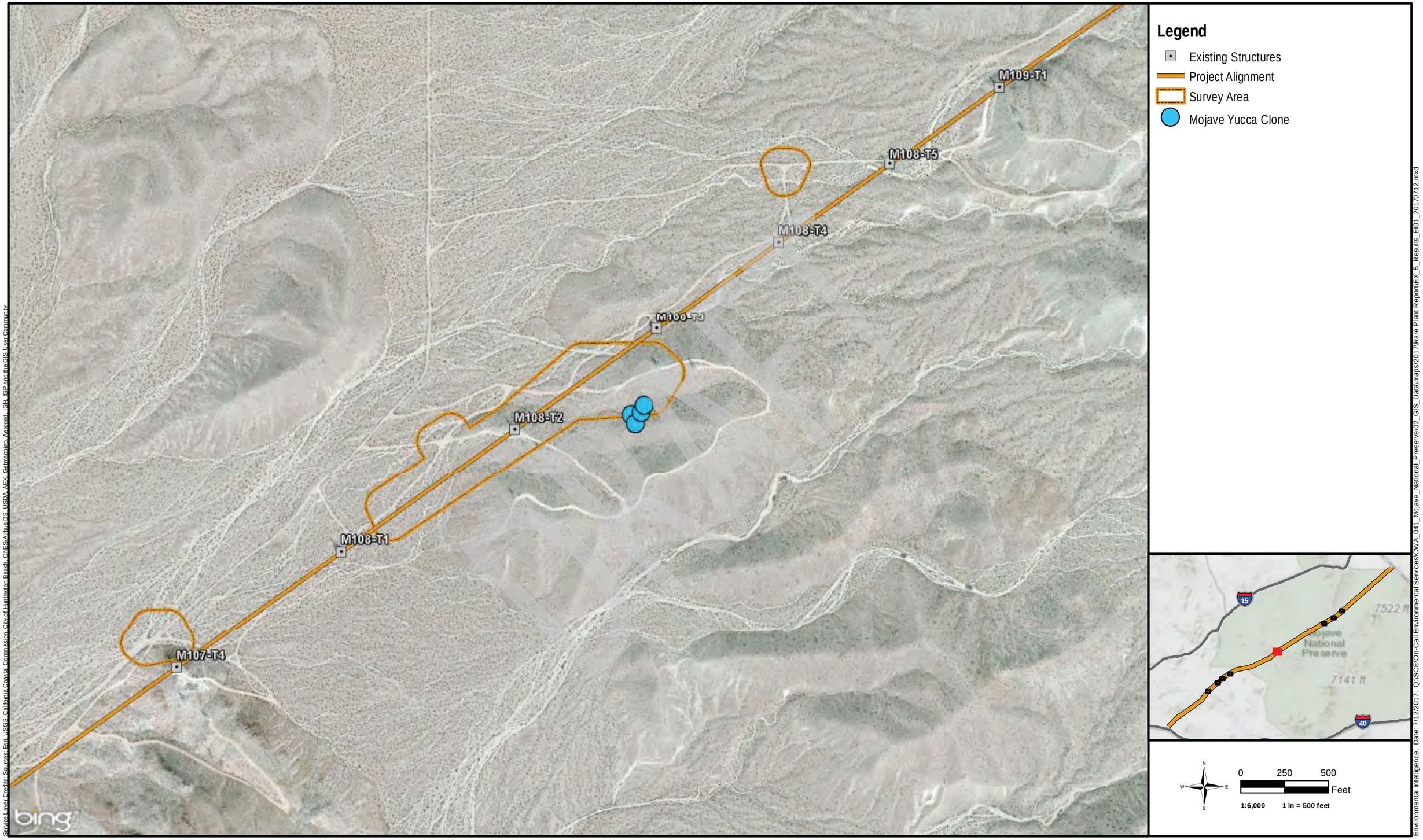


Exhibit 5. Botanical Survey Results (Page 5 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

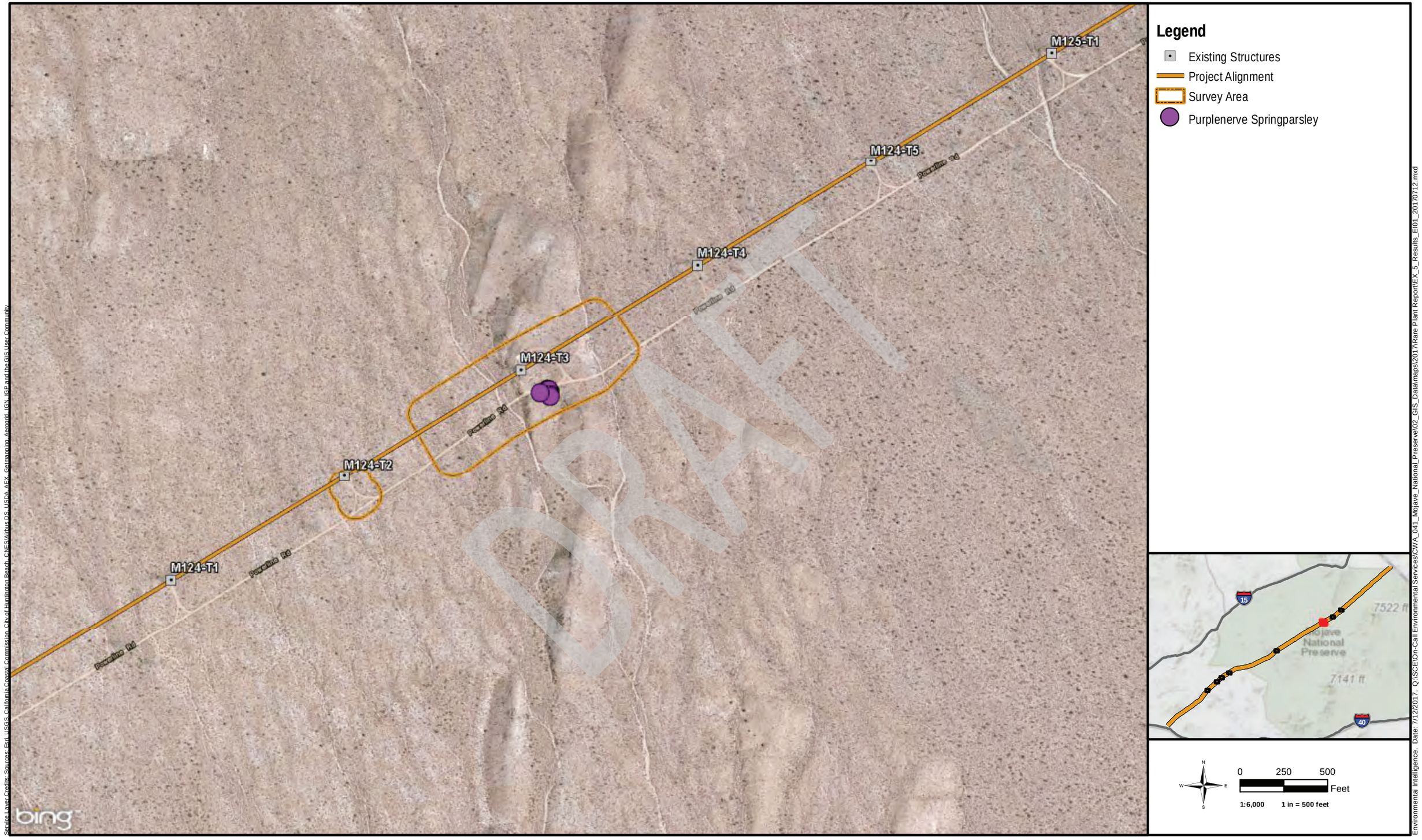


Exhibit 5. Botanical Survey Results (Page 6 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Legend

- Existing Structures
- Project Alignment
- Survey Area
- Matted cholla

N
W E
S

0 250 500
Feet

1:6,000 1 in = 500 feet

Sources: Esri, USGS, California Coastal Commission, City of Huntington Beach, CA FSA, Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 7 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Environmental Intelligence. Date: 7/12/2017. Q:\SCE\On-Call Environmental Services\CWA_041_Mojave_National_Preserve\02_GIS_Data\maps\2017\Rare Plant Report\EX_5_Results_EI01_20170712.mxd

Exhibit 5. Botanical Survey Results (Page 8 of 8)

LVRAS Project | San Bernardino County, CA and Clark County, NV

APPENDIX A:

SPECIAL-STATUS BIOLOGICAL RESOURCES OCCURRING OR POTENTIALLY OCCURRING ON OR IN THE VICINITY (WITHIN 9 SURROUNDING USGS TOPO QUADS) OF THE LVRAS PROJECT

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
SENSITIVE VEGETATION COMMUNITIES					
Chilopsis linearis (Desert willow woodland) Alliance	–	S3	–	Desert willow is dominant or co-dominant in the tree or tall shrub canopy, with desert ironwood (*Olneya tesota*), honey mesquite (*Prosopis glandulosa*), smoke tree (*Psorothamnus spinosus*) and Joshua tree (*Yucca brevifolia*). Shrubs may include cheese bush (*Ambrosia salsola*), cattle saltbush (*Atriplex polycarpa*), sweetbush (*Bebbia juncea*), buck horn cholla (*Cylindropuntia acanthocarpa*), encelia (*Encelia virginensis*), California jointfir (*Ephedra californica*), and California buckwheat (*Eriogonum fasciculatum*). Habitats include washes, intermittent channels, canyon bottoms, arroyos, along floodplains, and wash terraces, where flooding is infrequent. Soils are typically well-drained sands and gravels that are moderately acidic to slightly alkaline. Elevation ranges from 100-1,200m. **Occurs**. Present in a canyon wash at the base of Old Dad Mountain.	May-Jun

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Pleuraphis rigida (Big galleta shrub-steppe) Alliance	–	S2	–	Big galleta is dominant or co-dominant in the herbaceous and sub-shrub layers with Indian rice grass, black grama (*Bouteloua eriopoda*), foxtail brome (*Bromus madritensis* spp. *rubens*), downy dalea (*Dalea mollissima*), and matchweed (*Gutierrezia sarothrae*). Emergent trees and shrubs may be present at low cover, including catclaw, white bursage (*Ambrosia dumosa*), cheese bush, shadescale (*Atriplex canescens*), and creosote bush (*Larrea tridentata*). Habitats include flat ridges, lower bajadas, slopes, dune aprons, and stabilized dunes. Soils are typically clayey, sandy, or rocky. Elevation ranges from 500-1,400m. **Occurs**. Present on dune aprons near Towers M91-T3, M91-T4, and M101-T5.	Year-round
Psorothamnus spinosus (Smoke tree woodland) Alliance	–	S3	–	Smoke tree is dominant or co-dominant in the tree or tall shrub canopy with desert willow, desert ironwood, and blue palo verde (*Parkinsonia florida*). Shrubs may include catclaw, cheesebush, Emory's baccharis (*Baccharis emoryi*), sweetbush, brittlebush, California jointfir, desert lavender (*Hyptis emoryi*), creosote bush, and Parish's wire lettuce (*Stephanomeria pauciflora*). Habitats include arroyos, intermittently flooded channels and washes. Soils are typically sandy and well drained, moderately acidic or slightly saline. Elevation ranges from sea level-1,000m. **Occurs**. Present within wash near Tower M88-T2. Associated with Crucifixion thorn (*Castela emoryi*).	Jun-Jul

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Yucca brevifolia (Joshua tree woodland) Alliance	–	S3	–	Dominant plant species in this alluvial vegetation community include white bursage, cheese bush, big sagebush (*Artemisia tridentata*), yellow rabbitbush (*Chrysothamnus viscidiflorus*), blackbrush (*Coleogyne ramosissima*), buck-horn cholla (*Cylindropuntia acanthocarpa*), Nevada ephedra, and California Buckwheat. The canopy may be open to intermittent, and the herbaceous layer is open to intermittent with perennial grasses and seasonal annuals. Stands occur on alluvial fans and ridges with gentle to moderate slopes. Soils are often coarse sands, very fine silts, gravel, or sandy loams. Elevation ranges from 750-1,800m. **Occurs**. Present on alluvial fans and moderate slopes at 27 discrete locations between Towers M110 through M134.	May-Jun
PLANTS					
Aloysia wrightii Wright's beebrush	–	–	4.3	A perennial evergreen shrub that occurs in rocky, often carbonate, areas of Joshua tree woodland and pinyon and juniper woodland. 900-1,600m. **Unlikely**. On-site suitable habitat includes Joshua tree woodlands from Tower M109-T4 to M134-T4. Collected on the alignment in 2010 (André 14918) just south of Nipton Rd and approximately 1,400 feet from the nearest Project survey area. Likely to occur along the alignment near the California/Nevada border, but unlikely to occur within the Project survey area due to closest record being 1,400 feet away.	Apr-Oct

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Androstephium breviflorum Small-Flowered Androstephium	–	–	2B.2	Occurs in the vicinity of Pisgah Crater, Cronese Valley, Rice Valley, and at scattered sites along the California/Nevada border. A perennial herb found in desert dunes and creosote bush scrub, with sandy to rocky soil. 100-1,600m. **Absent**. Several recent collections were made from within 100 feet of the southern Project survey area, near Pisgah Substation, and northeastward along Powerline Rd. towards the Cady Mountains. Collected in 2008 at Dunn, 2 miles southwest of the proposed material yard along Highway 15 on Afton Rd. (Honer 2813). Plant observed at reference site but absent within Project survey area during 2017 botanical surveys.	Mar-Apr
Astragalus bernardinus San Bernardino Milk-Vetch	–	–	1B.2	Occurs on the desert slope of the San Bernardino Mountains, the Little San Bernardino Mountains, and in the eastern Mojave National Preserve, especially in the vicinity of Cima. A perennial herb found in stony areas among desert shrubs in Joshua tree and pinyon-juniper woodlands. 900-2,300. **Does not occur**. Suitable habitat occurs outside project alignment in the hills south of Cima. No recent collections in the area and exact location of historical records are unknown.	Apr-Jun

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Astragalus cimae var. *cimae* Cima Milk-Vetch	–	–	1B.2	Occurs in Mid Hills and the New York Mountains in the eastern Mojave National Preserve. Perennial herb in Great Basin scrub, Joshua tree woodland, and pinyon-juniper woodlands. 1,250-1,850m. **Does not occur**. Species restricted to higher elevations and habitat not found along project alignment. The type locality, given as "Cima," is likely an imprecise attribution. The species is probably absent from Joshua tree woodland within the project boundaries near Cima, as numerous records suggest the species is locally restricted to the desert mountain ranges south of the Project boundary.	Apr-May
Astragalus lentiginosus var. *borreganus* Borrego milk-vetch	–	–	4.3	An annual herb that occurs in sandy areas of Mojavean and Sonoran desert scrub. 30-895m. **Unlikely**. Suitable habitat in Devil's Playground in vicinity of Old Dad Mountain; Cima Dome. Recorded by CCH over 25 years ago and 1.9 miles from Project survey area and east of Pisgah Rd. (Wolf 8542).	Feb-May
Berberis fremontii Fremont Barberry	–	–	2B.3	Occurs in the New York Mountains, Mid Hills, and Granite Mountains, and the desert slope of the San Bernardino Mountains. A perennial evergreen shrub found in rocky and sometimes granitic habitats in chaparral, pinyon-juniper woodlands, and Joshua tree woodlands. 900-1,850m. **Does not occur**. Suitable habitat not present.	Apr-Jun

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Bouteloua trifida Three-Awned Grama	–	–	2B.3	Occurs in mountain ranges of the eastern Mojave Desert. A perennial grass found in dry, rocky areas, on calcareous soils. 200-1,600m. **Does not occur**. Suitable habitat not present.	May-Sep
Castela emoryi Emory's Crucifixion-Thorn	–	–	2B.2	Occurs throughout much of the Mojave Desert, although apparently not documented within the Mojave National Preserve. A perennial deciduous shrub found in dry, gravelly washes, low-grade alluvial slopes, and on playas in Mojavean and Sonoran creosote bush scrub. 30-1350m. **Occurs**. Species observed during 2017 botanical surveys on low-grade alluvial slopes within Project survey area at 5 discrete locations along the southwestern portion of the Project alignment. Associated with creosote bush scrub.	Jun-Jul
Chamaesyce parryi Parry's Spurge	–	–	2B.3	An annual herb that occurs in sandy areas of desert dunes and Mojavean desert scrub. 395-730m. **Unlikely**. Suitable habitat was found on-site at locations with desert scrub. Collected in Devil's Playground (La Cass 186) in 1980, 2 miles SE of alignment. Unlikely to occur based on age and distance of record.	May-Nov

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Cryptantha costata Ribbed Cryptantha	–	–	4.3	An annual herb found in sandy habitats in desert dunes, Mojavean desert scrub, and Sonoran desert scrub. 60-500m. **Unlikely**. Collected on sandy alkali east of Crucero, about 2 miles northwest of the project boundary, in 2011 (André and Fulton 16304). Similar habitat associated with Kelso Wash occurs along the alignment just north of the railroad tracks. Unlikely to occur based on distance of records.	Feb-May
Cryptantha holoptera Winged Cryptantha	–	–	4.3	Occurs widely in within the Desert Floristic Province of California. An annual herb found in Mojavean desert scrub and Sonoran desert scrub. 100-1,690m. **Unlikely**. Collected in the vicinity of Old Dad Mountain 2.2 miles from the Project boundary in 1993 and 1980. Several recent collections near Baker. Habitat in the region is virtually unchanged. The species is doubtless under-collected, widely distributed, and has some potential to occur throughout the Project. Unlikely to occur based on distance of records.	Mar-Apr

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Cymopterus multinervatus Purple-Nerve Cymopterus	–	–	2B.2	Occurs in mountain ranges of Eastern Mojave Desert, and on the desert slope of the San Bernardino Mountains. A perennial herb found on rocky, gravelly and sandy slopes in Joshua tree woodland and pinyon-juniper woodland. 630-1,800m. **Occurs**. Species observed during 2017 botanical surveys on sandy-decomposed limestone soil within Project survey area near Tower M124-T3. Associated with Joshua tree and creosote bush habitat.	Mar-Apr
Cynanchum utahense Utah Vine Milkweed	–	–	4.2	A perennial herb found in sandy or gravelly habitats of Mojavean desert scrub and Sonoran desert scrub. 100-1,435m. **Absent**. Recent collections have been made within Project alignment and within 300-600 feet of the Project boundaries in the vicinity of Pisgah, the Cady Mountains, and in Ivanpah Valley. Plant observed at reference site but absent within Project survey area during 2017 botanical surveys.	Mar-Oct

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Eremothera boothii ssp. *boothii* Booth's Evening-Primrose	–	–	2B.3	Occurrences scattered throughout the Mojave Desert. An annual herb found on sandy flats, steep loose slopes, and low volcanic slopes in Joshua tree and pinyon-juniper woodlands. 900-2,400m. **Does not occur**. Collected recently several times in the Cima Cinder Cone Lava Beds less than 4 miles northwest of the project boundary. Volcanic soils are located south of and outside the project areas within the Marl Mountains.	Jun-Aug
Eriastrum harwoodii Harwood's Eriastrum	–	–	1B.2	Occurs widely in the Eastern Mojave Desert. An annual found on sandy desert dunes and in creosote bush scrub. <1,000m. **Unlikely**. Collected at Crucero Hill about 4 miles northwest of the Project boundary in 2008 (Gowen 813). Annual Eriastrum indeterminable to species were encountered throughout the Project during recent surveys.	Mar-Jun
Erioneuron pilosum Hairy Erioneuron	–	–	2B.3	Occurs in the desert mountain ranges of the Eastern Mojave. A perennial grass found on rocky and sometimes carbonate slopes and ridges in pinyon-juniper woodlands. 1,280-2,000m. **Does not occur**. Suitable habitat not present. Recorded only from desert mountain ranges of the Eastern Mojave.	May-Jun

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Grusonia parishii Matted Cholla	–	–	2B.2	Occurs in the Hackberry, Clark, Castle, Little San Bernardino and Ivanpah Mountains, Landfair Valley and Joshua Tree National Park. A perennial stem succulent found on sandy, gravelly flats, generally in creosote bush/bur scrub and Joshua tree woodlands. 300-1,200m. **Occurs**. Observed along the alignment during surveys, about 3.6 miles southwest of Cima Rd.	May-Jun
Menodora scabra var. *scabra* Rough Menodora	–	–	2B.3	Occurs in the Castle, Mid Hills, and New York Mountain Ranges, and on Cerro Pinon. Found in rocky or sandy soils in Joshua tree woodland, Mojavean desert scrub and pinyon-juniper woodlands. 1,000-1,800m. **Does not occur**. Based on known distributions, material of *Menodora scabra* within the Project boundaries would be expected to be attributable to var. *glabrescens*.	May-Jun
Mentzelia puberula Darlington's Blazing Star	–	–	2B.2	Widely distributed in the Eastern Mojave Desert. A perennial herb found in sandy crevices of cliffs or on rocky slopes in Mojavean and Sonoran desert scrub. 90-1,280m. **Unlikely**. One historic (1980) collection from Old Dad Mountain. Suitable habitat observed in Jackass Canyon near Old Dad Mountain during surveys. Fruiting specimens of *Mentzelia* attributable to the same species group (otherwise indeterminable) were observed along the alignment just south of Jackass Canyon.	Mar-May

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Mirabilis coccinea Red Four O'clock	–	–	2B.3	Distributed throughout Fourth of July Canyon, Keystone Canyon and Bathtub Spring in New York Mountains. Occurs also in Castle Peak, Mid Hills, and Ivanpah Mountain Ranges. A perennial herb found on dry, rocky slopes and in washes in Joshua tree woodland and pinyon-juniper woodland. 1,300-1,800m. **Does not occur**. Typically observed in mountainous Joshua tree woodland The project is located too distant from the Ivanpah/New York Mountains where habitat is present.	May-Jul
Muilla coronata Crowned Muilla	–	–	4.2	Widespread in the Mojave Desert. A perennial bulbiferous herb found in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon-juniper woodland. 670-1,960m. **Unlikely**. Appropriate habitat is intermittent throughout within the Project. Collected along highway 15 at Dunn, two miles southeast of the proposed material yard on Afton Rd.	Mar-May

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Munroa squarrosa False Buffalo-Grass	–	–	2B.2	Occurs on toe slopes of desert ranges in the Eastern Mojave Desert. An annual grass found on open, silty or gravelly flats, and sandy, gravelly or rocky areas in Joshua tree woodland, and sometimes in pinyon-juniper woodland. 1,300-1,700m. **Does not occur**. Suitable habitat may occur near Cima and near the California/Nevada border. However, the nearest collection is from seven miles north of the Project boundary in the Ivanpah Mountains.	Oct
Nemacaulis denudata var. *gracilis* Slender Cottonheads	–	–	2B.2	Occurs in coastal Southern California, Colorado Desert, and at scattered sites in the Eastern Mojave Desert. An annual herb in sandy habitats, including dunes and coastal strand. 10-500m. **Does not occur**. Suitable habitat occurs in the Devil's Playground, but the nearest known occurrence is at Kelso, about 15 miles southeast of the project.	Apr-May

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Opuntia curvispina Curved-Spine Beavertail	–	–	2B.2	Occurs near the California/Nevada state line between Nipton, CA and Searchlight, NV. Reported for the vicinity of Cima in Mojave National Preserve. A perennial stem succulent found in chaparral, Mojavean desert scrub and pinyon-juniper woodlands. 1,000-1,400m. Species is a taxonomically recognized tetraploid hybrid resulting from *Opuntia chlorotica* and *Opuntia phaecantha*. **Does not occur**. Presumably known in California from only historic collections.	Apr-Jun
Pediomelum castoreum Beaver dam breadroot	-	-	1B.2	A perennial herb that occurs in creosote bush scrub and Joshua tree woodland communities. 600 – 950 meters. **Unlikely.** Species preferred habitat is found on-site in creosote bush communities. CNDDB record (1943) 1000 feet from Pisgah laydown yard. Unlikely to occur due to distance and age of historic records.	Apr-May
Pellaea truncata Spiny Cliff-Brake	–	–	2B.3	Occurs in the New York Mountains, Mid Hills Range and the Providence Mountains. A rhizomatous perennial occurring in crevices of granite or igneous rock in pinyon-juniper woodlands. 1,200-1,900m. **Does not occur**. Suitable habitat not present.	Apr-Jun

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Penstemon albomarginatus White-Margined Beardtongue	–	–	1B.1	Distributed mainly throughout the Lavic Lake volcanic field, Cady, Sleeping Beauty and Bullion Mountain Ranges. A perennial herb found in loose desert sand, generally on stabilized dunes with creosote bush scrub. 700-900m. **Likely**. Collected by CNDDB (2005 and 2010) within 500 feet of the Project survey area, on the south end of the alignment, near I-40 and Pisgah. However, the species was not detected during reference site visit to this record. While surveys were conducted during the appropriate blooming season, the lack of observations at the reference population suggests that there is a possibility that the species may be present on-site but not be detectable.	Mar-May
Penstemon pseudospectabilis var. *pseudospectabilis* Desert Beardtongue	–	–	2B.2	Occurs at scattered localities in the Eastern Mojave Desert. A perennial herb often found in sandy washes, and sometimes rocky areas in Mojavean and Sonoran desert scrub. 80-1,935m. **Unlikely**. Collected in the 1998 and in 1980 in the vicinity of Old Dad Mountain, where suitable habitat still exists in the vicinity of Jackass Canyon.	Jan-May

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Phacelia coerulea Sky-Blue Phacelia	–	–	2B.3	Occurs in mountain ranges of the Eastern Mojave Desert, and some adjacent valley. An annual herb found in open, sandy or rocky areas, generally in creosote bush scrub, sometimes also pinyon-juniper woodlands. 1,400-2,000m. **Unlikely**. Collected in creosote bush scrub one mile northwest of the project boundary along Nipton Rd. (André 10231).	Apr-May
Portulaca halimoides Desert portulaca	–	–	4.2	Occurs in the Eastern Mojave Desert. An annual herb found in sandy habitats within Joshua tree woodland. 1,000-1,200m. **Unlikely**. Collected in 2011 along the alignment and 1,000 feet from Project survey area in creosote bush scrub, one mile west of Ivanpah Rd. (André 22338). Suitable habitat is extensive in the eastern portion of the project. Likely to occur along alignment, but unlikely to occur within Project survey area based on distance of record.	Sep
Sibara deserti Desert Winged-Rockcress	–	–	4.3	An annual herb found in Mojavean desert scrub. 345-1,300m. **Unlikely**. Collected within the wash adjacent to the proposed staging area on the north side of Rocky Ridge in 1993 (Hrusa 10662). Collected on a rocky canyon wall at Sheep Spring in the Marl Mountains in 1966, 0.4 miles south of the alignment (Hitchcock 24346).	Mar-Apr

Species Name Potential Sites (based on range)	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	Federal	State	CNPS		
Sphaeralcea rusbyi var. *eremicola* Rusby's Desert-Mallow	–	–	1B.2	Occurs in Panamint, Clark, Ivanpah and Providence Mountain Ranges, Cima Dome in Mojave National Preserve, Lost Horse Valley in Joshua Tree National Park, and Mineral Hills near I-15. A perennial herb found in creosote bush scrub and Joshua tree woodlands. 1,000-1,500m. **Absent**. Collected along the alignment at two locations south of Wildcat Butte and Cima Dome in 1998 (Sanders 21967 and 21963). CNDDB records (1998) occurs within Project survey area along Powerline Road access route. This taxon is sometimes associated with roadside disturbances. Plant observed at reference site but absent within Project survey area during 2017 botanical surveys.	Mar-Jun
Wislizenia refracta ssp. *refracta* Jackass-Clover	–	–	2B.2	Occurs between Barstow and Baker, Cima Cinder Cones, Joshua Tree National Park, and throughout the Twentynine Palms region. An annual herb found in sandy washes, along roadsides on alkaline flats, on dunes, and in creosote bush scrub. Occasionally found in wetlands. 90-1,160m. **Unlikely**. Nearest recent collection is from just southwest of Midway on the north side of Hwy 15, about six miles southeast of the proposed staging yard on Afton Rd. Suitable habitat is present throughout the Project area.	Apr-Nov

LEGEND:

Federal (USFWS)	**State (CDFW)**
FE Endangered	SE Endangered
FT Threatened	ST Threatened
FC Candidate	SR Rare
	SC Candidate

California Native Plant Society (CNPS) List Categories

List 1A	Plants Presumed Extinct in California
List 1B	Plants Rare, Threatened, or Endangered in California and Elsewhere
List 2	Plants Rare, Threatened, or Endangered in California but More Common Elsewhere
List 3	Plants about Which We Need More Information — A Review List
List 4	Plants of Limited Distribution − A Watch List

California Native Plant Society (CNPS) Threat Rank Extensions

.1	Seriously threatened in California (high degree/immediacy of threat)
.2	Fairly threatened in California (moderate degree/immediacy of threat)
.3	Not very threatened in California (low degree/immediacy of threat or no current threats known

Appendix B:

FLORAL COMPENDIA

PLANTS (*introduced/non-native)

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
AGAVACEAE	**AGAVE FAMILY**
Hesperocallis undulata	Desert lily
Yucca baccata	Banana yucca
Yucca brevifolia	Joshua tree
Yucca schidigera	Mohave yucca
AMARANTHACEAE	**AMARANTH FAMILY**
Tidestromia suffruticosa	Honeysweet
ANACARDIACEAE	**SUMAC FAMILY**
Rhus aromatic	Fragrant sumac
APIACEAE	**PARSLEY FAMILY**
Cymopterus multinervatus	**Purplenerve springparsley (CNPS 2B.2)**
Lomatium nevadense	Nevada biscuitroot
APOCYNACEAE	**DOGBANE FAMILY**
Asclepias erosa	Desert milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
Acamptopappus sphaerocephalus	Rayless goldenhead
Adenophyllum cooperi	Cooper's dogweed
Ambrosia acanthicarpa	Annual bur-sage
Ambrosia dumosa	White bursage
Ambrosia eriocentra	Woolly bursage
Ambrosia salsola	Burrobush
Amphipappus fremontii var. fremontii	Femont's chaff bush
Amphipappus fremontii var. spinosus	Spiny fremont's chaffbush
Atrichoseris platyphylla	Parachute flower
Baccharis brachyphylla	Short leaved baccharis
Baileya multiradiata	Desert marigold
Baileya pauciradiata	Lax flower
Baileya pleniradiata	Woolly desert marigold
Bebbia juncea	Sweetbush
Brickellia californica	California brickellbush
Brickellia incana	Woolly brickellbush
Chaenactis carphoclinia	Pebble pincushion
Chaenactis fremontii	Fremont pincushion
Chaenactis stevioides	Desert pincushion
Chaetopappa ericoides	Rose heath
Dicoria canescens	Desert twinbugs
Dieteria canescens var. *leucanthemifolia*	Hoary aster
Encelia actoni	Acton encelia
Encelia farinosa	Brittlebush
Encelia frutescens	Button brittlebush
Encelia virginensis	Virgin river brittlebush
Ericameria cooperi	Cooper's goldenbush

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
Ericameria laricifolia	Turpentine bush
Ericameria linariifolia	Interior goldenbush
Ericameria paniculata	Mojave rabbitbrush
Eriophyllum wallacei	Wallace's woolly daisy
Geraea canescens	Hairy desert sunflower
Gutierrezia microcephala	Sticky snakeweed
**Lactuca serriola*	*Prickly lettuce
Layia glandulosa	Whitedaisy tidytips
Lepidospartum squamatum	Scalebroom
Leucosyris arida	Silver lake daisy
Logfia depressa	Dwarf cottonrose
Malacothrix coulteri	Snake's head
Malacothrix glabrata	Desert dandelion
Monoptilon bellidiforme	Small desert star
Monoptilon bellioides	Mojave desert star
Palafoxia arida	Desert palafox
Palafoxia arida var. *arida*	Desert needle
Perityle emoryi	Emory's rockdaisy
Pleurocoronis pluriseta	Bush arrowleaf
Porophyllum gracile	Slender poreleaf
Psilostrophe cooperi	Cooper's paper daisy
Rafinesquia neomexicana	Desert chicory
Senecio flaccidus var. *monoensis*	Mono ragwort
Stephanomeria pauciflora	Desert straw
Stephanomeria exigua	Small wirelettuce
Stylocline micropoides	Desert nest straw
Tetradymia stenolepis	Mojave cottonthorn
Trichoptilium incisum	Yellowhead
Uropappus lindleyi	Silver puffs
Xylorhiza tortifolia	Mojave aster
Xylorhiza tortifolia var. *tortifolia*	Mojave woodyaster
BIGNONIACEAE	**MINT FAMILY**
Chilopsis linearis ssp. *arcuata*	Desert willow
BORAGINACEAE	**BORAGE FAMILY**
Amsinckia intermedia	Common fiddleneck
Amsinckia tessellata	Devil's lettuce
Cryptantha angustifolia	Narrow leaved forget-me-not
Cryptantha circumscissa	Western forget-me-not
Cryptantha dumetorum	Bushloving cryptantha
Cryptantha maritima	White haired forget-me-not
Cryptantha micrantha	Purple rooted forget-me-not
Cryptantha nevadensis	Nevada forget-me-not
Cryptantha pterocarya	Winged-nut forget-me-not
Eucrypta micrantha	Desert eucrypta
Heliotropium convolvulaceum	Phlox heliotrope
Nama demissum	Purplemat
Pectocarya heterocarpa	Chuckwalla combseed

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
Pectocarya linearis ssp. *ferocula*	Sagebrush combseed
Pectocarya penicillata	Winged combseed
Pectocarya platycarpa	Broadfruit combseed
Pectocarya recurvata	Curvenut combseed
Pectocarya setosa	Moth combseed
Phacelia crenulata	Notch leaved phacelia
Phacelia crenulate var. *ambigua*	Heliotrope phacelia
Phacelia distans	Common phacelia
Phacelia fremontii	Fremont's phacelia
Plagiobothrys arizonicus	Arizona popcorn flower
Plagiobothrys jonesii	Jones' popcorn flower
Tiquilia plicata	Fanleaf crinklemat
BRASSICACEAE	**MUSTARD FAMILY**
Boechera glaucovalvula	Bluepod rockcress
**Brassica tournefortii*	*Saharan mustard
Descurainia pinnata	Western tansymustard
**Hirschfeldia incana*	*Mediterranean hoary mustard
Lepidium fremontii	Desert peppergrass
Lepidium lasiocarpum	Shaggyfruit pepperweed
Lepidium nitidum	Shining pepperweed
**Sisymbrium altissimum*	*Tubling mustard
**Sisymbrium irio*	*London rocket
CACTACEAE	**CACTUS FAMILY**
Cylindropuntia acanthocarpa	Buck horn cholla
Cylindropuntia echinocarpa	Wiggins' cholla
Cylindropuntia ramosissima	Branched pencil cholla
Echinocactus polycephalus var. *polycephalus*	Cottontop cactus
Echinocereus engelmannii	Calico cactus
Echinocereus mojavensis	Mojave kingcup cactus
Ferocactus cylindraceus	Barrel cactus
Grusonia parishii	**Matted cholla (CNPS 2B.2)**
Mammillaria tetrancistra	Common fishhook cactus
Opuntia basilaris var. *basilaris*	Beavertail cactus
Opuntia chlorotica	Dollarjoint pricklypear
Opuntia phaeacantha	Mojave pricklypear
Opuntia polyacantha var. *erinacea*	Grizzlybear pricklypear
CAMPANULACEAE	**BELLFLOWER FAMILY**
Nemacladus orientalis	Eastern glandular nemacladus
CARYOPHYLLACEAE	**CARNATION FAMILY**
Achyronychia cooperi	Frost mat
Eremogone macradenia var. *macradenia*	Desert sandwort
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Atriplex hymenelytra	Desert holly
Atriplex polycarpa	Allscale saltbush

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
Grayia spinosa	Spiny hopsage
Krascheninnikovia lanata	Winterfat
**Salsola tragus*	*Prickly Russian thistle
CLEOMACEAE	**BEEPLANT FAMILY**
Cleomella obtusifolia	Mojave cleomella
CONVOLVULACEAE	**MORNING GLORY FAMILY**
Cuscuta denticulate	Desert dodder
CUCURBITACEAE	**CUCUMBER FAMILY**
Cucurbita palmata	Coyote melon
CUPRESSACEAE	**CYPRESS FAMILY**
Juniperus osteosperma	Utah juniper
EPHEDRACEAE	**JOINTFIR FAMILY**
Ephedra californica	Desert tea
Ephedra funereal	Death valley ephedra
Ephedra nevadensis	Nevada mormon tea
EUPHORBIACEAE	**SPURGE FAMILY**
Croton californicus	Desert croton
Euphorbia albomarginata	Rattlesnake sandmat
Euphorbia micromera	Sonoran sandmat
Euphorbia parishii	Parish's sandmat
Euphorbia serpyllifolia	Thyme-leafed spurge
Stillingia spinulosa	Broad leaved stillingia
FABACEAE	**PEA FAMILY**
Astragalus didymocarpus	Dwarf white milkvetch
Astragalus layneae	Widow's milkvetch
Astragalus lentiginosus	Freckled milkvetch
Astragalus lentiginosus var. *fremontii*	Fremont's milkvetch
Astragalus mohavensis	Mohave locoweed
Astragalus mohavensis var. *mohavensis*	Mojave milkvetch
Astragalus nuttallianus	Nuttall locoweed
Astragalus sabulonum	**Gravel milkvetch (CNPS 2B.2)**
**Caesalpinia gilliesii*	*Bird of paradise
Dalea mollissima	Silky dalea
Lupinus arizonicus	Arizona lupine
Lupinus bicolor	Bicolored lupine
Lupinus concinnus	Bajada lupine
Lupinus flavoculatus	Yellow-eyed lupine
Lupinus odoratus	Mojave lupine
Lupinus shockleyi	Purple desert lupine
Prosopis glandulosa	Honey mequite
Psorothamnus arborescens	Mojave indigo bush
Psorothamnus fremontii	Fremont's indigo bush

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
Senegalia greggii	Devil's catclaw
Senna armata	Desert senna
GERANIACEAE	**GERANIUM FAMILY**
**Erodium cicutarium*	Red-stemmed filaree
KRAMERIACEAE	**RHATANY FAMILY**
Krameria bicolor	White rhatany
Krameria erecta	Littleleaf ratany
LAMIACEAE	**MINT FAMILY**
Salvia columbariae	Chia sage
Salvia dorrii	Desert sage
Scutellaria mexicana	Mexican bladdersage
LOASACEAE	**LOASA FAMILY**
Eucnide urens	Desert bush nettle
Mentzelia albicaulis	White-stemmed blazingstar
Mentzelia involucrata	Sand blazingstar
Mentzelia veatchiana	Veatch's blazing star
Petalonyx thurberi	Sandpaper plant
MALVACEAE	**MALLOW FAMILY**
Eremalche exilis	White mallow
Eremalche rotundifolia	Desert fivespot
Sphaeralcea ambigua	Desert mallow
MYRTACEAE	**MYRTLE FAMILY**
**Eucalyptus camaldulensis*	*Red river gum
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
Abronia villosa var. *villosa*	Desert sand verbena
Allionia incarnate	Trailing four o'clock
Allionia incarnata var. *villosa*	Trailing windmills
Mirabilis laevis	Desert wishbone bush
Mirabilis laevis var. *retrorsa*	Wishbone bush
Mirabilis laevis var. *villosa*	Wishbone bush
Mirabilis multiflora	Colorado four o'clock
OLEACEAE	**OLIVE FAMILY**
Menodora spinescens	Spiny desert olive
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia campestris	Mojave suncup
Camissonia pallida ssp. *hallii*	Hall's suncup
Chylisima claviformis	Clavate fruited primrose
Chylismia brevipes	Yellow cups
Chylismia claviformis	Clavate fruited primrose
Eremothera boothii	Booth's sun cup

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
Eulobus californicus	California primrose
Oenothera californica	California evening primrose
Oenothera deltoides	Desert latern
Oenothera deltoies ssp. *cognata*	Birdcage evening primrose
OROBANCHACEAE	**BROOMRAPE FAMILY**
Castilleja chromosa	Desert paintbrush
PAPAVERACEAE	**POPPY FAMILY**
Argemone corymbosa	Mohave prickly poppy
Eschscholzia glyptosperma	Desert golden poppy
Eschscholzia minutiflora	Pygmy poppy
PHRYMACEAE	**LOPSEED FAMILY**
Mimulus bigelovii var. *bigelovii*	Bigelow's monkeyflower
PINACEAE	**PINE FAMILY**
**Pinus pinea*	*Italian stone pine
PLANTAGINACEAE	**PLANTAGO FAMILY**
Mohavea breviflora	Golden desert snapdragon
Mohavea confertiflora	Ghost flower
Plantago ovata	Desert plantain
Plantago patagonica	Patagonia plantain
POACEAE	**GRASS FAMILY**
**Bromus madritensis*	*Foxtail brome
Dasyochloa pulchella	Low woollygrass
Hilaria rigida	Big galleta
Muhlenbergia porteri	Bush muhly
Panicum urvilleanum	Desert panicgrass
**Schismus arabicus*	*Arabian schismus
**Schismus barbatus*	*Common mediterranean grass
Sporobolus cryptandrus	Sand dropseed
Stipa hymenoides	Indian rice grass
Stipa speciosa	Desert needle grass
**Triticum aestivum*	*Common wheat
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum diffusum	Miniature woollystar
Eriastrum eremicum	Desert woollystar
Gilia brecciarum	Nevada gilia
Gilia scopulorum	Rock gilia
Gilia stellata	Star gilia
Langloisia setosissima	Bristly langloisia
Langloisia setosissima ssp. *punctata*	Lilac sunbonnet
Linanthus aureus	Golden gilia
Linanthus demissus	Desert linanthus
Loeseliastrum schottii	Schott's gilia

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
POLYGONACEAE	**BUCKWHEAT FAMILY**
Centrostegia thurberi	Red triangles
Chorizanthe brevicornu	Brittle spine flower
Chorizanthe brevicornu var. *brevicornu*	Brittle spineflower
Chorizanthe rigida	Devil's spineflower
Eriogonum brachypodum	Parry's buckwheat
Eriogonum deflexum	Flatcrown buckwheat
Eriogonum fasciculatum	Eastern mojave buckwheat
Eriogonum fasciculatum var. *polifolium*	California buckwheat
Eriogonum inflatum	Desert trumpet
Eriogonum maculatum	Spotted buckwheat
Eriogonum nidularium	Whisk broom
Eriogonum pusillum	Yellow turbans
Eriogonum thomasii	Thomas' buckwheat
Eriogonum trichopes	Little desert buckwheat
Oxytheca perfoliata	Roundleaf oxytheca
Rumex hymenosepalus	Wild rhubarb
RANUNCULACEAE	**BUTTERCUP FAMILY**
Delphinium parishii	Desert larkspur
Delphinium parryi	San Bernardino larkspur
RESEDACEAE	**MIGNONETTE FAMILY**
Oligomeris linifolia	Lineleaf whitepuff
ROSACEAE	**ROSE FAMILY**
Coleogyne ramosissima	Blackbrush
RUTACEAE	**CITRUS FAMILY**
Thamnosma montana	Turpentine broom
SIMAROUBACEA	**QUASSIA FAMILY**
Castela emoryi	**Emory's crucifixion thorn (CNPS 2B.2)**
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura wrightii	Jimsonweed
Lycium andersonii	Water jacket
Lycium cooperi	Cooper's box thorn
Nicotiana obtusifolia	Desert tobacco
Physalis crassifolia	Yellow nightshade groundcherry
TAMARICACEAE	**TAMARISK FAMILY**
**Tamarix aphylla*	*Athel tamarisk
**Tamarix chinensis*	*Chinese tamarisk
THEMIDACEAE	**THEMIDACEAE FAMILY**
Dichelostemma capitatum	Blue dicks

SCIENTIFIC NAME (* introduced/nonnative species)	**COMMON NAME**
ULMACEAE	**ELM FAMILY**
**Ulmus spp.*	*Elm
VISCACEAE	**MISTLETOE FAMILY**
Phoradendron spp.	Mistletoe
ZYGOPHYLLACEAE	**CALTROP FAMILY**
Larrea tridentata	Creosote bush

LEGEND:

Federal (USFWS)	**State (CDFW)**
FE Endangered	SE Endangered
FT Threatened	ST Threatened
FC Candidate	SR Rare
	SC Candidate

California Native Plant Society (CNPS) List Categories

List 1A	Plants Presumed Extinct in California
List 1B	Plants Rare, Threatened, or Endangered in California and Elsewhere
List 2	Plants Rare, Threatened, or Endangered in California but More Common Elsewhere
List 3	Plants about Which We Need More Information — A Review List
List 4	Plants of Limited Distribution − A Watch List

California Native Plant Society (CNPS) Threat Rank Extensions

.1	Seriously threatened in California (high degree/immediacy of threat)
.2	Fairly threatened in California (moderate degree/immediacy of threat)
.3	Not very threatened in California (low degree/immediacy of threat or no current threats known

APPENDIX C:

SITE PHOTOGRAPHS

Photo 1:

Photo of general area conditions along Project.

Photo 2:

Photo of non-native grasslands along Project alignment.

Photo 3:

Photo of Creosote bush (*Larrea tridentata*) Shurbland Alliance.

Photo 4:

Photo of Mohave Yucca (*Yucca schidigera*) clonal colony.

Photo 5:

Photo of *Castela emoryi* (crucifixion thorn) found near Project alignment in *Larrea tridentata* Shrubland Alliance.

Photo 6:

Photo of general area conditions for proposed Coolwater Yard.

Photo 7:

Photo of purplenerve springparsley *(Cymopterus multinervatus)* found at 4590 feet in a *Yucca brevifolia* Woodland Alliance.

Photo 8:

Close-up photo of purplenerve springparsley.

Environmental Intelligence, LLC

RARE PLANT SURVEY FORM

Date: 4/19/17 Site Name: M84-T3 (Map Pg 13) UID: _____

Lead Botanist: Kevin Thomas Supporting Botanist(s) Nichole Nesbihal

Target Species: Castela Emoryi

Reference Population Name: _____ Target observed at reference? ☐ Yes ☐ No ☐ Unsure

Target species present on Site? ☐ Yes ☐ No Area Covered: _____ Units: Acres ft^2 m^2

GPS Make and Model: Garmin 64st GPS Accuracy: 3 Units: Feet or (Meters)

Coordinate System: Lat/Long (UTM) Other: 11S 575627 3866514 Datum: NAD27 NAD83 (WGS84)

Y Coordinate (Latitude): _____ X Coordinate (Longitude): _____

Plant Data

Count unit: (stem) clump rosette Size determined by: Census Sample (Visual) Estimate

Plant count: 1 Estimated area: 5 Units: Acres ft^2 (m^2)

OR Estimate: 251-500 501-1000 >1000 **OR** % Cover: 0 1-5 6-25 26-50 51-100

% Vegetative: 0 1-5 6-25 26-50 51-100 % Flowering: 0 1-5 6-25 26-50 51-100

% Fruiting: 0 1-5 6-25 26-50 51-100 % Senescent: 0 1-5 6-25 26-50 51-100

Seedlings or Immature present? Yes (No) Unsure Count time: _____ minutes

What is the condition of this rare plant occurrence? Excellent (Average) Poor Unsure

Please note the characteristic(s) considered: Vegetation

Conditions which might have prevented surveyors from locating target species? N/a

Voucher specimen obtained? ☐ Yes ☒ No Stored where? _____

Permit Number(s): _____

Habitat

Slope/topographical position: gravelly wash NE gradual slope

Elevation range: 1381 ft

Aspect: NE

Hydrology: Wash and alluvial slope

Soils: _____

Vegetation Alliance: Creosote Scrub

Associated species: Larrea tridentata, Hymenoclea salsola, Bebbia Juncea, Encelia Frutescens

Invasive Species

_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant

Abundant: >100 observations Common: 50-100 observations Uncommon: 10-50 observations Rare: <10 observations

Name: Kevin Thomas Date: 4/19/17 UID:

Disturbance

Development:	None	Trace	(Some)	Most	Trampling:	(None)	Trace	Some	Most
Browsing:	(None)	Trace	Some	Most	Drought:	(None)	Trace	Some	Most
Insect damage or disease:	(None)	Trace	Some	Most	Fire:	(None)	Trace	Some	Most
Competition/ succession:	(None)	Trace	Some	Most	Drought/Hydro:	(None)	Trace	Some	Most
Adjacent land management:	None	Trace	(Some)	Most					

Other disturbance (please describe) and specific comments: next To Road edge

Management Recommendations:

Photo Log

Photo Number	File Name	Feature Photographed (e.g., flower , juvenile, unknown, insect)	Location and Direction of Photo (e.g., center of colony looking North)
01	CASEM01	whole plant	looking north
02	CASEM02	branch	looking north
03			
04			
05			
06			
07			
08			
09			
10			

Notes

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Environmental Intelligence, LLC

RARE PLANT SURVEY FORM

Date: 4/20/2017 Site Name: _____ UID: _____

Lead Botanist: Kevin Thomas Supporting Botanist(s) Nichole Nesbitt

Target Species: Castela Emoryi

Reference Population Name: _____ Target observed at reference? □ Yes ☒ No □ Unsure

Target species present on Site? ☒ Yes □ No Area Covered: 500 Units: Acres (ft²) m²

GPS Make and Model: Garmin 64 ST GPS Accuracy: 5 Units: Feet or Meters

Coordinate System: Lat/Long UTM Other: 11S 580158 3870917 Datum: NAD27 NAD83 (WGS84)

Y Coordinate (Latitude): _____ X Coordinate (Longitude): _____

Plant Data

Count unit: (stem) clump rosette Size determined by: Census Sample (Visual) Estimate

Plant count: 5 Estimated area: 500 Units: Acres (ft²) m²

OR Estimate: 251-500 501-1000 >1000 **OR** % Cover: 0 1-5 6-25 26-50 51-100

% Vegetative: 0 1-5 6-25 26-50 51-100 % Flowering: 0 1-5 6-25 26-50 51-100

% Fruiting: 0 1-5 6-25 26-50 51-100 % Senescent: 0 1-5 6-25 26-50 51-100

Seedlings or Immature present? Yes No Unsure Count time: _____ minutes

What is the condition of this rare plant occurrence? Excellent (Average) Poor Unsure

Please note the characteristic(s) considered: Vegetation

Conditions which might have prevented surveyors from locating target species? N/A

Voucher specimen obtained? □ Yes (☒ No) Stored where? _____

Permit Number(s): _____

Habitat

Slope/topographical position: wash

Elevation range: _____

Aspect: East

Hydrology: _____

Soils: _____

Vegetation Alliance: Creosote Scrub

Associated species: Larrea Tridentata, Hymenoclea Salsola Ambrosia Dumosa, Encelia Frutescens

Invasive Species

_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant

Abundant: >100 observations Common: 50-100 observations Uncommon: 10-50 observations Rare: <10 observations

Disturbance

Development:	None	Trace	(Some)	Most	Trampling:	None	Trace	Some	Most
Browsing:	(None)	Trace	Some	Most	Drought:	None	Trace	Some	Most
Insect damage or disease:	(None)	Trace	Some	Most	Fire:	None	Trace	Some	Most
Competition/ succession:	(None)	Trace	Some	Most	Drought/Hydro:	None	Trace	Some	Most
Adjacent land management:	None	Trace	(Some)	Most					

Other disturbance (please describe) and specific comments: within Survey Area Next To Tower

Management Recommendations: _____

Photo Log

Photo Number	File Name	Feature Photographed (e.g., flower , juvenile, unknown, insect)	Location and Direction of Photo (e.g., center of colony looking North)
01	CasEmo3		
02	CasEmo4		
03			
04			
05			
06			
07			
08			
09			
10			

Notes

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RARE PLANT SURVEY FORM

Date: 04/20/17 Site Name: LVRAS UID: _____

Lead Botanist: Doug GB / Ron Clark Supporting Botanist(s) _____

Target Species: Cymopterus multinervatus

Reference Population Name: _____ Target observed at reference? ☐ Yes ☐ No ☐ Unsure

Target species present on Site? ☒ Yes ☐ No Area Covered: 100 Units: Acres ft^2 (m^2)

GPS Make and Model: GPSMAP 64s GPS Accuracy: ±9' Units: (Feet) or Meters

Coordinate System: Lat/Long (UTM) Other: ~~11S 0630~~ Datum: NAD27 NAD83 (WGS84)

Y Coordinate (Latitude): 11S 0630289 X Coordinate (Longitude): 3899271

Plant Data

Count unit: (stem) clump rosette Size determined by: Census Sample (Visual) Estimate

Plant count: 10 Estimated area: 100' Units: Acres (grid) (m^2)

OR Estimate:	251-500	501-1000	>1000		**OR % Cover:**	0	1-5	6-25	26-50	51-100
% Vegetative:	0	1-5	6-25	26-50	(51-100)	% Flowering:	0	1-5	6-25	(26-50)	51-100
% Fruiting:	0	1-5	6-25	26-50	51-100	% Senescent:	0	1-5	6-25	26-50	51-100

Seedlings or Immature present? (Yes) No Unsure Count time: 30 minutes

What is the condition of this rare plant occurrence? (Excellent) Average Poor Unsure

Please note the characteristic(s) considered: Purple nerved bracts, leaf morphology

Conditions which might have prevented surveyors from locating target species? plants growing among Hilaria rigida, generally obscured

Voucher specimen obtained? ☐ Yes ☒ No Stored where? _____

Permit Number(s): Not enough individuals

Habitat

Slope/topographical position: ± 5%

Elevation range: 4591'

Aspect: S

Hydrology: Xeric

Soils: Sandy / decomposed limestone

Vegetation Alliance: Yucca brevifolia alliance

Associated species: Yucca brevifolia, Hilaria rigida, Cylindropuntia, Larrea, Bromus Ephedra, Yucca baccata

Invasive Species

_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant
_____	Rare	Uncommon	Common	Abundant

Abundant: >100 observations Common: 50-100 observations Uncommon: 10-50 observations Rare: <10 observations

Name: DGB/RC Date: 04/20/17 UID:

Disturbance

Development:	None	Trace	Some	Most	Trampling:	None	Trace	Some	Most
Browsing:	None	Trace	Some	Most	Drought:	None	Trace	Some	Most
Insect damage or disease:	None	Trace	Some	Most	Fire:	None	Trace	Some	Most
Competition/ succession:	None	Trace	Some	Most	Drought/Hydro:	None	Trace	Some	Most
Adjacent land management:	None	Trace	Some	Most					

Other disturbance (please describe) and specific comments: Located w/in active cattle range lands

Management Recommendations:

Photo Log

Photo Number	File Name	Feature Photographed (e.g., flower , juvenile, unknown, insect)	Location and Direction of Photo (e.g., center of colony looking North)
01	8839	Plant w/ Flower bracts	down, center of colony
02			
03			
04			
05			
06			
07			
08			
09			
10			

Notes

Multiple Specimen observed

11 S 0630283 3899266 Ele. 4591

11 S 0630293 3899267

11 S 0630292 3899263

11 S 0630291 3899270

11 S 0630293 3899262

11 S 0630293 3899259

11 S 0630276 3899265

2 individuals.

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