

**WASTEWATER COLLECTION SYSTEM, PHASES 1 AND 2  
DESERT TORTOISE FOCUSED SURVEY**



**CITY OF TWENTYNINE PALMS, SAN BERNARDINO COUNTY, CALIFORNIA**

**Prepared for:**

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**12 May 2022**

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## **1.0 INTRODUCTION**

Wood Environment & Infrastructure Solutions, Inc. (Wood) was contracted by Terra Nova Planning and Research to conduct a focused survey for the desert tortoise (*Gopherus agassizii*) at the site of Phases 1 and 2 of a proposed wastewater collection system project (project) in Twentynine Palms, San Bernardino County, California. This report provides methods, results, and discussion of the survey.

### **1.1 Project Location and Topography**

The project is entirely within the City of Twentynine Palms, San Bernardino County, California (see Figure 1). It is located primarily on the 7.5-minute Twentynine Palms, Calif. United States Geological Survey (USGS) quadrangle extending slightly south into the Queen Mountain, Calif. USGS quadrangle. It is in Township 1 North, Range 9 East, in portions of Sections 15, 16, 20-22, 27-29, 32 and 33 (see Figure 2). Project topography is roughly level overall, with some low hills in the southwestern area. Elevations range from approximately 1,795 feet (547 meters) in the northeast to 2,140 feet (652 meters) in the southwest. The land within the study area generally slopes from the southwest to the northeast (NV5 2022).

### **1.2 Project Description**

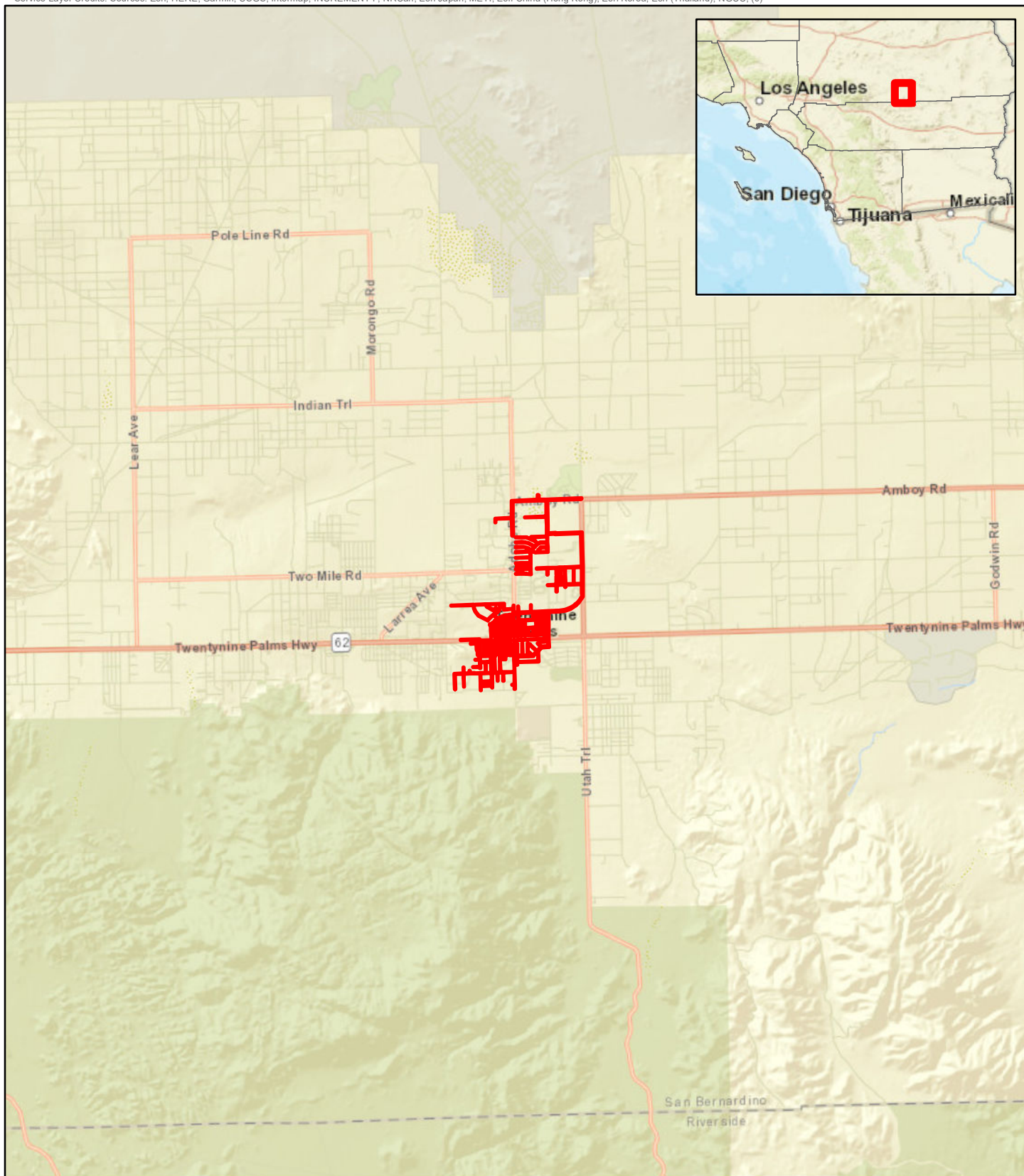
Phase 1 includes:

- Trunk sewers for Phase 1.
- Collector sewers for Phase 1.
- Two existing package treatment plants for the Turtle Rock and Desert Knoll Developments.
- The two large dense military housing developments on Two Mile Road and Joe Davis Drive.
- The residential area northeast of the Adobe Road – Two Mile Road intersection.
- The commercial area on Adobe Road and Amboy Road north of Samarkand Drive.

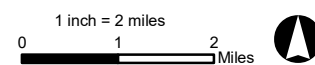
Phase 2 includes:

- Trunk sewers for Phase 2.
- Collector sewers for Phase 2.
- Two planned package treatment plants for project Phoenix and the Wander Hotel.
- The dense downtown area east of Donnell Hill. This area has a balanced mix of both residential and commercial land use.

See Figure 3 for a project overview.



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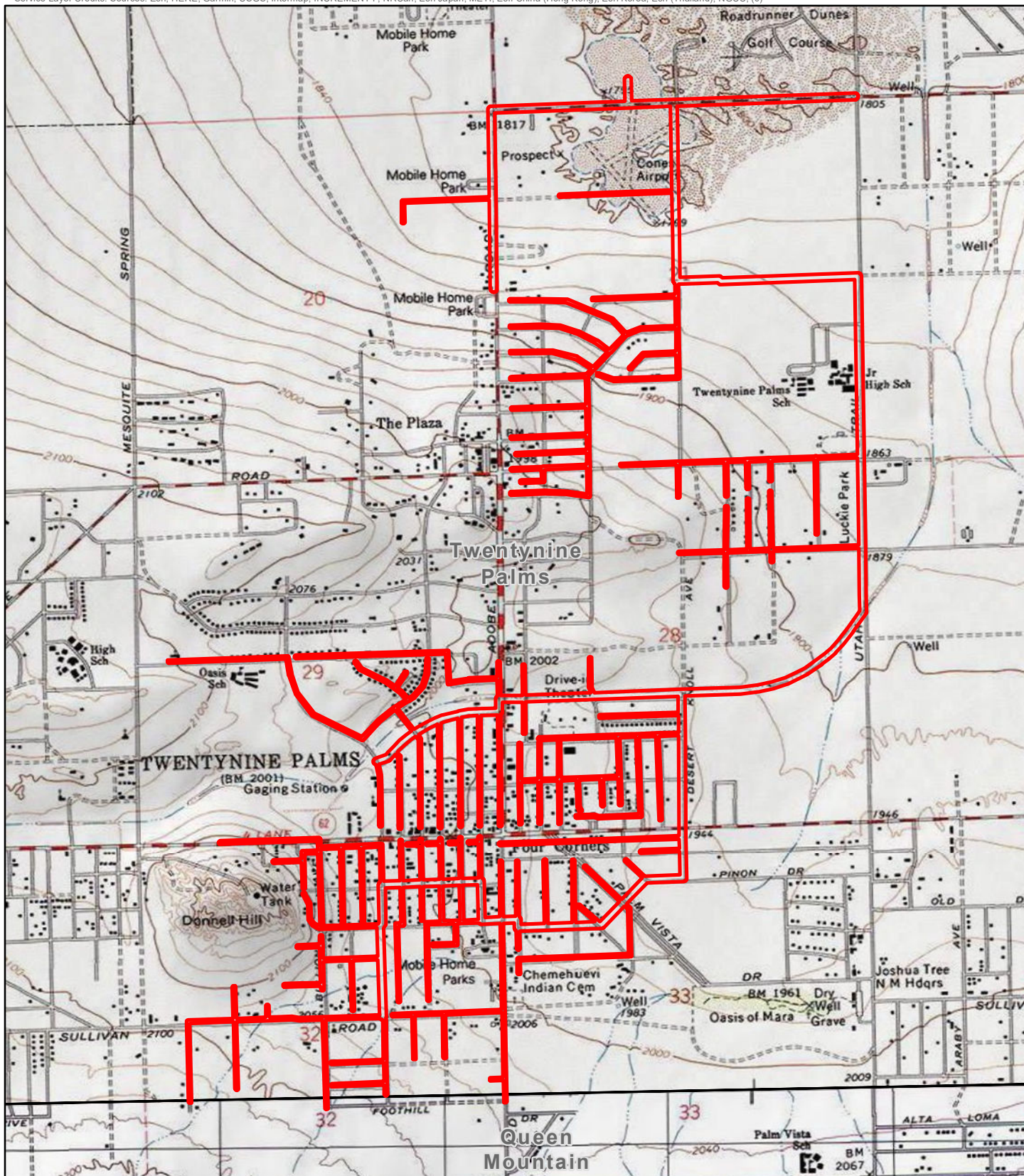
**wood.**

Project Area

**FIGURE 1**  
Regional Vicinity  
Twentynine Palms Wastewater  
Collection System, Phases 1 and 2  
Twentynine Palms, CA



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1 inch = 2,000 feet  
0 1,000 2,000 Feet

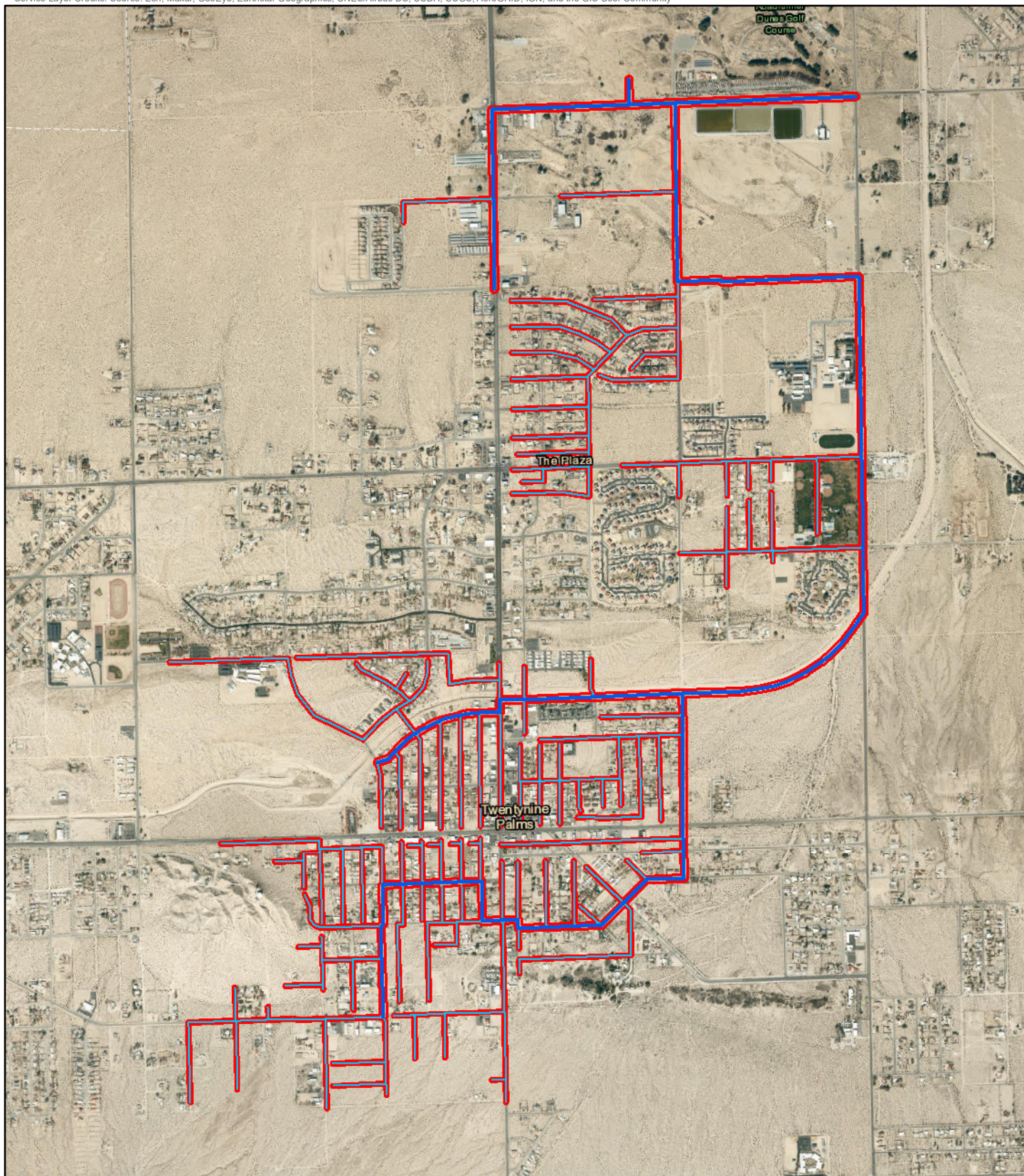
wood.

Project Area

**FIGURE 2**  
USGS 7.5" Topo Quads: 29 Palms & Queen Mountain  
Twentynine Palms Wastewater  
Collection System, Phases 1 and 2  
Twentynine Palms, CA

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**wood.**

- Proposed Trunk Sewer
- Proposed Collector Sewer
- Project Area

1 inch = 2,000 feet  
0 1,000 2,000 Feet



**FIGURE 3**  
Project Overview  
Twentynine Palms Wastewater  
Collection System, Phases 1 and 2  
Twentynine Palms, CA



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## **2.0 BACKGROUND ON THE DESERT TORTOISE**

The desert tortoise is a long-lived, terrestrial turtle, with a domed carapace (upper shell) and rounded, stumpy elephantine hind limbs. The front limbs are flattened and heavily scaled for digging and without webbed toes. The carapace is oblong with rounded sides due to the joining of the carapace to the plastron (lower shell). The scutes are often yellowish in the middle and have grooved, parallel, concentric growth rings that form outward with age toward the scute margins. The plastron is typically yellowish, becoming brown around the scute margins. The head is relatively small and rounded in front with reddish-tan coloring and the iris being greenish-yellow. The front and hind feet are about equal in size and the tail is of short length.

Desert tortoises in the Mojave and Colorado deserts west and north of the Colorado River were listed by the U.S. Fish and Wildlife Service (USFWS) as threatened on April 2, 1990 (USFWS 1990). They are also listed as threatened by the State of California. Proposed actions within the range of the Mojave desert tortoise fall under purview of the federal Endangered Species Act 1973, as amended (ESA), in addition to State regulations. These tortoises have since been named as a full species, still *G. agassizii*, no longer conspecific with tortoises south and east of the Colorado River that were reclassified as *G. morafkai* (Murphy et al. 2011). USFWS (2019). For purposes of the ESA, desert tortoise habitat is defined as 1) areas with presence of desert tortoises or desert tortoise sign, 2) dispersal areas (i.e., habitat corridors), or 3) areas suitable for desert tortoises as identified by the USFWS or in the most recent approved recovery plan for the Mojave population of the desert tortoise (USFWS 2011).

The desert tortoise is most common in desert scrub, desert wash, and Joshua tree habitats in a variety of terrain types, including alluvial fans, valleys, rocky hillsides, and washes. They require friable soil for burrow and nest construction. Burrows are typically found at the base of shrubs, in the interspaces between shrubs, and occasionally in caliche soil bank areas or underneath boulders/rocks. They are herbivores and feed on a variety of plants including annual herbs and perennial grasses.

Tortoise activity is greatest during the spring and early summer, and to a lesser extent during the fall; however, tortoises can be active at any time of the year during appropriate weather conditions. Although tortoises hibernate during the winter and typically emerge in late February or early March, hatchlings and juveniles can be fairly active during the winter months. Adults will also emerge from their burrows to drink if water resources have been limited during the previous activity season and/or winter precipitation has provided standing water. Their activity is usually much reduced during hot summer months, but they may be active following summer rains or if temperatures are moderate (Boarman 2003). They retreat into their horizontal burrow to avoid surface temperature extremes and to escape from predators. Desert tortoises are known to utilize an average of 7-12 burrows at any given time. Multiple tortoises are also known to occasionally share a single burrow (Bureau of Land Management "BLM" 2006).

Threats to desert tortoises include loss or degradation of habitat, vandalism, poaching, intentional killing, predation on young tortoises by the common raven (*Corvus corax*) and other predators (e.g. kit fox, snakes, etc.), and disease (e.g. Mycoplasmosis). Off-road vehicles, military training maneuvers, mining, and livestock grazing also affect tortoise habitat by collapsing burrows, eroding soils, reducing availability of food plants, eliminating shrubs which would provide shade for tortoises and support for their burrows, and ultimately results in surface disturbance that promotes conditions more conducive to invasion by exotic plant species, which provide less nutritional value to tortoises than the native species that were replaced. Human activities, including garbage dumping, landfills, roads, increased nesting opportunities, irrigation, and increased vehicle use have also led to increased numbers of common ravens in California deserts. Ultimately, the increased predation on young tortoises by common ravens reduces recruitment into breeding populations (Boarman 2003).

Tortoises are most often detected by scat, sign, and burrows/pallets. Tortoises themselves can sometimes be detected aboveground foraging or moving about or in burrows by shining a light within. Tortoise sign includes scat, tracks, eggshell fragments, courtship rings, drinking depressions, carcasses, or fragments thereof. Presence of sign is an indication that tortoises either occur, or have recently occurred, at a particular location that is likely to be part or all of a lifetime home range. Sign can be detected at any time of the year and always indicates suitable habitat, if not occupied habitat.

### **3.0 METHODS**

#### **3.1 Literature Review and Records Search**

A literature review and record search were conducted to identify occurrences of desert tortoise, critical habitat for desert tortoise, or any designated desert tortoise management areas within the project footprint. The review included:

- A report from the California Department of Fish and Wildlife' (CDFW's) California Natural Diversity Data Base (CNDDDB) for a five-mile radius of the project site (CDFW 2022a),
- The USFWS (2022) Environmental Conservation Online System (ECOS) including critical habitat mapping and an Information for Planning and Consultation (IPaC) report.
- Aerial photographs, and
- Pertinent documents from the Wood library and project files (*e.g.*, other biological surveys from the general vicinity).

#### **3.2 Focused Survey**

Wood biologists conducted desert tortoise focused surveys daily from 5 April 2022 through 11 April 2022 (see Appendix A). The surveys followed guidance for linear projects in the protocol: *Preparing for Any Action that May Occur Within the Range of the Mojave Desert Tortoise* (USFWS 2019). The survey included the trunk lines and the 50-foot action area on either side of them plus the collector lines and a 25-foot action area on either side of them. Except where fully developed, all relatively natural lands in the project footprint, including bare ground next to such lands was surveyed.



## **4.0 RESULTS**

### **4.1 Focused Survey**

As reported in the biological resources assessment for the project (Wood 2022), much of the alignment is surrounded by the homes, businesses, and public facilities that will be served by the proposed system. The remaining habitat is a patchwork of varying sizes of undeveloped vacant lots and lands. Most undeveloped lands are not pristine, but instead show signs of anthropogenic disturbance, such as mechanical disturbance of soil, vegetation removal, off road vehicle tracks, and trash dumping. Nevertheless, the undeveloped lands provide potential habitat and corridors for desert tortoise between developed/disturbed areas.

No specific soil mapping was available for most of the project site (United States Department of Agriculture, Natural Resources Conservation Service 2019.). The only mapped soil is near the southeast site corner: "Pintobasin gravelly sand, 1 to 3 percent slopes." In general, most observed soils appeared consistent with gravelly sands, but some soils in the northeast project area included apparent alkali sinks, fine sands, and even dunes.

Where not developed, the primary vegetation community present throughout the project area is Creosote Bush Scrub dominated by creosote bush (*Larrea tridentata*) with various co-dominants including white bur-sage (*Ambrosia dumosa*), white rhatany (*Krameria bicolor*), allscale saltbush (*Atriplex polycarpa*) and cheesebush (*Ambrosia salsola*). In the northern project area there are stand of Saltbush Scrub dominated by allscale saltbush (*Atriplex polycarpa*) and/or four-wing saltbush (*Atriplex canescens*) and Desert Sink Scrub dominated by bush seepweed (*Suaeda nigra*). A major flood control channel which originates from Fortynine Palms Canyon to the southwest is present onsite, as well as other unnamed drainages. These are mapped as Desert Wash Systems and where plants have not been removed by flood control agencies, they are vegetated with species such as smoke tree (*Psoralea argemone*) and catclaw (*Senegalia greggii*). Vegetation communities in the project footprint are mapped on Figure 4) and are based on those in USGS (2004). A full list of plant and vertebrate wildlife species detected onsite is included in Wood (2022).

### **4.2 Literature Review**

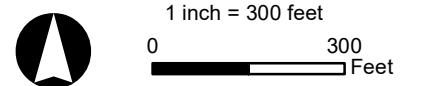
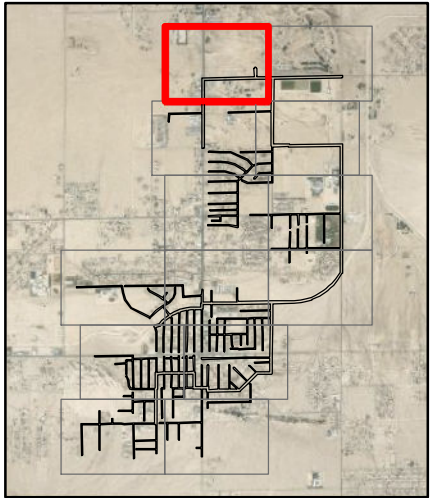
The closest desert tortoise records within the CNDDDB (CDFW 2022) are within a polygon present immediately west of the project area. Tortoise densities within that polygon were estimated at 20 - 50 per square mile in 1990-1991.

The proposed project site is within the Western Mojave Recovery Unit (USFWS 2011). It is not within designated critical habitat for the desert tortoise (see Figure 5).





- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub



**FIGURE 4a**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

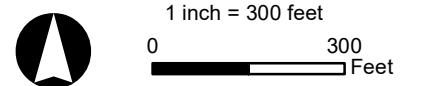
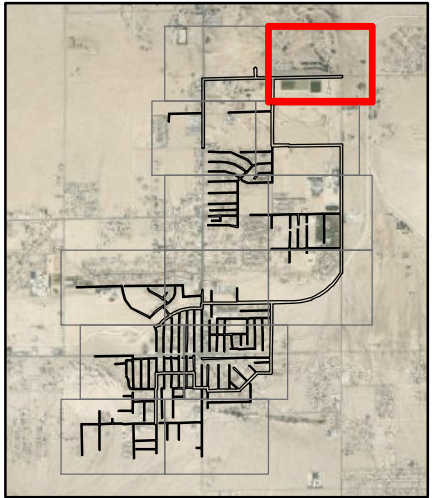


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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

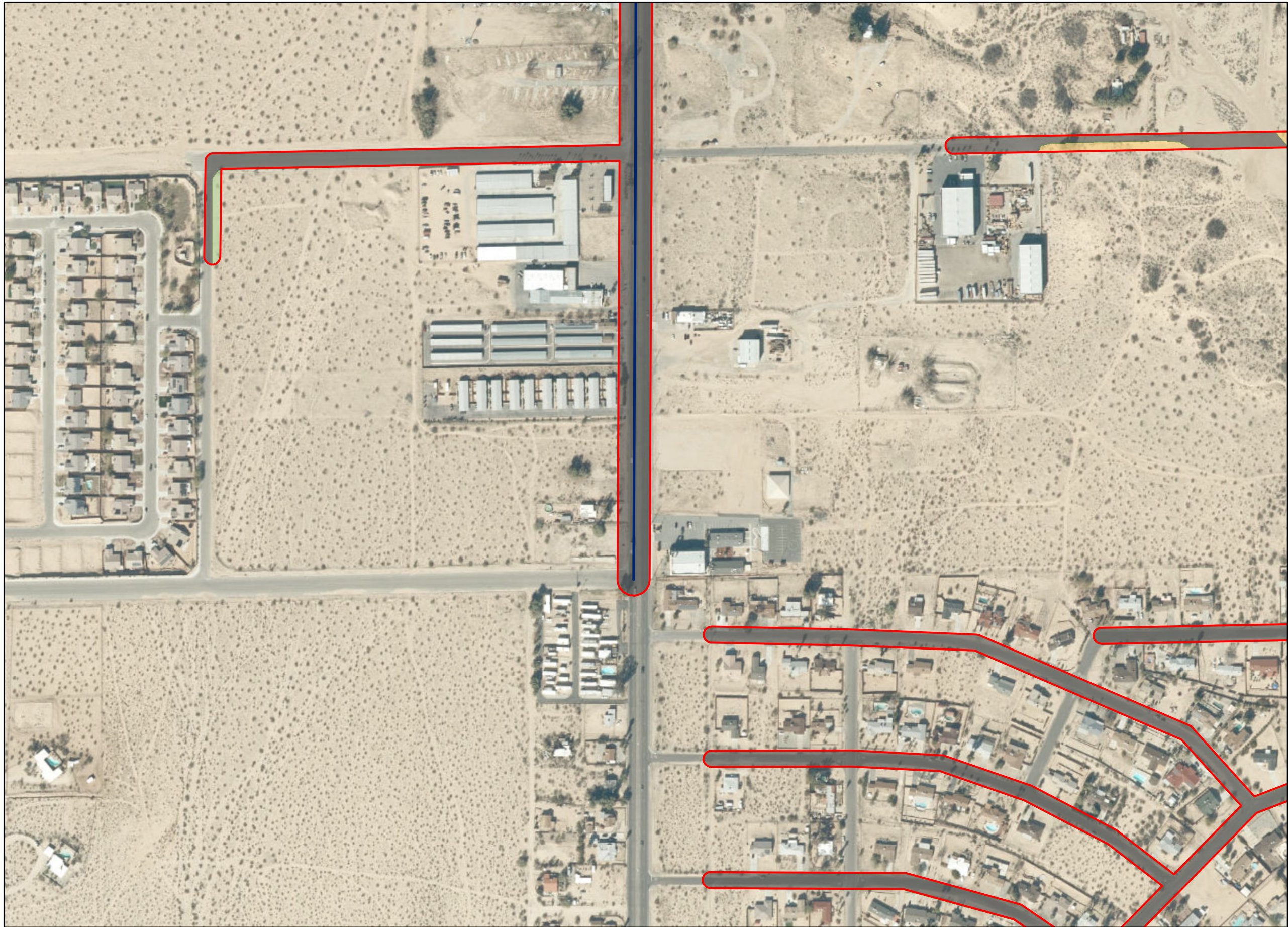


**FIGURE 4b**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

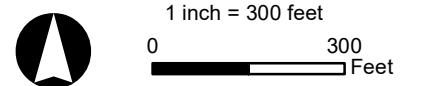
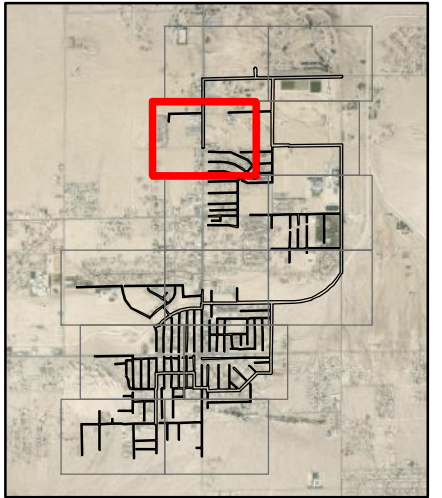


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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





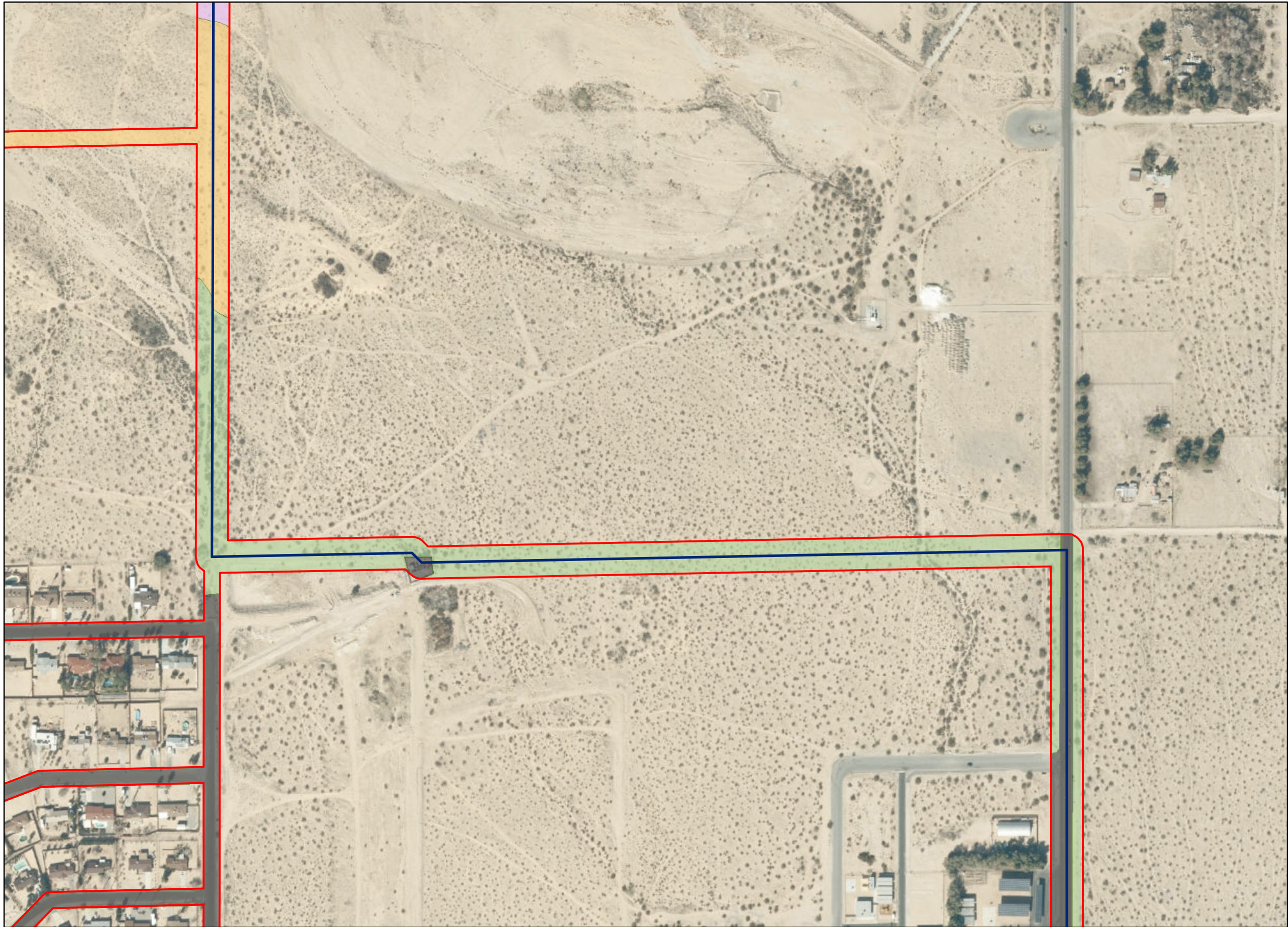
- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub



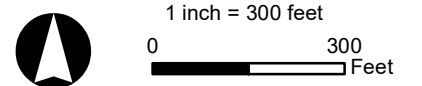
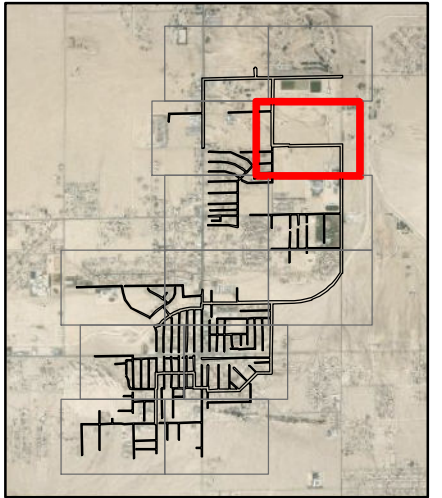
**FIGURE 4c**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA







- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

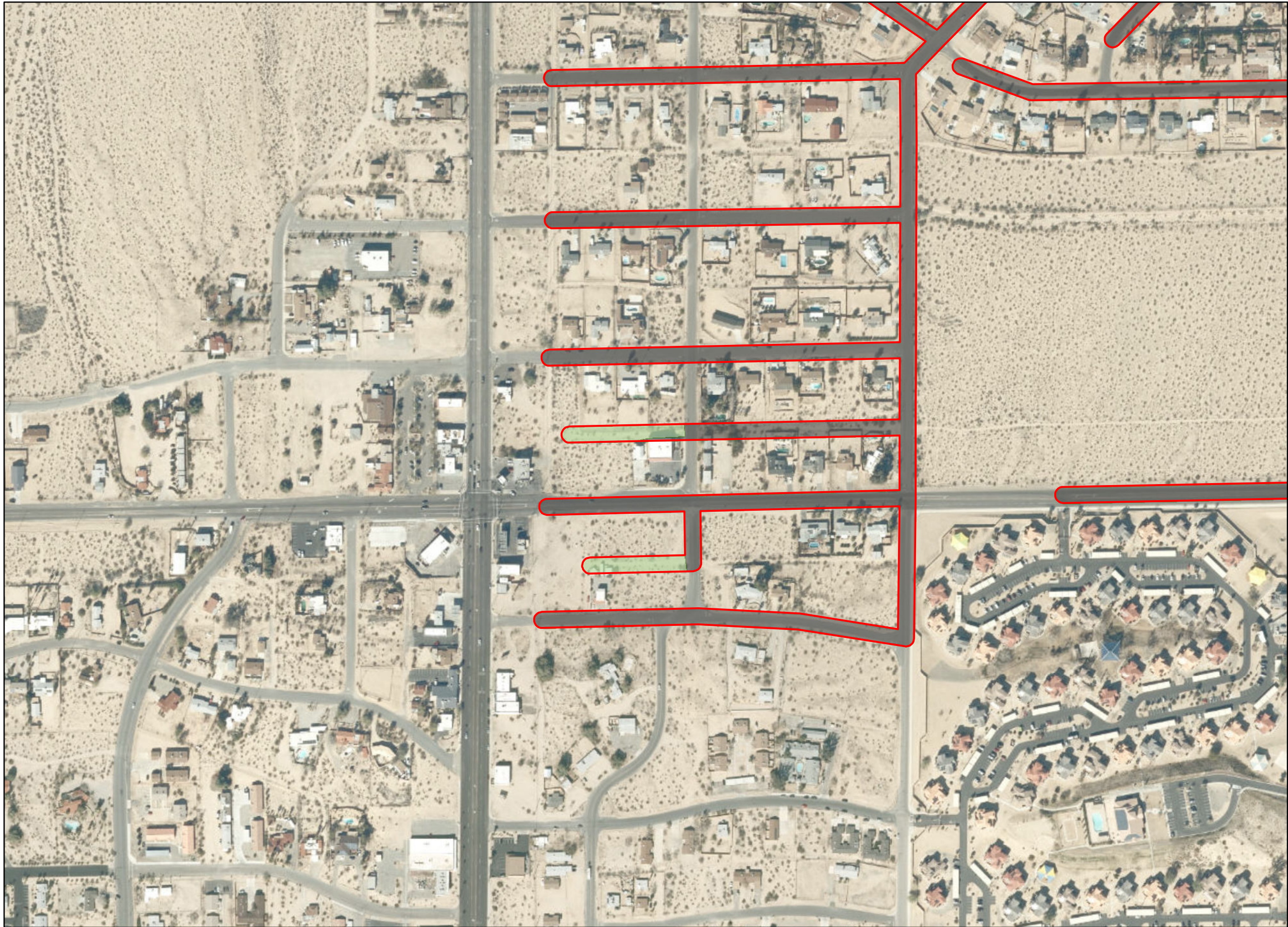


**FIGURE 4d**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

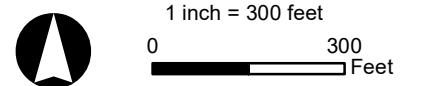
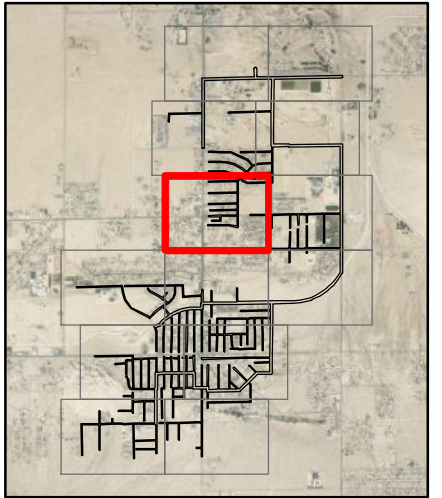


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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

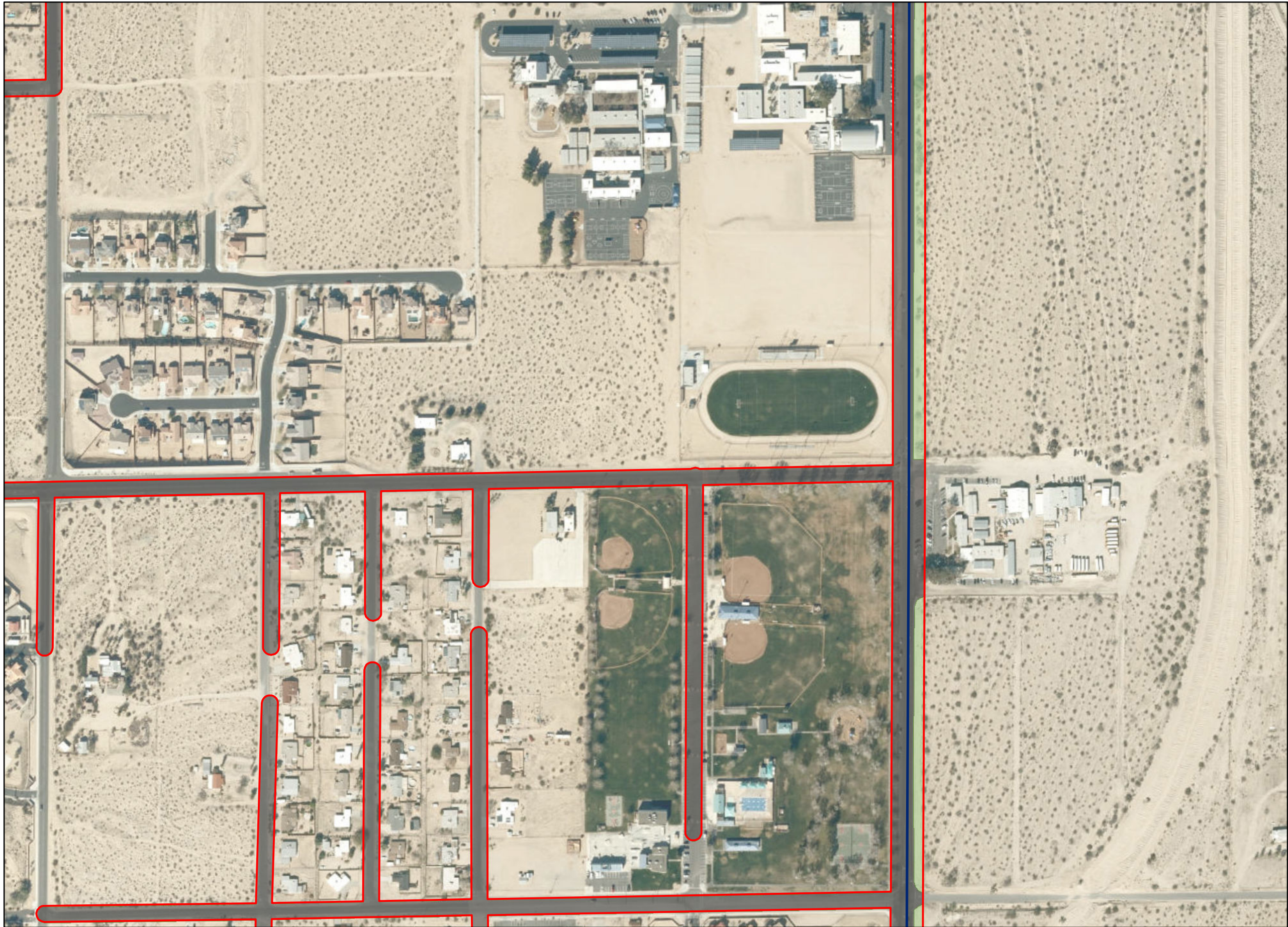


**FIGURE 4e**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

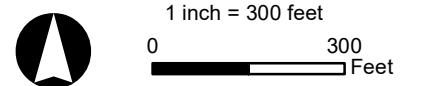
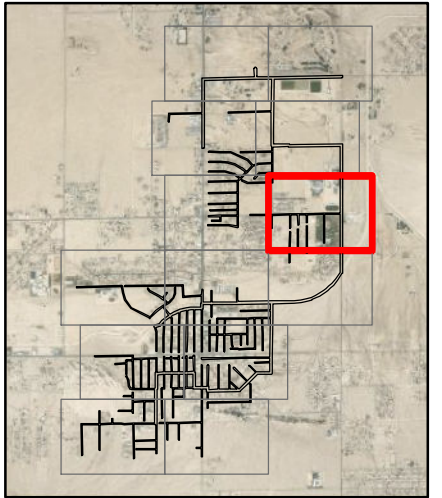


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
- Desert Sink Scrub
- Desert Wash System
- Developed/Disturbed
- Saltbush Scrub



**FIGURE 4f**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

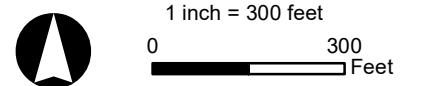
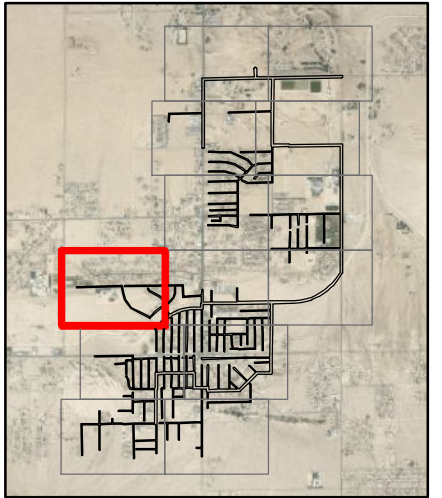


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

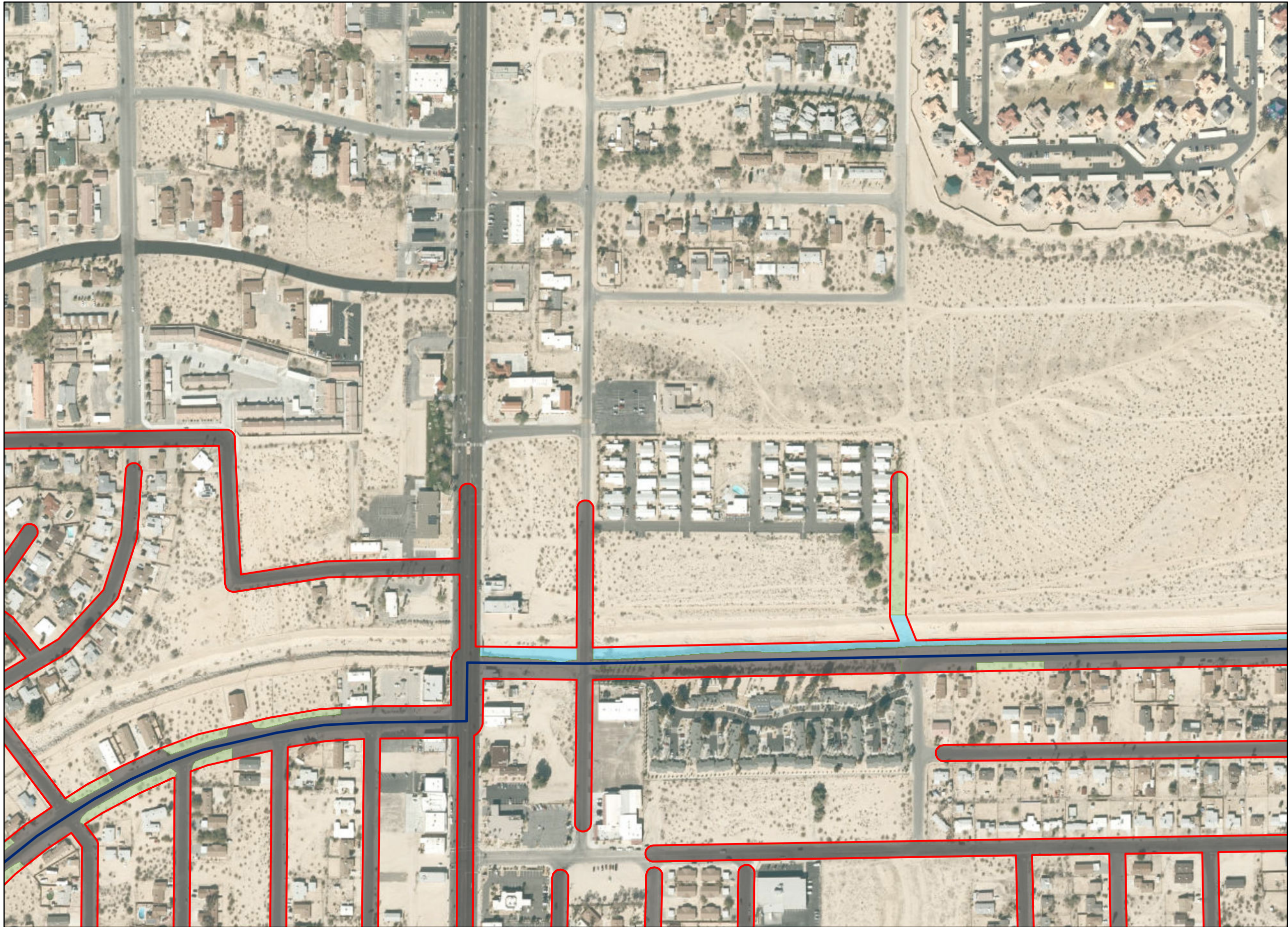


**FIGURE 4g**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

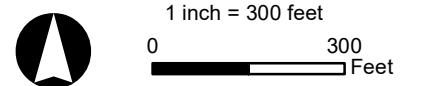
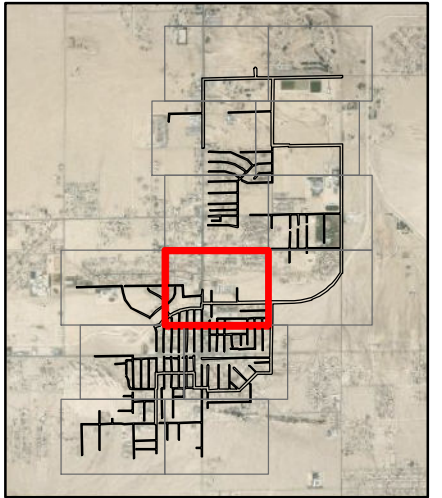


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

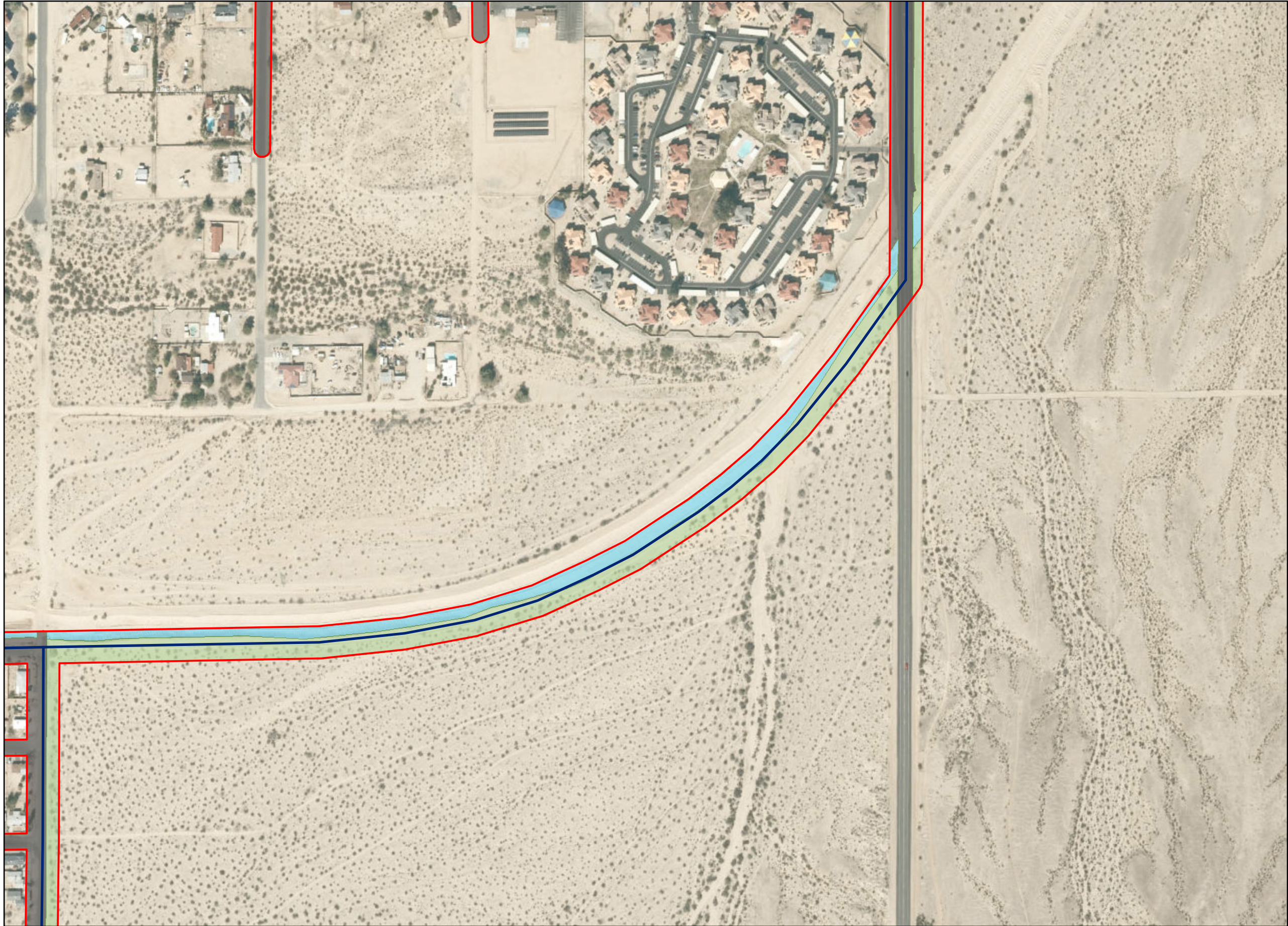


**FIGURE 4h**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

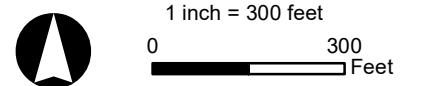
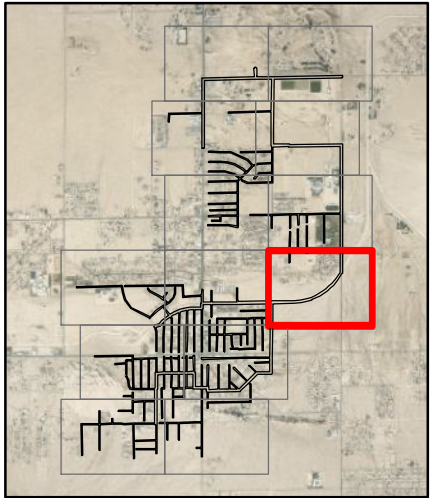


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

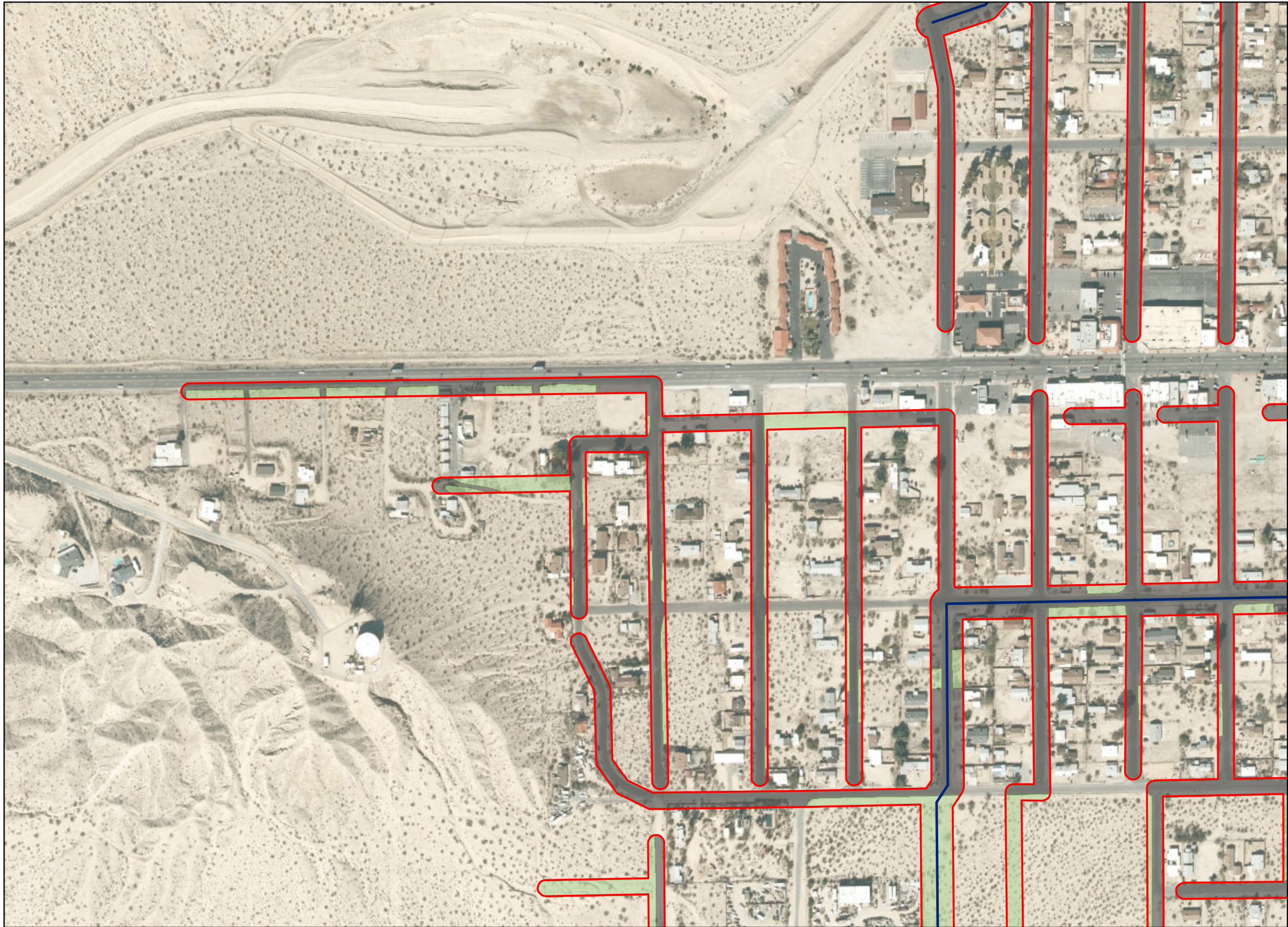


**FIGURE 4i**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

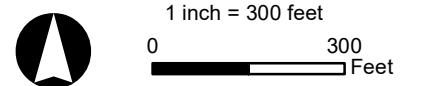
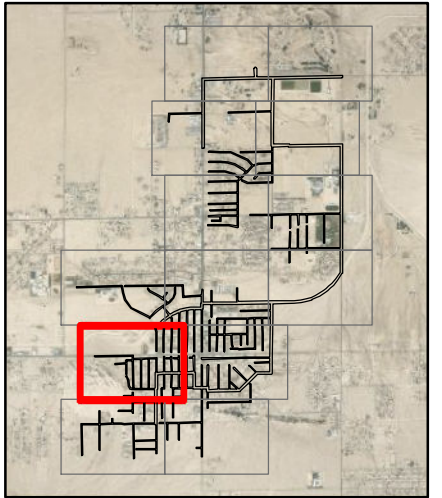


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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub

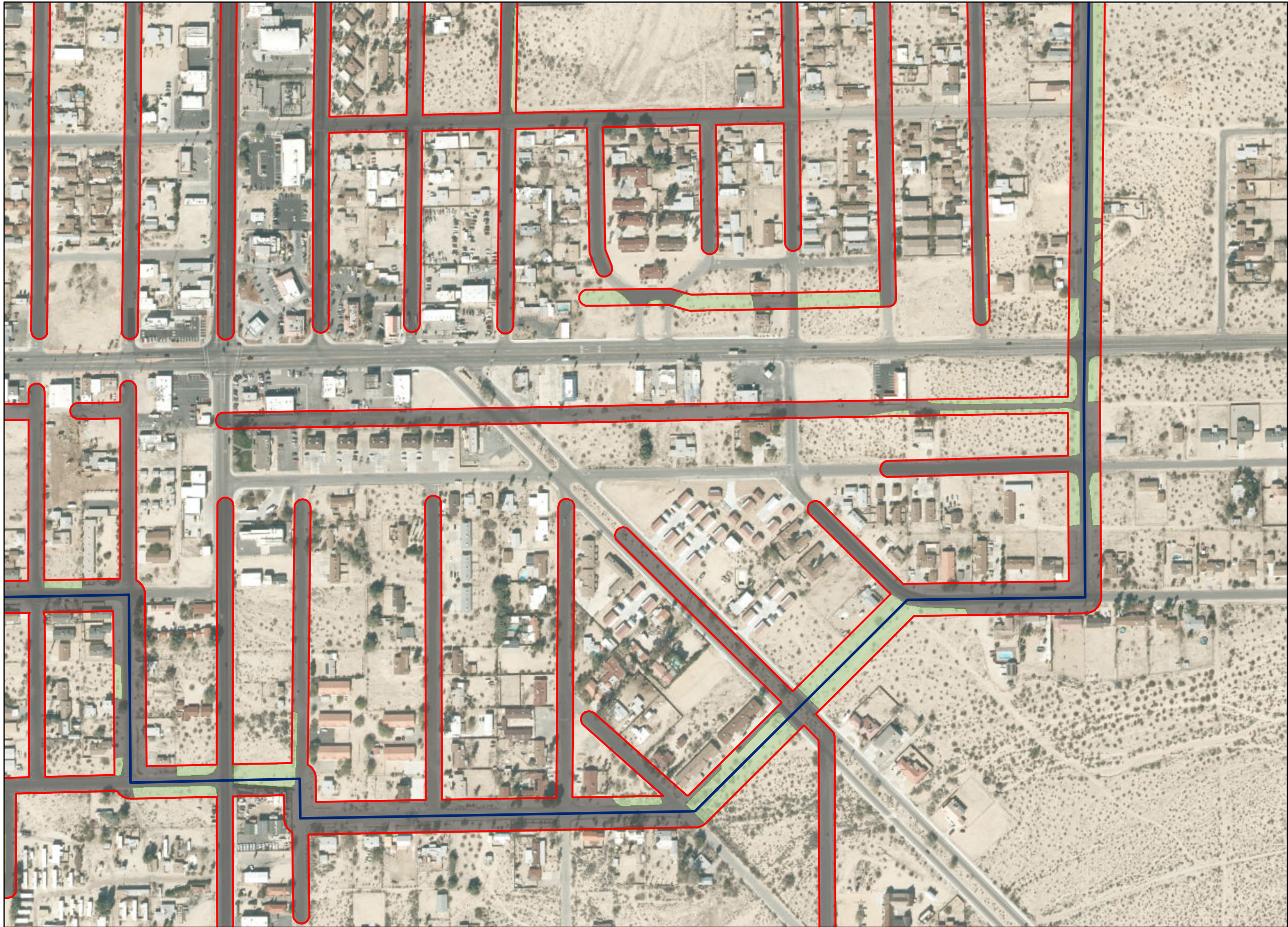


**FIGURE 4j**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

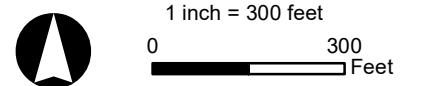
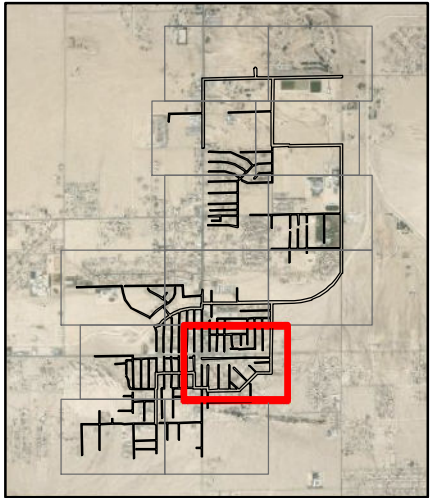


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
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  - Desert Wash System
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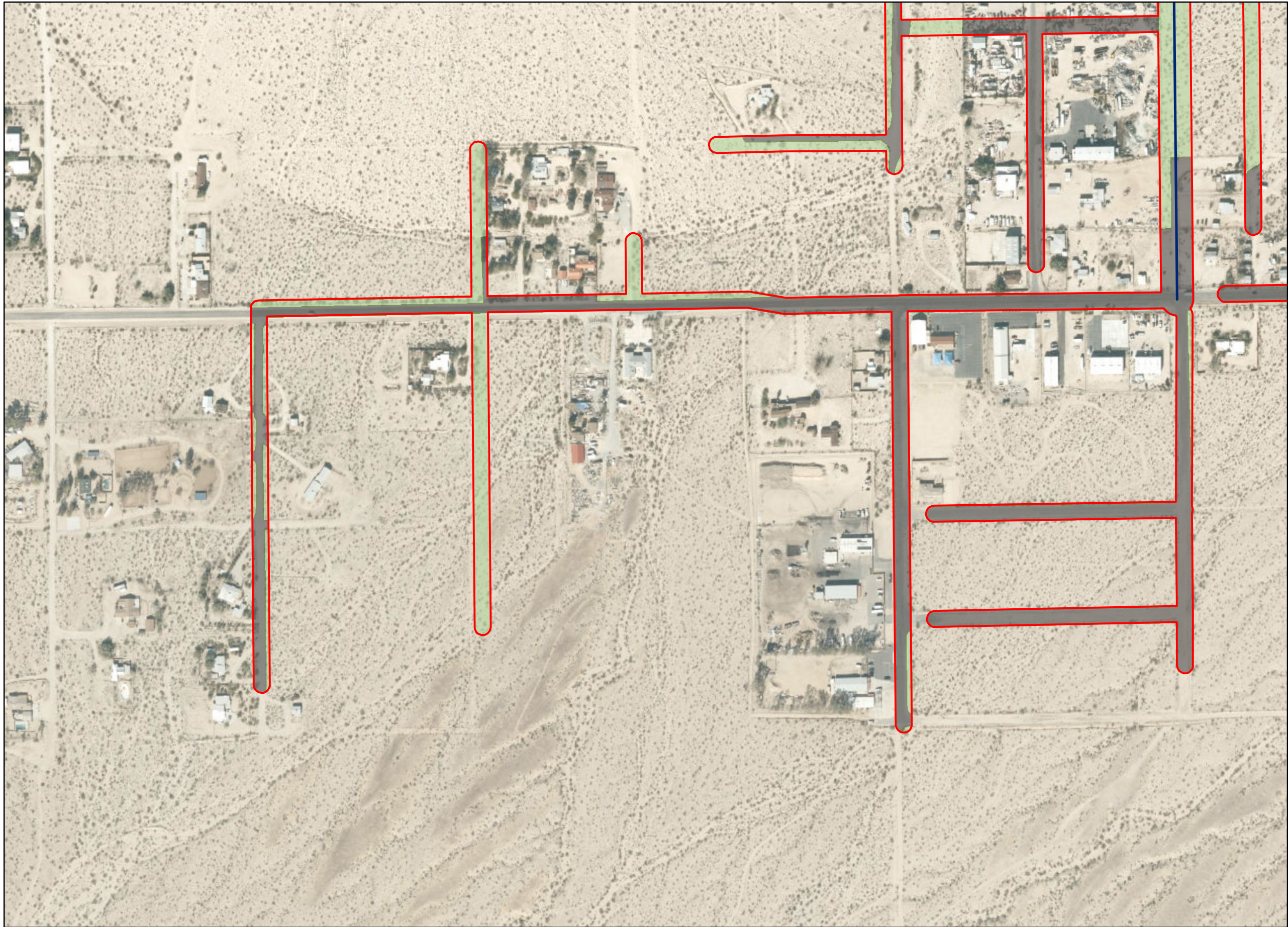


**FIGURE 4k**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

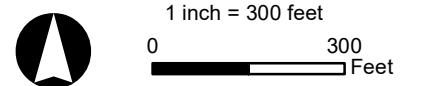
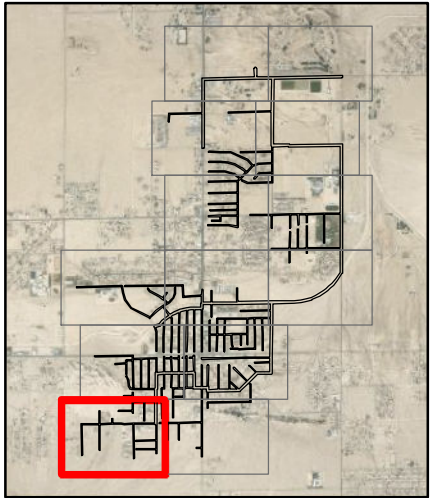


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- Proposed Trunk Sewer - Phase 1
- Survey Area
- Vegetation Communities**
- Creosote Bush Scrub
  - Desert Sink Scrub
  - Desert Wash System
  - Developed/Disturbed
  - Saltbush Scrub



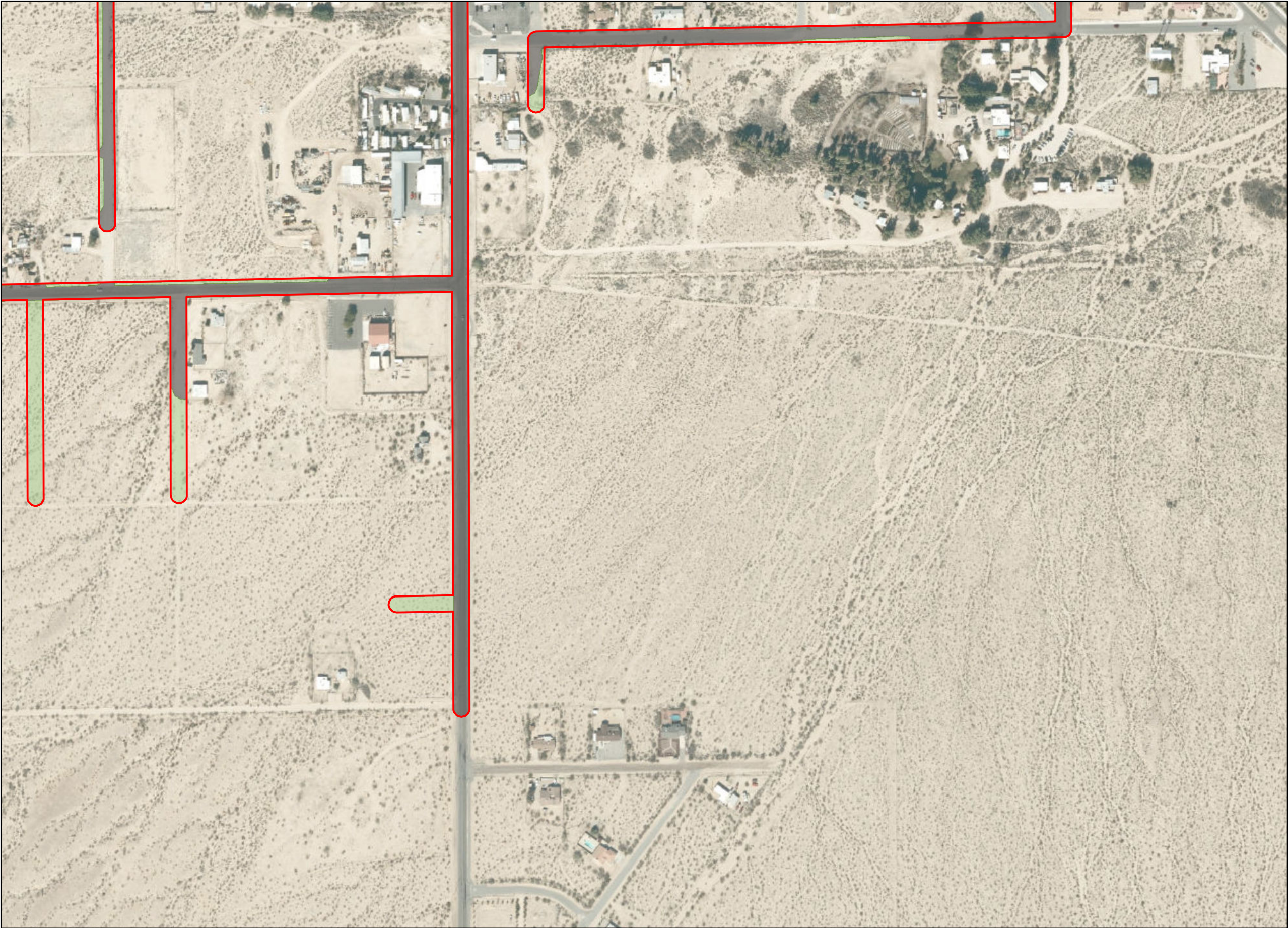
**FIGURE 4I**

Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA



Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors  
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



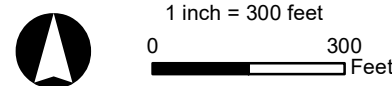
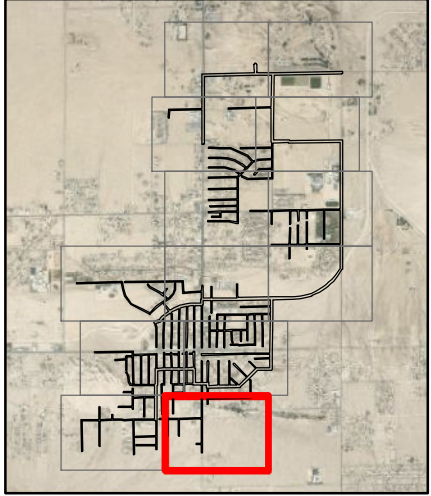


Proposed Trunk Sewer - Phase 1

Survey Area

**Vegetation Communities**

- Creosote Bush Scrub
- Desert Sink Scrub
- Desert Wash System
- Developed/Disturbed
- Saltbush Scrub

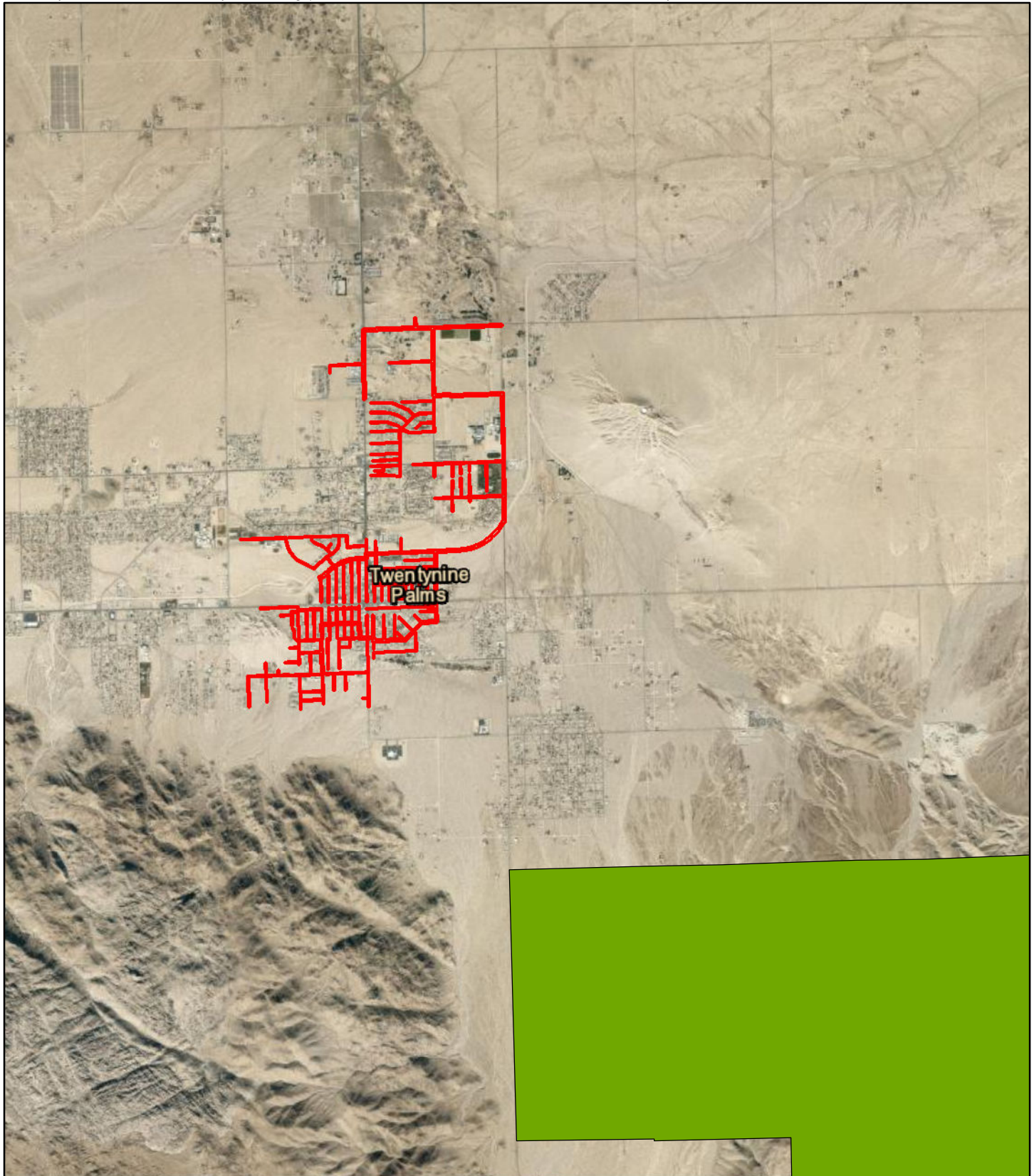


**FIGURE 4m**  
Vegetation Communities  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA





Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors  
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community





Path: \\sdg1-fs1\GIS\3554\_NaturalResources\TerraNova\_29Palms\_SewerLine\_322520122\MXD\ReportFigures\DETO\Fig5\_DETOCritHab\_1mile.mxd, amanda.schwab 5/5/2022

wood.

-  Project Area
-  Desert Tortoise Critical Habitat

**FIGURE 5**  
Desert Tortoise Critical Habitat  
Twentynine Palms Wastewater  
Collection System, Phases 1 & 2  
Twentynine Palms, CA

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## **5.0 DISCUSSION**

Although there is no desert tortoise critical habitat designated on the project site, it is present approximately 1.5 miles to the southeast. Further, the vegetation communities occurring on the project site (*e.g.* Creosote Bush Scrub, Saltbush Scrub) are habitats typically utilized by desert tortoises, and the CNDDDB reported populations immediately to the west in 1990-1991. During the focused survey, Wood biologists were provided an anecdotal report by a local resident who stated that they had observed a mating pair of desert tortoises in the southern project area last year.

Despite all that, the focused survey detected no desert tortoises or desert tortoise sign within the project footprint and action area. Further, although desert tortoise was not the primary target, focused surveys for the burrowing owl were conducted in a 150-meter buffer around the project footprint and action area. No desert tortoises or desert tortoise sign were detected within that buffer either.

Despite the absence of desert tortoise and sign, the project area is surrounded by potential habitat with past occupied habitat and designated critical habitat nearby. For these reasons desert tortoises may enter the project area in the future. The following mitigation and minimization measures are recommended to ensure that any potential impacts to the desert tortoise are avoided:

- 1) A worker's environmental awareness program (WEAP) would be implemented to educate the construction crew of potential special status species present on the project site.
- 2) Construction and maintenance personnel would be required to inspect for desert tortoises under vehicles prior to moving the vehicle. If a desert tortoise is found beneath a vehicle, it would not be moved until the desert tortoise had left of its own accord. All desert tortoise observations would be reported to a qualified biologist and the wildlife agencies.
- 3) A qualified biologist should monitor construction when it is occurring adjacent to undeveloped lands to ensure that tortoises do not enter the work area and that they are not disturbed if present.
- 4) Any open trenches adjacent to habitat should be monitored by a qualified biologist daily. If left open overnight or at any time when not monitored, they should be fenced and/or covered to prevent entry by desert tortoises. Exit ramps should be present within open trenches.

Desert tortoises cannot be taken (harmed, harassed) under state and federal law. This report and any recommended mitigation measures do not constitute authorization for incidental take of the desert tortoise.

## 6.0 REFERENCES

- Boarman, W. 2003. Desert tortoise species account. *In* Final Environmental Impact Report and Statement for the West Mojave Plan (Bureau of Land Management "BLM" 2005). California Desert Conservation Area District Office, Riverside, California.
- BLM. 2006. West Mojave Plan.
- California Department of Fish and Wildlife (CDFW). 2022a. California Natural Diversity Database (CNDDB) RareFind 5 records of sensitive elements.
- CDFW. 2022b. Special Animals List. April. Periodic publication. Sacramento, CA. Accessed online at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline>
- CDFW. 2016. Complete List of Amphibian, Reptile, Bird and Mammal Species in California. May. Accessed online at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=87155&inline>
- Jepson Flora project. 2022. *Jepson eFlora*. Accessed online at: <http://ucjeps.berkeley.edu/IJM.html>
- Murphy R.W., K.H. Berry, T. Edwards, A.E. Leviton, A. Lathrop, J.D. Riedle. 2011. The dazed and confused identity of Agassiz's land tortoise, *Gopherus agassizii* (Testudines, Testudinidae) with the description of a new species, and its consequences for conservation. *ZooKeys* 113:39–71.
- NV5. 2022. City of Twentynine Palms Wastewater Feasibility Study, Draft Report. March 31.
- United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2022. The PLANTS Database. National Plant Data Team. Accessed online at: <https://plants.usda.gov/java/>
- United States. Fish and Wildlife Service (USFWS). 2022. Environmental Conservation Online System (ECOS) <https://ecos.fws.gov/ecp/>
- USFWS. 2019. Preparing for Any Action that May Occur Within the Range of the Mojave desert tortoise. October 8, 2019. Accessed online from: <https://wildlife.ca.gov/Conservation/Survey-Protocols#377281283-reptiles>
- USFWS. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pp.
- USFWS. 1994. Endangered and Threatened Wildlife and Plants. Determination of Critical Habitat for the Mojave Population of the Desert Tortoise, *Federal Register*, 59: 5820-5866.
- USFWS. 1990. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Mojave Population of the Desert Tortoise, *Federal Register*, 55:12178-12191.
- USFWS. 1989. Endangered and Threatened Wildlife and Plants. Emergency Determination of Endangered Status for the Mojave Population of the Desert Tortoise, *Federal Register*, 54: 32326-32331.

Wastewater Collection System, Phases 1 & 2  
Desert Tortoise Focused Survey  
May 2022

United States Geological Survey (USGS). 2004. Mojave Desert Ecosystem Program: Central Mojave Vegetation Database.

Wood, Environment & Infrastructure Solutions, Inc. (Wood). 2022. Wastewater Collection System, Phases 1 and 2, Draft Biological Resources Assessment. City of Twentynine Palms, San Bernardino County, California. Unpublished report prepared for Terra Nova Planning and Research.

## **Appendix A      Survey Forms**



Date of survey: 5 4 22 Survey biologist(s): Tim Humley  
(day, month, year) (name, email, and phone number)

Site description: Elm Dr, Sullivan Dr., Bullion Ave., Spit Rock Ave, Belling Dr., Hastings Dr.  
(project name and size, general location)

County: SB Quad: 29 Palms Location: Twenty nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 142 Transect length: 251.5  
(easting, northing, elevation in meters) (easting, northing, elevation in meters)

GPS Start-point: 34.128048, -116.069727 Start time: 11:00 am/pm  
(easting, northing, elevation in meters) (easting, northing, elevation in meters)

GPS End-point: 34.125113, -116.060079 End time: 13:58 am/pm  
(easting, northing, elevation in meters) (easting, northing, elevation in meters)

Start Temp: 82° °C F End Temp: 89° °C F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
4						
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6						
7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4				
5				
6				
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8				

Date of survey: 5 4 22 Survey biologist(s): Jim Chumley  
(day, month, year) (name, email, and phone number)

Site description: Sullivan Rd., Yucca Ave, Adobe Rd  
(project name and size, general location)

County: SB Quad: 29 Palms Location: Twenty nine Palms  
(UTM coordinates, lat-long, and/or TRS, map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: \_\_\_\_\_ Transect length: 1.0

GPS Start-point: 34.128215, -116.059746 Start time: 1405 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.124746, -116.054485 End time: 16:15 am/pm  
(easting, northing, elevation in meters)

Start Temp: 89° °F End Temp: 91 °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
2						
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7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				

Date of survey: 6 4 22 Survey biologist(s): Tim Chomley, Lauryn Duato  
(day, month, year) (name, email, and phone number)

Site description: Old Dale Rd, Pactus Ave, Cholla Ave, Smoke Tree Ave, Yucca Ave, Tamarisk Ave, Desert Quercus  
(project name and size; general location)

County: SB Quad: 29 palms Location: Twenty nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1/2 Transect length: 1.1

GPS Start-point: 34.135145 -116.051264 Start time: 12:10 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.133469 -116.045491 End time: 16:50 am/pm  
(easting, northing, elevation in meters)

Start Temp: 81° °C End Temp: 86 °C

### Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
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3						
4						
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7						
8						

### Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
2				
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7				
8				

Date of survey: 7 4 22 Survey biologist(s): Lauryn Duto  
(day, month, year) (name, email, and phone number)

Site description: Cottonwood Dr, Inn Dr, Nat'l Park Dr, Old Dale Rd, Mesquite Ave, Palo Verde Ave  
(project name and size, general location)

County: SB Quad: 29 Palms Location: Twenty Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1 Transect length: 4.6

GPS Start-point: 34.131992 - 116.054424 Start time: 7:30 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.130217 - 116.064512 End time: 11:00 am/pm  
(easting, northing, elevation in meters)

Start Temp: 66° °F End Temp: 81° °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				

Date of survey: 7 4 22 Survey biologist(s): Tim Crumley, Lauryn Duto  
(day, month, year) (name, email, and phone number)

Site description: Holly Ave., Piñon Dr., Desert Knoll Ave., Cactus Dr., alley  
(project name and size: general location)

County: SB Quad: 29 Palms Location: Twenty-nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1 & 2 Transect length: 1.0

GPS Start-point: 34.131846 - 116.049635 Start time: 11:00 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.135160 - 116.045598 End time: 12:15 am/pm  
(easting, northing, elevation in meters)

Start Temp: 79° °C/F End Temp: 80° °C/F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
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6						
7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				



Date of survey: 7 4 22 Survey biologist(s): Tim Chumley, Lauryn Donto  
(day, month, year) (name, email, and phone number)  
 Site description: Buena Vista Dr., Split Rock Ave, Desert Queen Ave, Tamarisk Ave, Yucca Ave, Smoke Tree Ave  
(project name and size; general location)  
 County: SB Quad: 29 Palms Location: Twentynine Palms  
(UTM coordinates, lat-long, and/or TRS: map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1+2 Transect length: 2.0 mi  
 GPS Start-point: 34.140424 -116.054544 Start time: 13:00 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.135796 -116.13576 End time: 14:45 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 85° °F End Temp: 88° °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
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7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				

Date of survey: 7 4 22 Survey biologist(s): Tim CUMLET  
(day, month, year) (name, email, and phone number)  
 Site description: Civic Center Dr, El Paseo Drive, Split Rock Ave, Bagley Ave, Yucca Ave, Sun Court  
(project name and size, general location)  
 County: SB Quad: 29 Palms Location: Twenty-nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1-2 Transect length: 1.9  
 GPS Start-point: 34.141734 -116.054367 Start time: 15:00 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.142702 -116.070243 End time: 17:30 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 87° °F End Temp: 88° °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
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4				
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6				
7				
8				



BTJR, COYOTE, ASPIDOTIG, CORA, UTA STANS, COHU, CROT. CEZASIS, SAPY  
GRRO, SAVS, DIPDOMYS SP, TWU, CHIONACTIS OCCIPITALIS (T), R.T. GROUND SQUAME  
WESP, HOSP, HOFI

# USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 8 APR 22 Survey biologist(s): M. WILCOX, N. MOORHATCH, T. CHUMLEY,  
(day, month, year) (name, email, and phone number) L. DUOTO

Site description: TERRA NOVA 29 PALMS SEWER  
(project name and size; general location)

County: SB Quad: 29 Palms Location: Utah Trail to Desert Knoll, N to Aubrey Rd, E to Utah Tr  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1-4 Transect length: \_\_\_\_\_

GPS Start-point: 34.15764804, -116.03673600 Start time: 0750 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.16480656, -116.03671463 End time: 0945 am/pm  
(easting, northing, elevation in meters)

Start Temp: 63 °F End Temp: 87 °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL >160-mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
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5						
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7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
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5				
6				
7				
8				

VERP, COHA, GTGR, COFO, TUVU, NEOTOMASP, BGGN, COLEONYX VAR., VERD,  
WREKI, MODO

# USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 8 APR 22 Survey biologist(s): M WILCOX, N MCKINCHIE, T CHUMLEY, L. DUOTO  
(day, month, year) (name, email, and phone number)

Site description: TERRA NOVA 29 PALMS SEWER  
(project name and size; general location)

County: \_\_\_\_\_ Quad: \_\_\_\_\_ Location: Utah Tr to Desert Knoll (WD canal)  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect # 5-8 Transect length: \_\_\_\_\_

GPS Start-point: 34.14661573, -116.03644925 Start time: 10:46 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.14085200, -116.04541965 End time: 11:14 am/pm  
(easting, northing, elevation in meters)

Start Temp: 85 F End Temp: 86 F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL >160-mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
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8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				

CACW, ANHU, DIPSO SAURUS DOR., RTGS, COHU, ROP, ANMO LEO,  
 PHAI, LBWO, CAGS

**USFWS 2010 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET**

Please submit a completed copy to the action agency and local USFWS office within 30-days of survey completion

Date of survey: 8 APR 22 Survey biologist(s): M. WILCOX, N. MOORHEAD  
(day, month, year) (name, email, and phone number)

Site description: TERRA NOVA 29 PALMS SEWER  
(project name and size; general location)

County: \_\_\_\_\_ Quad: \_\_\_\_\_ Location: Desert Kull (62 to Buena Vista)  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 9-10 transect length: \_\_\_\_\_

GPS Start-point: 34.14083708° -116.04532870° Start time: 1300 am/pm pm  
(easting, northing, elevation in meters)

GPS End-point: 34.13719322° -116.04536919° End time: 1336 am/pm pm  
(easting, northing, elevation in meters)

Start Temp: 91 °F End Temp: 91 °F

**Live Tortoises**

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL >160-mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
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4						
5						
6						
7						
8						

**Tortoise Sign (burrows, scats, carcasses, etc)**

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				



Date of survey: 8 4 22 Survey biologist(s): Tim CUMLEY Lauryn Duoto  
(day, month, year) (name, email, and phone number)

Site description: Amboy Rd  
(project name and size, general location)

County: SB Quad: 29 Palms Location: Twenty Palms  
(UTM coordinates, lat-long, and/or TRS, map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 142 Transect length: 0.25 mi

GPS Start-point: 34.150173 -116.054237 Start time: 1300 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.150212 -116.049761 End time: 14:00 am/pm  
(easting, northing, elevation in meters)

Start Temp: 91 °C/F End Temp: 91 °C/F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
2						
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5						
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7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
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5				
6				
7				
8				

Date of survey: 9 4 22 Survey biologist(s): Tim Chumley Melanie Buckovac  
(day, month, year) (name/ email, and phone number)  
 Site description: "Buena Vista Dr." (ditch), Casita Dr., Gorgonio Dr., Joshua Dr., Palm View Ave., Athol Ave., Cienega Dr., E & W Ct., Mesquite Av., Palo Verde Av., Orofino Ave.  
(project name and size, general location)  
 County: \_\_\_\_\_ Quad: \_\_\_\_\_ Location: \_\_\_\_\_  
(UTM coordinates, lat-long, and/or TRS, map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: \_\_\_\_\_ Transect length: \_\_\_\_\_  
 GPS Start-point: 34, 139 316, -116.045 706 Start time: 0744 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: \_\_\_\_\_ End time: 1050 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 71° °F End Temp: 88° °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
1						
2						
3						
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5						
6						
7						
8						

## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
2				
3				
4				
5				
6				
7				
8				

Date of survey: 9 4 22 Survey biologist(s): Tim CHUMLEY Melanie Buckovar  
(day, month, year) (name, email, and phone number)  
 Site description: Two Mile Road, Wainwright Ave, Halsey Ave, Desert Knoll, Marine Ave, Joe Davis Rd  
(project name and size; general location)  
 County: SB Quad: 29 Palms Location: Twenty nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1#2 Transect length: 1.5 mi  
 GPS Start-point: 34.150483 -116.036705 Start time: 11:00 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.146673 -116.045525 End time: 12:35 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 88° °F End Temp: 93 °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
1						
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
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6				
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Date of survey: 10 4 22 Survey biologist(s): Tim CHUMLEY EMILY URQUIDI  
(day, month, year) (name, email, and phone number)

Site description: 29 Palm Hwy (Hwy 62)  
(project name and size; general location)

County: SB Quad: 29 Palms Location: Twentynine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1 #2 Transect length: 0.3 mi

GPS Start-point: 34.135376 -116.063409 Start time: 07:19 am/pm  
(easting, northing, elevation in meters)

GPS End-point: 34.135376 -116.068088 End time: 8:00 am/pm  
(easting, northing, elevation in meters)

Start Temp: 62° °F End Temp: 65 °F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
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Date of survey: 10 4 22 Survey biologist(s): Tim CHUMLEY EMILY VERAQUI  
(day, month, year) (name, email, and phone number)  
 Site description: Two Mile Rd (Desert Knoll to Aztec)  
(project name and size, general location)  
 County: SB Quad: 29 Palms Location: Twenty nine Palms  
(UTM coordinates, lat-long, and/or TRS, map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 142 Transect length: 0.2 mi  
 GPS Start-point: 34.150381 -116.045539 Start time: 8:20 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.150345 -116.048570 End time: 8:49 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 66° °C/F End Temp: 67° °C/F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow; all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
1				
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Date of survey: 10 4 22 Survey biologist(s): Tim Chumley Emily Urquidí  
(day, month, year) (name, email, and phone number)  
 Site description: Aztec Ave, Siesta Cr., Plaza Rd, Homestead Dr, Alley, 2nd Rd, Crestview Dr  
(project name and size, general location)  
 County: SB Quad: 29 Palms Location: Twenty-nine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1+2 Transect length: 2.2 mi  
 GPS Start-point: 34.153833 -116.049895 Start time: 0922 @am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.149167 -116.053653 End time: 11:50 @am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 69° °C/F End Temp: 75° °C/F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
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Date of survey: 10 4 22 Survey biologist(s): Tim CHUMLEY EMILY URQUIDI  
(day, month, year) (name, email, and phone number)  
 Site description: Desert Knoll Ave, Playa Vista Dr, White Sands Drive, Aztec Ave, Desert Dunes Dr  
(project name and size, general location)  
 County: SB Quad: 29 Palms Location: Twenty nine Palms Samzuken Rd.  
(UTM coordinates, lat-long, and/or TRS, map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 1#2 Transect length: 1.8 mi  
 GPS Start-point: 34.157481 -116.045313 Start time: 13:15 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.154875 -116.053457 End time: 14:40 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 18° °C/F End Temp: 80° °C/F

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
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Date of survey: 10 4 22 Survey biologist(s): Tim Chumley Emily Urquidí  
(day, month, year) (name, email, and phone number)

Site description: Colle Todd

County: SB Quad: 29 Palms Location: Twenty-nine Palms  
(project name and size, general location) (UTM coordinates, lat-long, and/or TRS; map datum)

Circle one: ☒ coverage or ☐ Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 142 Transect length: 330 ft

GPS Start-point: 34.161171 -116.050963 Start time: 14:50 am/pm ☒  
(easting, northing, elevation in meters)

GPS End-point: 34.161154 -116.049977 End time: 15:00 am/pm ☒  
(easting, northing, elevation in meters)

Start Temp: 79° °C/F End Temp: 79° °C/F

### Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location <small>(in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)</small>	Approx MCL ≥180 mm? <small>(Yes, No or Unknown)</small>	Existing tag # and color, if present
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### Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign <small>(burrows, scats, carcass, etc)</small>	Description and comments
1				
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Date of survey: 11 4 22 Survey biologist(s): Tim CHUMLEY NATHAN MOORHATCH, KEVIN SALGADO  
(day, month, year) (name, email, and phone number)  
 Site description: "Colle Todd" east end  
(project name and size; general location)  
 County: SB Quad: 29 Palms Location: Twentynine Palms  
(UTM coordinates, lat-long, and/or TRS; map datum)  
 Circle one: 100% coverage or Sampling Area size to be surveyed: \_\_\_\_\_ Transect #: 12 Transect length: 0.20  
 GPS Start-point: 34.161249 -116.045333 Start time: 08:01 am/pm  
(easting, northing, elevation in meters)  
 GPS End-point: 34.161216 -116.048803 End time: 08:30 am/pm  
(easting, northing, elevation in meters)  
 Start Temp: 60°C End Temp: 65°C

## Live Tortoises

Detection number	GPS location Easting Northing		Time	Tortoise location (in burrow: all of tortoise beneath plane of burrow opening, or not in burrow)	Approx MCL ≥180 mm? (Yes, No or Unknown)	Existing tag # and color, if present
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## Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting Northing		Type of sign (burrows, scats, carcass, etc)	Description and comments
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