

SECTION FIVE FEDERALLY LISTED SPECIES WITH SUITABLE HABITATS IN THE PROJECT AREA

As a result of the field and background review, FEMA determined that the project area may provide habitats suitable to support two federally listed wildlife species and three plant species regulated by USFWS under the Federal ESA:

- California red-legged frog (Threatened)
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (Threatened)
- Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*) (Endangered)
- Contra Costa goldfields (*Lasthenia conjugens*) (Endangered)
- Showy Indian clover (*Trifolium amoenum*) (Endangered)

The remaining species were determined to have no potential to occur or are not likely to occur in the project area, and thereby would not be affected by the proposed project. This determination was based on the absence of suitable habitat in the project area and/or the fact that the project area is outside the documented species range. Additionally, the project area is outside designated or proposed critical habitat for these remaining species. Since the proposed project would have no effect on these species and/or their critical habitat, these species are not discussed further in this document.

5.1 CALIFORNIA RED-LEGGED FROG

5.1.1 Life History

The California red-legged frog (CRLF) was listed as a threatened species under the Federal ESA on May 23, 1996 (USFWS 1996). The species is distributed throughout at least 28 counties in California but occurs primarily between Santa Barbara and just north of San Francisco (Jennings and Hayes 1994; USFWS 2002; Schaffer et al. 2004). The largest areas of currently occupied habitat are in Monterey, San Luis Obispo, and Santa Barbara counties (USFWS 2004). The CRLF uses a variety of aquatic, riparian, and upland habitats up to an elevation of 4,921 feet (Jennings and Hayes 1994; Bulger et al. 2003; Stebbins 2003).

The CRLF typically inhabits permanent and semipermanent water sources such as streams, lakes, marshes, natural and artificial ponds, and ephemeral drainages in valley bottoms and foothills. CRLFs typically breed between November and April in standing or slow-moving water that is at generally over 2 feet deep (Hayes and Jennings 1988), although CRLF tadpoles have been observed in shallower (10- to 20-inch) sections of streams not overrun by riparian vegetation (Reis 1999). Streams suitable for CRLF breeding typically contain shrubby riparian or emergent vegetation, such as cattails (*Typha* sp.), tules (*Scirpus* sp.), and overhanging willows (*Salix* spp.) (Hayes and Jennings 1988). Egg masses containing 2,000 to 5,000 eggs are attached to

vegetation below the surface of the water and hatch in 6 to 14 days (Storer 1925; Jennings and Hayes 1994). The fully aquatic CRLF larvae require approximately 11 to 20 weeks for development through metamorphosis, and metamorphosed frogs require appropriate upland refugia for aestivation during dry periods. Refuge for the CRLF includes small mammal burrows, downed logs or vegetation, and dense vegetation/litter layer (USFWS 2002).

Non-migrating CRLFs typically stay within 200 feet of aquatic habitat 90 percent of the time and have been found to be closely associated with dense cover (e.g., California blackberry [*Rubus ursinus*], poison oak, and coyote bush [*Bacharis pillularis*]) (Bulger et al. 2003). Adult frogs are mainly active at night and may be active year-round in areas with permanent water. Juvenile frogs are active diurnally and nocturnally. Feeding occurs along the shoreline and the surface of the water (USFWS 2002). Migrating CRLFs are known to disperse to streams up to 2 miles from their breeding sites. These migrations are typically made during wet-weather periods and at night (USFWS 2002).

Continuing loss of fresh water habitat and the introduction of non-native predatory fish species and bullfrogs (*Lithobates catesbeianus*, formerly *Rana catesbeiana*) are attributed to the continuing population decline of the CRLF (USFWS 2002).

5.1.2 Critical Habitat

On July 20, 2007, the USFWS announced its decision to review eight decisions made under the Endangered Species Act “after questions were raised about the integrity of the scientific information used and whether the decisions were consistent with appropriate legal standards” (USFWS 2007a). On November 23, 2007, USFWS announced that it would take action to revise seven of the decisions, including the 2006 final critical habitat designation for the CRLF, which consisted of a subset of the proposed critical habitat units under consideration and that “may have affected the extent of the critical habitat designation” for this species (USFWS 2007a, 2007b, 2007c).

On September 16, 2008, USFWS issued a revised proposal for designating critical habitat boundaries for the CRLF (USFWS 2008a). The area that USFWS proposed as designated critical habitat for the CRLF is three times larger than the 2006 designation for the species. The final critical habitat rule is due to the *Federal Register* by August 29, 2009.

The project area lies outside of all currently designated critical habitat for the CRLF (USFWS 2006a) and all proposed revised designated critical habitat for the CRLF (USFWS 2008a). The closest critical habitat unit, NAP-1 (USFWS 2006a, 2008a), is approximately 7.5 miles northwest of the project area. The project area does not overlap any previously proposed critical habitat units (USFWS 2005b) and is not within a CRLF Recovery Plan Core Area (USFWS 2002).

5.1.3 Previously Documented Occurrences

Solano County is considered to be within the CRLF's current range (USFWS 2002). A CNDDDB records search of the nine USGS 7.5-minute quadrangles surrounding and including the project area (Fairfield North [project area], Denverton, Fairfield South, Cordelia, Allendale, Elmira, Mt. Vaca, Capell Valley, and Mt. George) returned 17 previously documented occurrences of the CRLF (CDFG 2009). The search returned no occurrences of CRLF within 1 mile of the project area and only one record of the CRLF from within a 10-mile radius of the project area. This occurrence is from the Vaca Mountains, approximately 8.5 miles northwest of the project area, where in April 1983, one CRLF adult was observed in Wragg Creek, on the northern side of Highway 128. Habitat at that site consisted of a mix of oak woodland and non-native grassland (CDFG 2009).

5.1.4 Suitable Habitats in the Project Area and Vicinity

Habitats suitable for breeding, dispersal, and aestivation of the CRLF are present throughout most of the project area. Alamo Creek has the pooling and emergent and overhanging vegetation required for CRLF breeding and larval development. The dense riparian vegetation along the banks of the channel within riparian woodland habitat provides suitable habitat for the CRLF to aestivate and disperse. The orchard provides suitable dispersal habitat for the CRLF. The agricultural field and developed habitats provide less suitable dispersal habitat for the CRLF.

Habitats suitable to support the CRLF breeding cycle are also present in the 1-mile radius buffer surrounding the project area. Aquatic habitats in the 1-mile radius buffer surrounding the project area include Alamo Creek, Ulatis Creek, Encinosa Creek, and tributaries of all three creeks. These streams support great valley mixed/valley oak riparian forest, where development has not replaced the natural vegetation. The 1-mile radius area also contains four ponds and Goepfert Reservoir. Upland habitats include non-native grasslands, oak woodlands, and developed areas (e.g., residential, agricultural). Please refer to the CRLF Site Assessment Report for a detailed analysis of the suitability of the habitats in the project area and the 1-mile radius buffer surrounding the project area for the California red-legged frog (FEMA 2008).

5.1.5 Survey Results

No CRLFs were observed in the project area or the 1-mile radius surrounding the project area during the site assessment (April 2008) and protocol-level field surveys (May through August 2008) conducted for the proposed project in 2008. These surveys were conducted in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog*, issued by the USFWS on August 2005 (USFWS 2005a). These surveys are briefly discussed in Section 3.2.2 of this BA. For a detailed discussion of the methodology and findings of these surveys please refer to the CRLF Site Assessment Report (FEMA 2008) and the CRLF Field Survey Report (FEMA 2009a) prepared for the proposed project.

5.2 VALLEY ELDERBERRY LONGHORN BEETLE

5.2.1 Life History

The VELB was listed as a threatened species under the Federal ESA on August 8, 1980. However, on October 2, 2006, the USFWS released a *5 Year Review: Summary and Evaluation Report* which recommended delisting the VELB from the ESA. This recommendation was based on USFWS data collected that indicates the species has recovered to a point where listing is no longer warranted (USFWS 2006b).

VELBs have only been found in association with their host plants, elderberry shrubs. Elderberry shrubs are often found within or close to riparian habitats along Central Valley rivers and their tributaries. Due to the widespread reduction of riparian habitat throughout the State, supporting habitat for this species has been drastically reduced from historical levels (Biosystems Analysis, Inc. 1994).

The VELB depends on the elderberry shrub, throughout its entire life cycle. Beetles remain hidden within the stems and trunks of elderberry shrubs as larvae and pupae for 1 to 2 years. VELBs spend most of the life in the larvae stage within the elderberry shrub. Adults emerge from the shrubs between mid-March through June, about the same time the elderberry shrub produces flowers (Barr 1991; USFWS 1984; USFWS 2006b).

Elderberry shrubs often occur in clumps that consist of several stems attached to a main trunk. Stems and trunks must be equal to or greater than 1 inch in diameter to provide suitable habitat for beetles. Generally, the VELB occurs in low densities and is difficult to observe. Therefore, USFWS requires mitigation for impacts to any elderberry shrubs located within the range of the beetle (USFWS 1999).

5.2.2 Critical Habitat

Critical habitat for the valley elderberry longhorn beetle was designated in 1980 (USFWS 1980). The USFWS designated two critical habitat areas along the American River in the Sacramento area. The project area does not overlap designated critical habitat for the VELB. The nearest critical habitat units are in Sacramento County more than 30 miles from the project area (USFWS 1980). According to the Recovery Plan for the species (USFWS 1984), an area along Putah Creek in Solano County and an area west of the Nimbus Dam along the American River Parkway in Sacramento County are considered essential habitat for the VELB.

5.2.3 Previously Documented Occurrences

Eight previously documented occurrences of the VELB occur within 10 miles of the project area (CDFG 2009). The closest previously documented occurrence of this species is located approximately 6 miles south of the project area, and was last seen in 2002. At this location, one

Federally Listed Species with Suitable Habitats in the Project Area

elderberry shrub with a basal diameter between 14 to 16 inches and VELB emergence exit holes was observed on the southern bank of a creek bed.

5.2.4 Suitable Habitats in the Project Area and Vicinity and Survey Results

The elderberry shrub, the host plant for the VELB, was identified in the project area and in the 100-foot buffer surrounding the project area during protocol-level surveys in 2008 conducted for the proposed project. The 100-foot buffer is based on guidance in the “*Conservation Guidelines for the Valley Elderberry Longhorn Beetle*” (USFWS 1999). These surveys are briefly discussed in Section 3.2 of this BA.

During the 2008 surveys, URS biologists identified 91 blue elderberry shrubs with stems of at least 1 inch in diameter at ground level (with a total of 141 stems) in the project area and the 100-foot buffer surrounding the project area (Figure 8, index sheet and sheets 1 through 4 and Figure 9, index sheet and sheets 1 through 4). Of the 91 shrubs, 63 shrubs were in the project area, and 28 shrubs were in the 100-foot buffer.

The majority of elderberry shrubs (83 shrubs) were in the riparian habitat associated with Alamo Creek. Of these 83 shrubs in the riparian habitat, 55 shrubs were within the project area, and 28 shrubs were within the buffer.

Eight elderberry shrubs (see Figure 9, Sheet 2, stems N64 to N74) did not occur within the riparian habitat; they were located approximately 225 feet north of the riparian corridor mapped within the project area.

Of the 63 elderberry shrubs with stems of at least 1 inch in diameter at ground level in the project area, 34 shrubs had exit holes anywhere on the shrub, 56 shrubs did not have exit holes, and 4 shrubs had exit holes that could not be fully assessed for the presence of exit holes because they were mixed in or covered by other vegetation.

For more detailed information regarding the survey methodology and findings please refer to the Elderberry Shrub Stem Count Survey Report prepared for the proposed project (FEMA 2009c).

5.3 TIBURON PAINTBRUSH

5.3.1 Life History

Tiburon paintbrush is listed as endangered under the Federal ESA. This species is a semi-woody perennial hemiparasitic herb of the snapdragon family (Scrophulariaceae) with branched stems that grow 1 to 2 feet tall. It has conspicuous floral bracts which are yellowish and sometimes red-tipped. The unbranched hairs and the lack of glands below the inflorescence (entire cluster of flowers and associated structures) distinguish this species from other *Castilleja* species. (USFWS 1998).

Tiburon paintbrush flowers from April to June at elevations from 60 to 400 meters. This species is found in serpentinite valley and foothill grassland (CNPS 2008).

5.3.2 Critical Habitat

No critical habitat has been designated for this species.

5.3.3 Previously Documented Occurrences

Only one documented occurrence of this species was identified in the CNDDDB search of the nine USGS 7.5-minute quadrangles surrounding and including the project area (CDFG 2009). This occurrence is approximately 18 miles southwest of the project area (CDFG 2009, occurrence number 5).

5.3.4 Suitable Habitats in the Project Area and Vicinity

Tiburon paintbrush has the potential to occur in valley and foothill grassland habitat in the project area.

5.3.5 Survey Results

Tiburon paintbrush was not observed in the project area during botanical surveys conducted on April 24–25, May 19–20, and June 11, 2008 (FEMA 2009b).

5.4 CONTRA COSTA GOLDFIELD

5.4.1 Life History

Contra Costa goldfields are listed as endangered under the Federal ESA. This species is a showy spring annual herb in the aster family (Asteraceae) that grows 4 to 12 inches tall and is usually branched. The flowers are bright yellow with phyllaries that are one-quarter to one-half fused. Identifying characteristics include the partially fused phyllaries and the lack of a pappus, which distinguishes this species from the similar Fremont's goldfields and Burke's goldfields (USFWS 2005c).

Contra Costa goldfields flower from March to June at elevations up to 470 meters. This species is found in cismontane woodland, alkaline playas, valley and foothill grassland, and mesic vernal pools (CNPS 2008).

5.4.2 Critical Habitat

The project area does not overlap designated critical habitat for Contra Costa goldfields. The nearest designated critical habitat unit (4-A) is 5 miles southeast of the project area (USFWS 2006c).

5.4.3 Previously Documented Occurrences

A total of 13 documented occurrences of Contra Costa goldfields were identified within the CNDDDB search of the nine USGS 7.5-minute quadrangles surrounding and including the project area (CDFG 2009). The closest documented occurrence of this species is approximately 4.39 miles southeast of the project area (CDFG 2009, occurrence number 36). All of the populations located in Solano County are clustered near the City of Fairfield or at Travis Air Force Base (USFWS 1997; CDFG 2009).

5.4.4 Suitable Habitats in the Project Area and Vicinity

Typical habitat for Contra Costa goldfields consists of vernal pools, swales, moist flats, and depressions in open, grassy areas of woodland and valley grassland communities. (CDFG 2009; USFWS 2005c). While no vernal pools are located within the project area, woodland and valley and foothill grassland habitats occur throughout the project area, and is potential suitable habitat for this species (CNPS 2008).

5.4.5 Survey Results

Contra Costa Goldfields were not observed in the project area during botanical surveys conducted on April 24–25, May 19–20, and June 11, 2008 (FEMA 2009b).

5.5 SHOWY INDIAN CLOVER

5.5.1 Life History

Showy Indian clover is listed as endangered under the Federal ESA. It is an annual herb in the pea family (Fabaceae) that grows from 10 to 69 centimeters. This species has flowers which are purple with white tips that grow in dense round or ovoid heads that are approximately 2.5 centimeters in diameter. The flowers are not subtended by the circular toothed bract present in many other clovers (USFWS 2008b).

Showy Indian clover flowers from April to June at elevations from 5 to 415 meters. This species is found in valley and foothill grasslands and coastal bluff scrub (CNPS 2008). Sometimes this species is observed in serpentine soils and can be found in open sunny sites and in swales. It has also been observed along the roadside and on eroding cliff faces (CDFG 2009).

5.5.2 Critical Habitat

No critical habitat has been designated for this species.

5.5.3 Previously Documented Occurrences

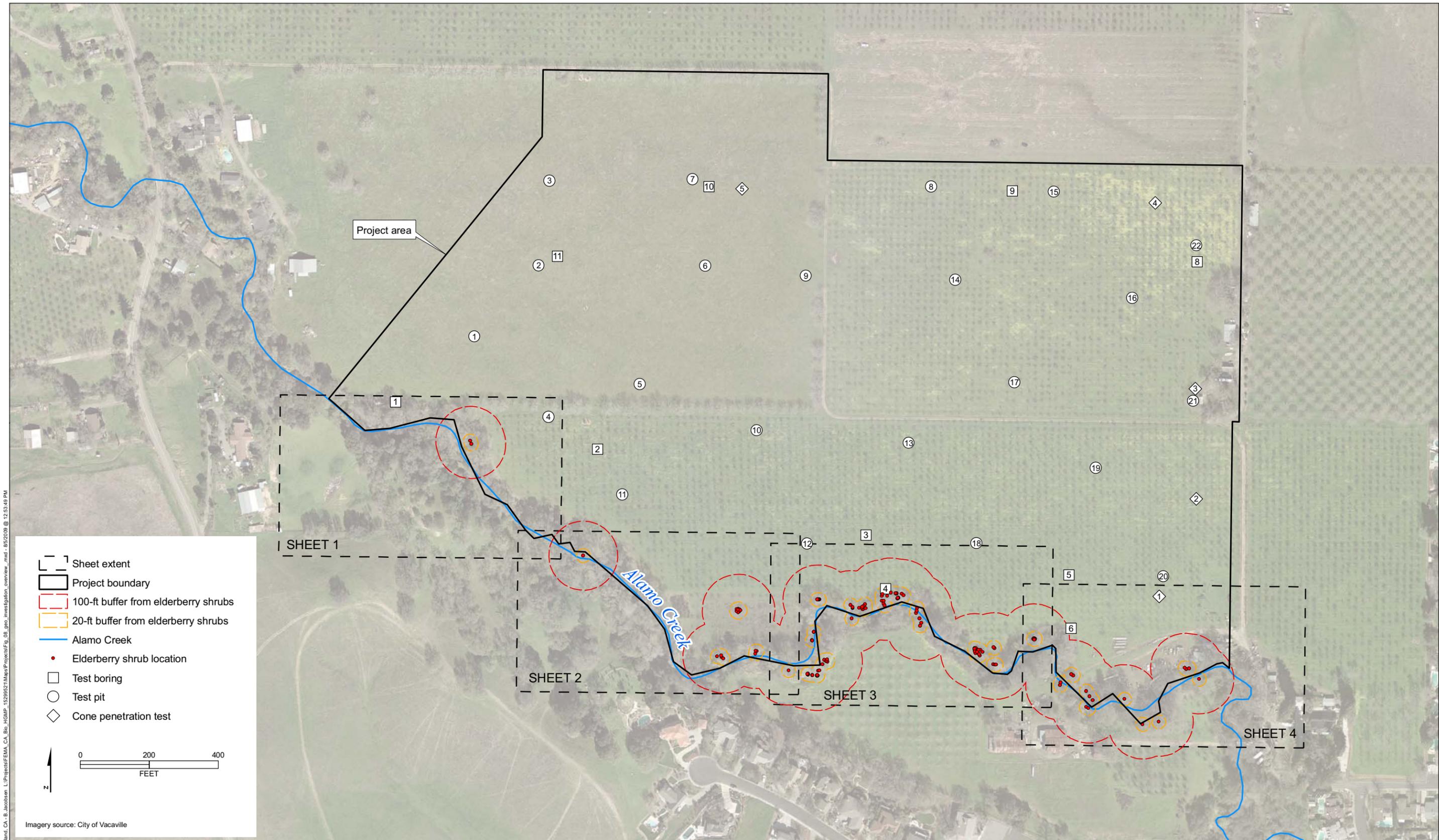
A total of four documented occurrences of showy Indian clover were identified within the CNDDDB search of the nine USGS 7.5-minute quadrangles surrounding and including the project area (CDFG 2009). The closest documented occurrence of this species is approximately 1.99 miles southeast of the project area (CDFG 2009, occurrence number 11).

5.5.4 Suitable Habitats in the Project Area and Vicinity

Showy Indian clover has the potential to occur in valley and foothill grassland habitat in the project area.

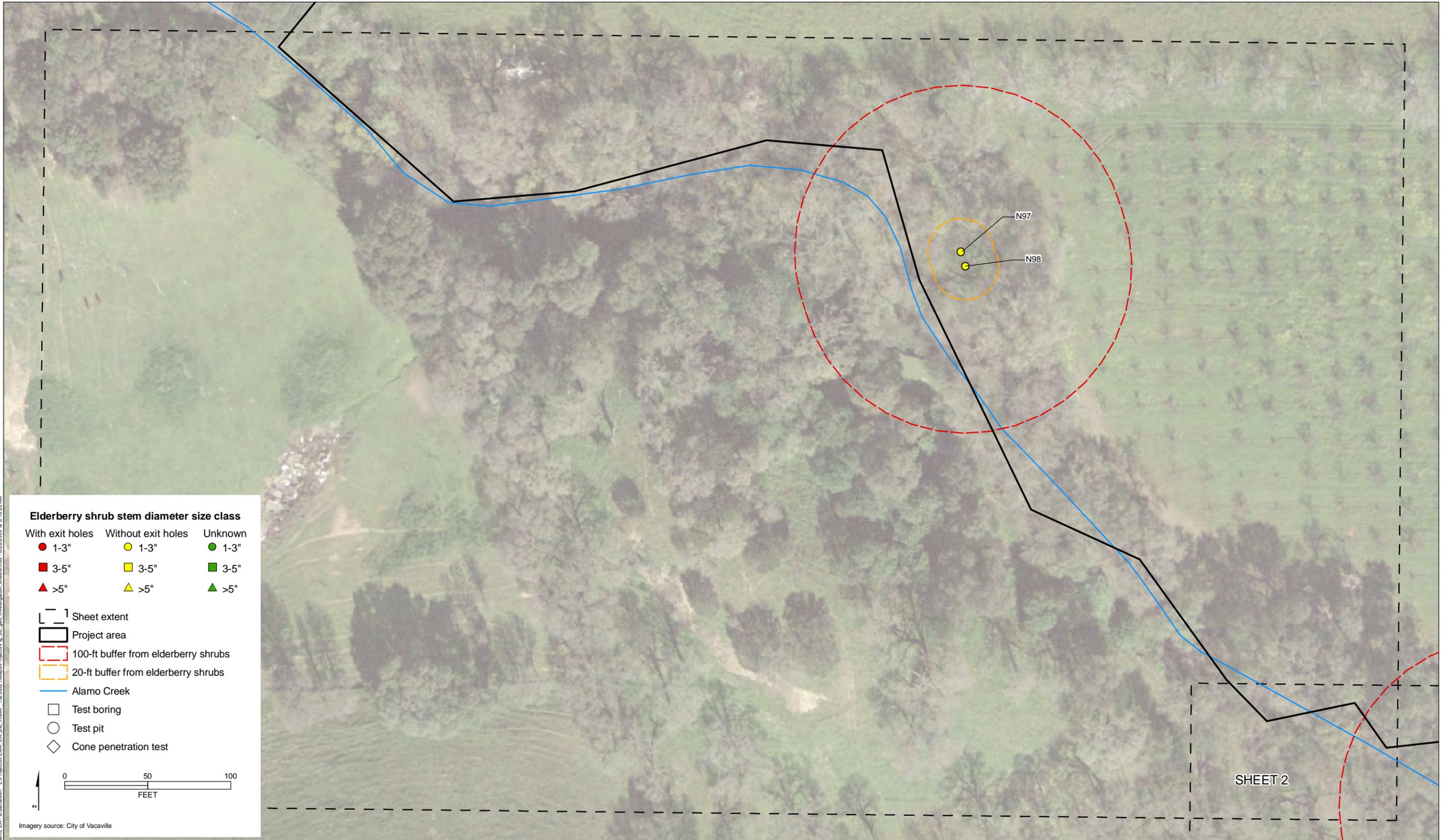
5.5.5 Survey Results

Showy Indian clover was not observed in the project area during botanical surveys conducted on April 24–25, May 19–20, and June 11, 2008 (FEMA 2009b).



URS Corp - Oakland, CA - B. Jacobsen L:\Projects\FEMA_CA_Bio_HCHP-1529521\MapProject\Fig_08_aer_investigation_overview.mxd - 05/20/08 @ 12:53:48 PM

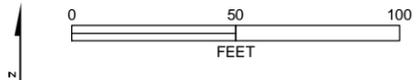
URS Corp. - Oakland, CA - B. Jacobsen L:\Project\FEMA_CA_Bio_HCMP_152992\Map\Project\Fig_08_geo_investigation_2sheets.mxd - 6/26/2009 @ 8:18:26 AM



Elderberry shrub stem diameter size class

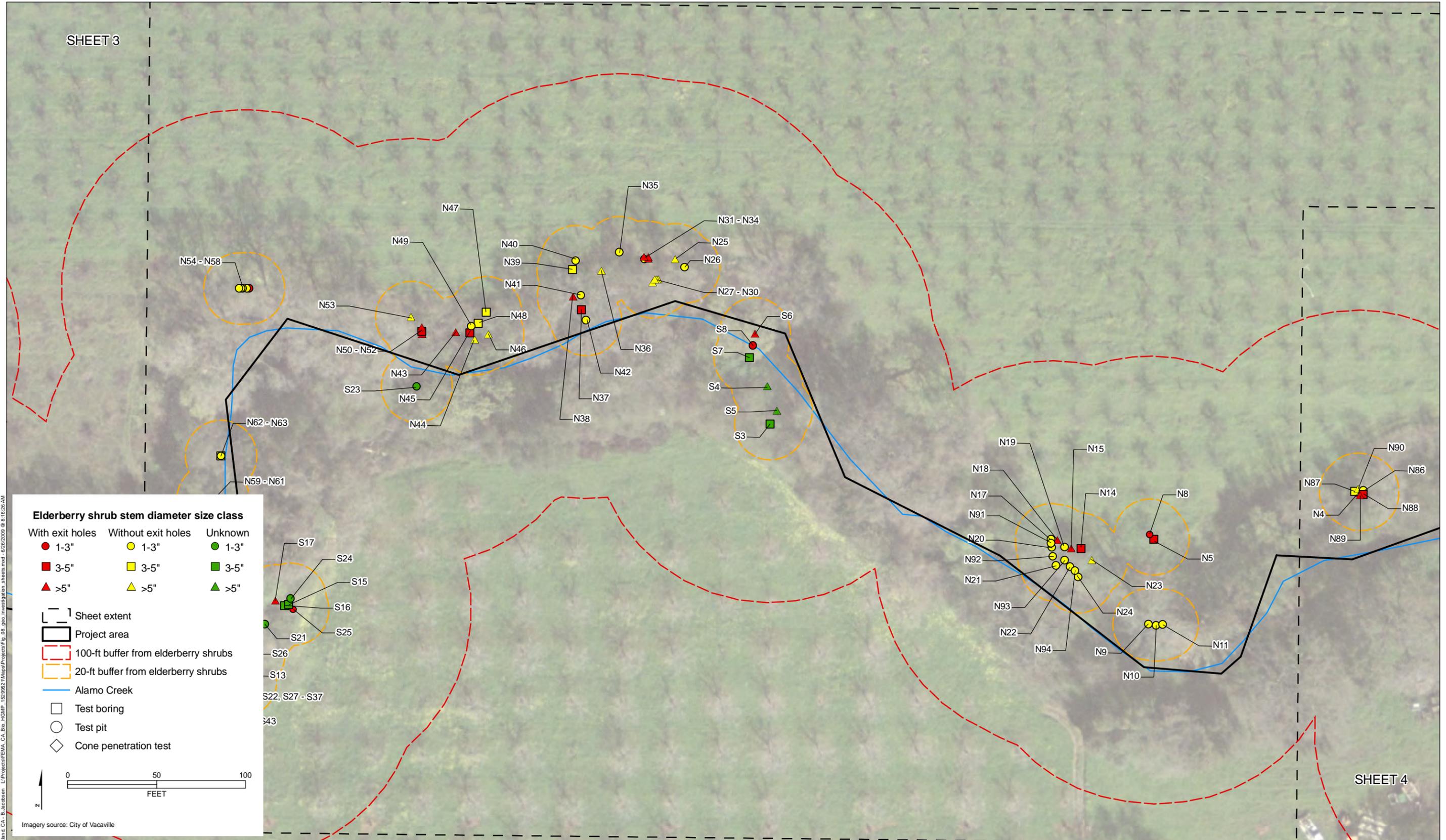
With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

- [-] Sheet extent
- [] Project area
- [] 100-ft buffer from elderberry shrubs
- [] 20-ft buffer from elderberry shrubs
- [] Alamo Creek
- [] Test boring
- [] Test pit
- [] Cone penetration test



Imagery source: City of Vacaville

SHEET 3



SHEET 4

URS Corp., Oakland, CA; B. Jacobsen L:\Projects\FEMA_CA_Bio_HCMP_1529692\Map\Figures\Fig_08_geo_investigation_shrubs.mxd - 6/26/2009 @ 8:18:26 AM

SHEET 2

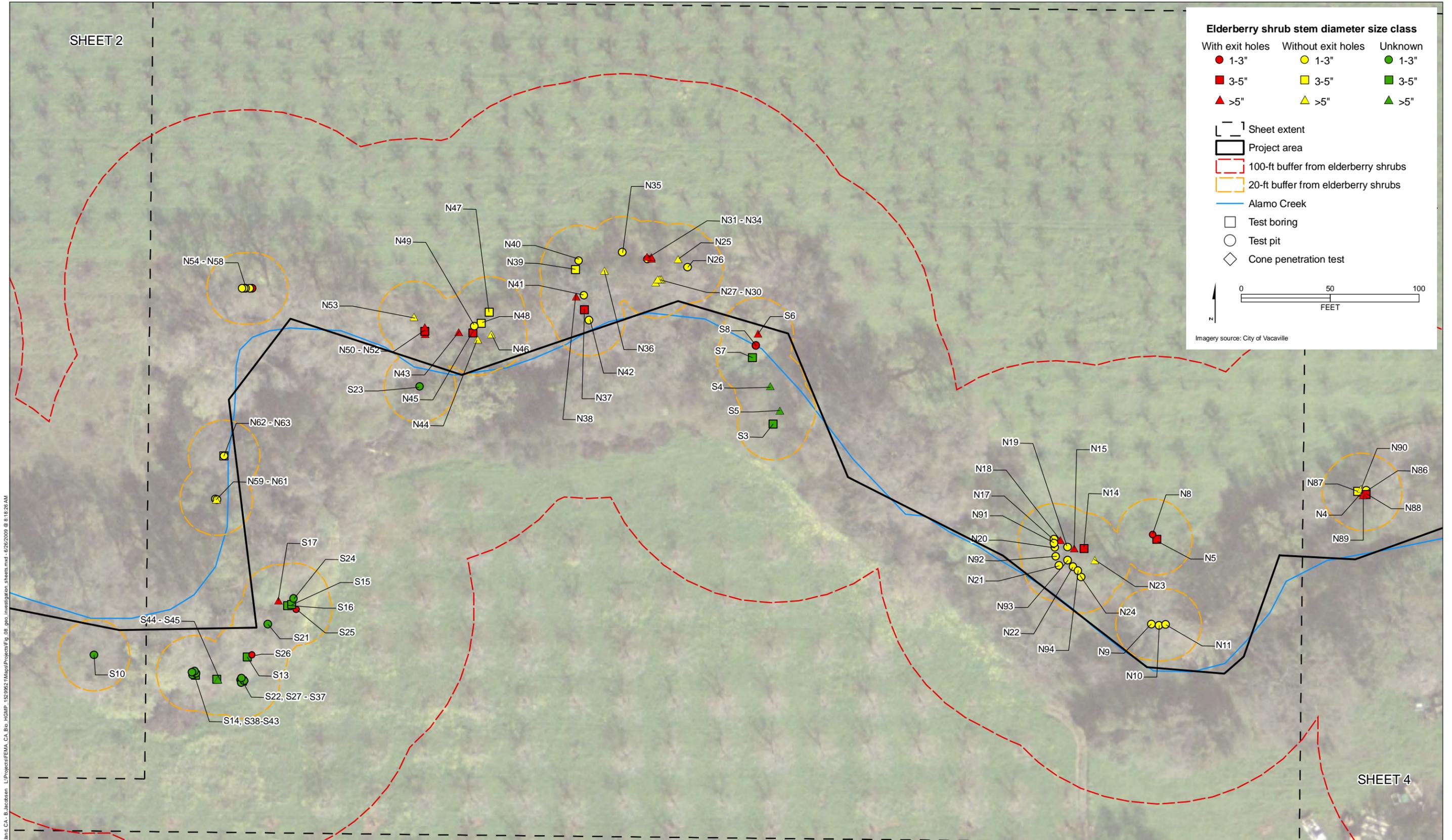
Elderberry shrub stem diameter size class

With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

[---] Sheet extent
 [---] Project area
 [---] 100-ft buffer from elderberry shrubs
 [---] 20-ft buffer from elderberry shrubs
 [---] Alamo Creek
 □ Test boring
 ○ Test pit
 ◇ Cone penetration test

0 50 100
FEET

Imagery source: City of Vacaville

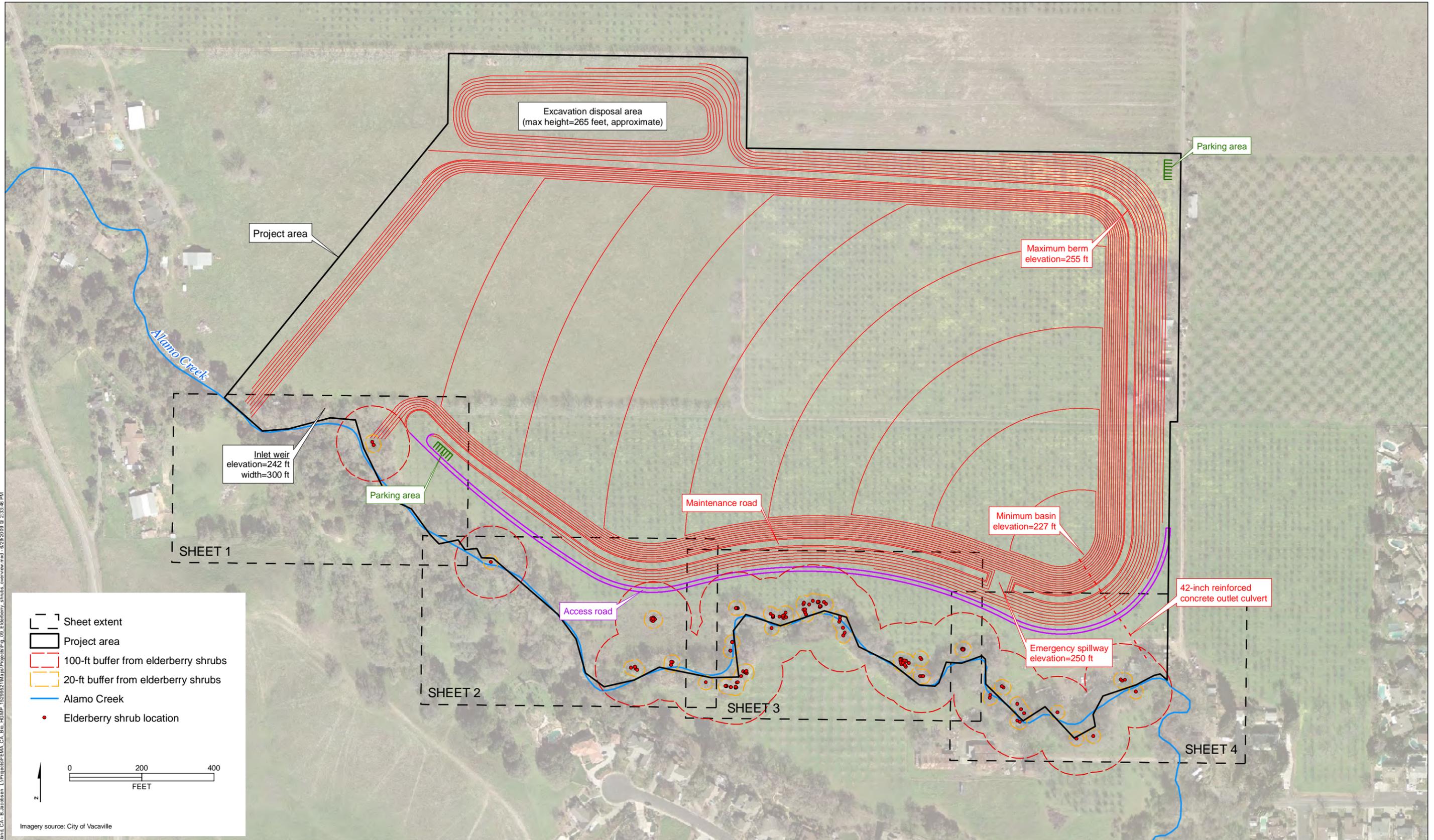


SHEET 4

URS Corp., Oakland, CA; B. Jacobsen L:\Projects\FEMA_CA_Bo_HCMP_152362\Maps\Project\Fig_08_geo_investigation_2sheets.mxd - 6/26/2009 @ 8:18:26 AM

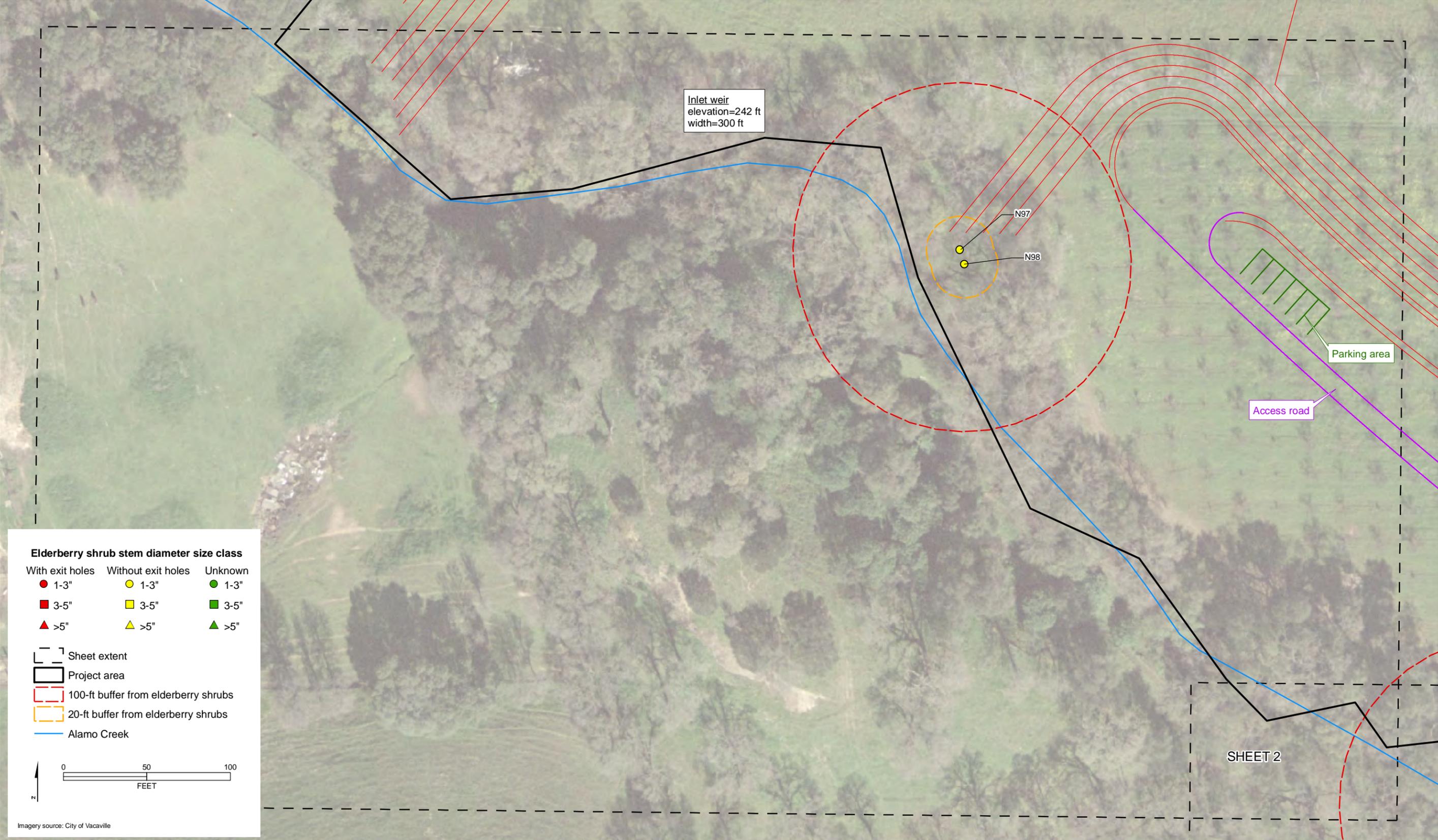


URS Corp., Oakland, CA; B. Jacobsen L:\Projects\FEMA_CA_Bio_HCMP_1523992\Maps\Projects\Fig_08_geo_investigation_shrubs.mxd - 6/26/2009 @ 8:18:26 AM



US Corp. Oakland, CA - B. Jacobsen L:\Projects\FEMA-CA-Bio-IGMP-1529521\Mapa\Projects\Fig_05_Elderberry_shrubs_Overview.mxd - 6/29/2018 @ 2:53:46 PM

URS Corp., Oakland, CA; B. Jacobsen L:\Project\FEMA_CA_Bio_HCMP_152392\Mapa\Project\Fig_09_Elderberry_shrubs.mxd 6/25/2009 @ 1:54:39 PM



Elderberry shrub stem diameter size class

With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

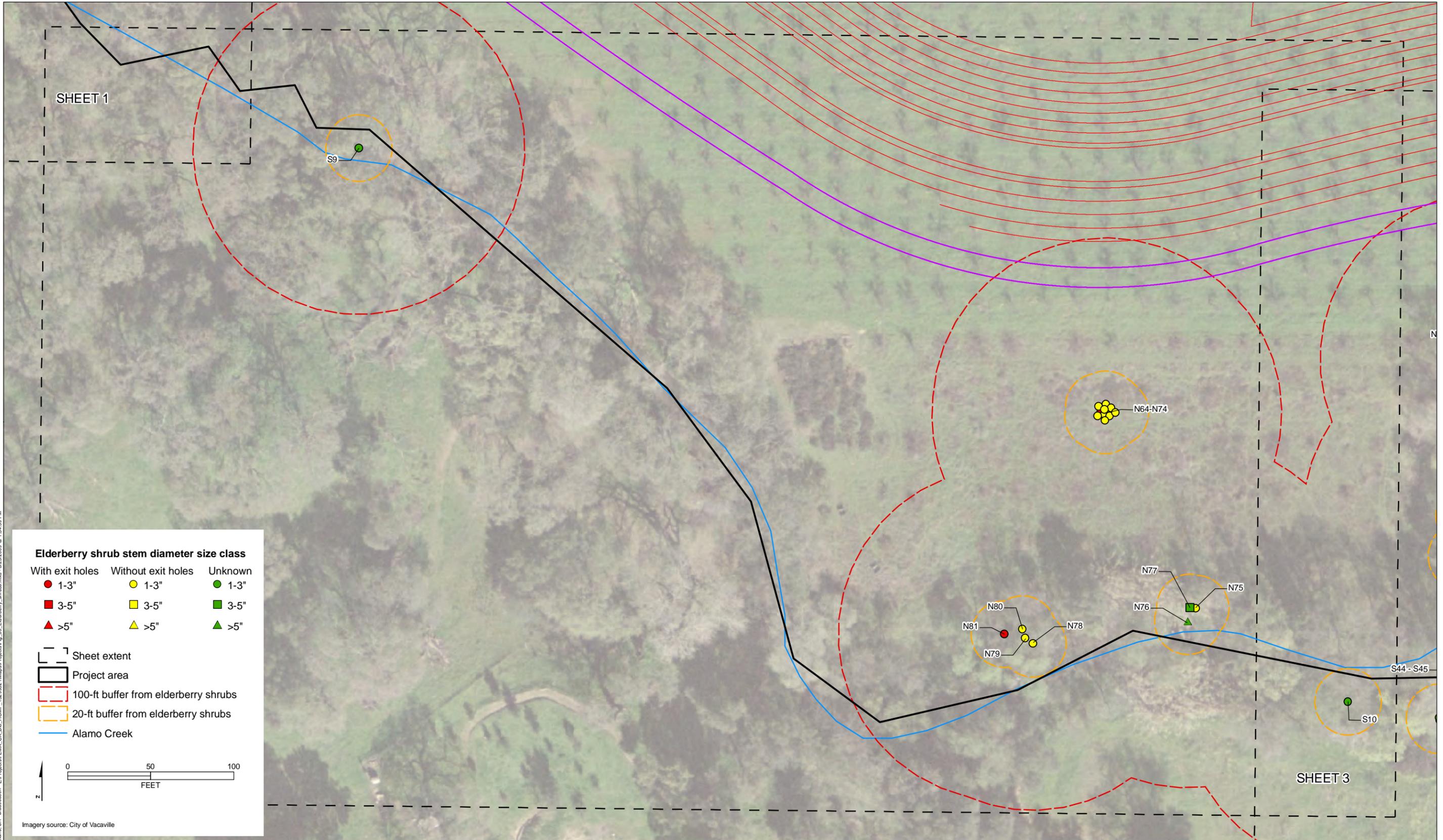
[---] Sheet extent
 [---] Project area
 [---] 100-ft buffer from elderberry shrubs
 [---] 20-ft buffer from elderberry shrubs
 [---] Alamo Creek

0 50 100
FEET

Imagery source: City of Vacaville

SHEET 2

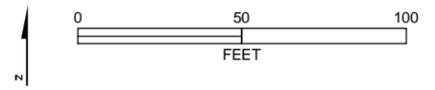
URS Corp., Oakland, CA; B. Jacobsen L:\Project\FEMA_CA_Bio_HCHP_152992\Map\Project\Fig_09_Elderberry_shrubs.mxd 6/25/2009 @ 1:54:39 PM



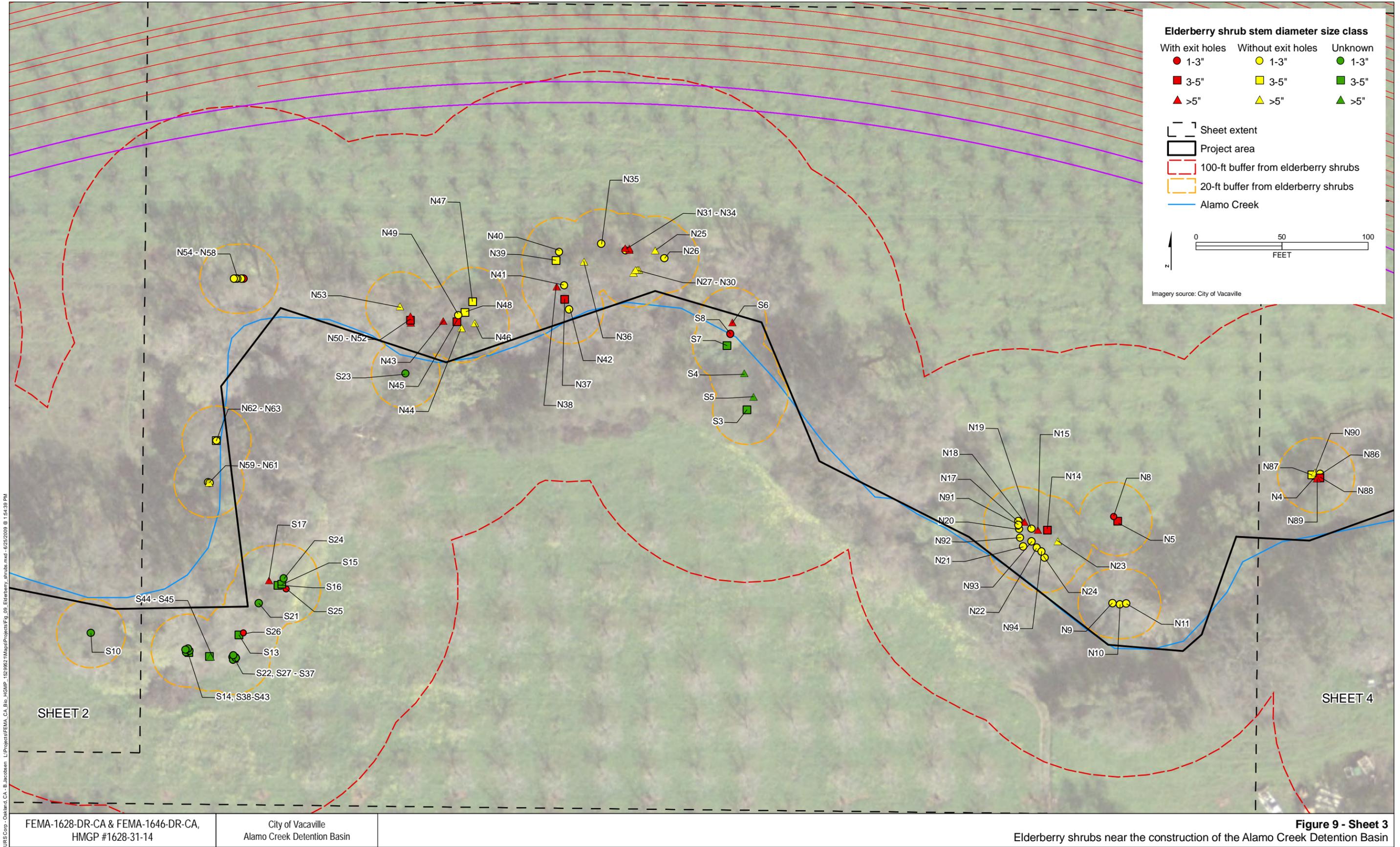
Elderberry shrub stem diameter size class

With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

- [- - -] Sheet extent
- [] Project area
- [- - -] 100-ft buffer from elderberry shrubs
- [- - -] 20-ft buffer from elderberry shrubs
- [- - -] Alamo Creek



Imagery source: City of Vacaville



Elderberry shrub stem diameter size class

With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

[---] Sheet extent
 [---] Project area
 [---] 100-ft buffer from elderberry shrubs
 [---] 20-ft buffer from elderberry shrubs
 [---] Alamo Creek

0 50 100
 FEET

Imagery source: City of Vacaville

URS Corp., Oakland, CA; B. Jaccobson L:\Projects\FEMA_CA_Bio_HCHMP_152992\Mapa\Project\Fig_09_Elderberry_shrubs.mxd; 6/25/2009 @ 1:54:09 PM



Elderberry shrub stem diameter size class

With exit holes	Without exit holes	Unknown
● 1-3"	● 1-3"	● 1-3"
■ 3-5"	■ 3-5"	■ 3-5"
▲ >5"	▲ >5"	▲ >5"

[---] Sheet extent
 [---] Project area
 [---] 100-ft buffer from elderberry shrubs
 [---] 20-ft buffer from elderberry shrubs
 [---] Alamo Creek

0 50 100
 FEET

Imagery source: City of Vacaville

URS Corp., Oakland, CA; B. Jacobsen L:\Projects\FEMA_CA_Bio_HCHMP_152992\Mapa\Project\Fig_09_Elderberry_shrubs.mxd 6/25/2009 @ 1:54:39 PM

Potential Adverse Effects of the Preliminary Engineering and Environmental Investigation and Proposed Project

SECTION SIX POTENTIAL ADVERSE EFFECTS OF THE PRELIMINARY ENGINEERING AND ENVIRONMENTAL INVESTIGATION AND PROPOSED PROJECT

This section analyzes potential adverse effects to the federally listed wildlife and plant species under USFWS' jurisdiction identified as having the potential to occur in the project area because suitable habitat is present in the project area, the project area is within the species range, and/or occurrences in or near the project area are documented. Additional clarification on the construction plans may require a supplemental review of the potential effects on federally listed species.

6.1 CALIFORNIA RED-LEGGED FROG

Although suitable habitat for the CRLF is located within the project area, protocol-level surveys for the CRLF conducted for the proposed project determined that the CRLF does not occur within the project area or a 1-mile radius surrounding the project area (FEMA 2009a). Therefore, no adverse effects are expected to occur to the CRLF as a result of the proposed project.

6.2 VALLEY ELDERBERRY LONGHORN BEETLE

Habitat suitable to support the VELB is present in the project area and the 100-foot buffer surrounding the project area. During the 2008 surveys, URS biologists identified 91 blue elderberry shrubs with stems of at least 1 inch in diameter at ground level in the project area and the 100-foot buffer surrounding the project area (Figure 8 [index and sheets 1 through 4] and Figure 9 [index and sheets 1 through 4]). Of the 91 shrubs, 63 shrubs were in the project area, and 28 shrubs were in the 100-foot buffer. All of these elderberry shrubs are potential suitable habitat for the VELB.

Construction activities associated with the proposed project may directly and indirectly affect the VELB and its host habitat. Direct and indirect effects from the proposed project could result in "take" of the VELB. "Take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap capture, collect, or to attempt to engage in any such conduct." (ESA, Section 3[19]. Different kinds of take are addressed below in three main categories: (1) direct take, (2) erosion and sedimentation, and (3) adverse effects to habitat.

Regarding the City's (1) proposed geotechnical testing and site evaluation program (summer 2009) and (2) potential future geotechnical investigations, if the City implements the measures described in Sections 2.2.1 and 2.2.2, FEMA has determined that there would be **no effect** to VELB. Therefore, these two proposed testing programs are not discussed further in this section. The following effects analysis pertains to the Fall 2008 geotechnical investigations, and future construction, operation, and maintenance of the proposed project.

6.2.1 Direct Effects

According to the ESA Consultation Handbook, direct effects are the direct or immediate effects of the proposed project on the species or its habitat (USFWS and NMFS 1998). Direct effects could potentially occur to VELB in the project area and in the 100-foot buffer surrounding the project area.

6.2.1.1 *Direct Disturbance, Injury, or Mortality*

Preliminary engineering and environmental investigation and proposed project activities within or adjacent to elderberry shrubs with stems at least 1 inch in diameter at ground level within the project area or within 100-feet from the boundary of the project area could result in disturbance, injury, and/or mortality of the VELB, especially if construction involves the removal and/or damage of elderberry shrubs or if the activity occurs during the VELB's emergent period (March 15–June 15).

Geotechnical Investigations (Fall 2008)

Between October 13, 2008, and November 10, 2008, the City conducted test borings, dug test pits, and conducted cone penetration tests at the project area (Appendix C). Three test borings (borings 1, 4, and 6) were conducted between October 13 and 16, 2008, near the riparian habitat within the project area. Of these three test borings, one (test boring 4) was conducted within 100 feet of elderberry shrubs with stems at least 1 inch in diameter at ground level. Test boring 4 was within 100 feet of the drip line, but greater than 20 feet from the drip line, of 16 elderberry shrubs with stems at least 1 inch in diameter at ground level (Table 6-1; Figure 8, Sheet 3). Five of these shrubs have at least one stem with exit holes. Test boring 4 was within 20 feet of the drip line of one elderberry shrub with two stems at least 1 inch in diameter at ground level (Table 6-2; Figure 8, sheet 3). Exit holes were not present on this shrub.

Potential Adverse Effects of the Preliminary Engineering and Environmental Investigation and Proposed Project

Table 6-1. Field data for the elderberry shrubs and associated stems less than 100 feet but more than 20 feet from the geotechnical activities conducted in Fall 2008.

Shrub ID Number	Stem ID Number*	Location (Project Area/Buffer)	Stem Diameter (in inches)	Presence of Exit Holes?	Riparian?
16	N25	Project area	>5	N	Y
17	N26	Project area	1-3	N	Y
18	N27	Project area	>5	N	Y
	N28		>5	N	Y
	N29		>5	N	Y
	N30		>5	N	Y
19	N31	Project area	>5	Y	Y
	N32		>5	Y	Y
	N33		>5	Y	Y
	N34		1-3	N	Y
20	N35	Project area	1-3	N	Y
21	N36	Project area	>5	N	Y
22	N37	Project area	3-5	Y	Y
23	N38	Project area	>5	Y	Y
24	N39	Project area	3-5	N	Y
	N40		1-3	N	Y
25	N41	Project area	1-3	N	Y
26	N42	Project area	1-3	N	Y
27	N43	Project area	>5	Y	Y
28	N44	Project area	>5	N	Y
29	N45	Project area	3-5	Y	Y
30	N46	Project area	>5	N	Y
31	N47	Project area	3-5	N	Y
	N48		3-5	N	Y
32	N49	Project area	1-3	N	Y

ID = identification

Table 6-2. Field data for the elderberry shrubs and associated stems less than 20 feet from geotechnical activities conducted in of the Fall 2008.

Shrub ID Number	Stem ID Number*	Location (Project Area/Buffer)	Stem Diameter (in inches)	Presence of Exit Holes?	Riparian?
24	N39	Project area	3–5	N	Y
	N40		1–3	N	Y

ID = identification

The potential for adverse effects to VELB, as a result of the activities conducted with test boring 4, is extremely low for several reasons:

- Test boring 4 was conducted outside of the riparian area in an upland area which appears to have been historically used as an access road within the orchard (Appendix C)
- The area of ground-disturbance from test borings is minimal (i.e., 4 to 8 inches in diameter)
- The activity occurred during clear weather
- The boring was conducted outside of the emergent period for VELB (March 15–June 15)

All other geotechnical investigations were conducted greater than 100 feet from the drip line of elderberry shrubs identified during the 2008 surveys in upland areas during clear weather. A biological monitor was also present for geotechnical investigation activities that were conducted after October 17, 2008. Therefore, FEMA has determined that the remaining geotechnical investigation activities conducted in fall 2008 had no adverse effects on the VELB or its suitable habitat.

Construction of the Alamo Creek Detention Basin

Construction of the inlet structure would likely remove and/or damage two elderberry shrubs with stems at least 1 inch in diameter at ground level (N97 and N98; see Figure 9, sheet 1). Although neither of these two shrubs presented exit holes, they provide suitable habitat for VELB. Removal of these elderberry shrubs could result in adverse effects to the VELB, in the form of disturbance, injury, and/or mortality. No other construction activities associated with the project would require removal of elderberry shrubs.

Construction of the outlet and the south end of the detention basin structure would require encroachment in the 100-foot buffer from some elderberry shrub drip lines (Figure 9, index sheet and sheets 1 through 4). The exact number of elderberry shrubs would be dependent upon the size of the temporary work areas adjacent to the outlet and detention basin.

Potential Adverse Effects of the Preliminary Engineering and Environmental Investigation and Proposed Project

Encroachment within the 20-foot buffer from the drip lines of elderberry shrubs with stems at least 1 inch in diameter at ground level is not anticipated except for the two elderberry shrubs that would be removed.

Operation and Maintenance

Weed abatement through mowing and/or use of an herbicide (Aquamaster) would be performed 2 to 3 times in the summer to restrict the accumulation of fire fuel and maintain water flow in the ACDB. If weed abatement activities remove or damage elderberry shrubs within the project area or the 100-foot buffer surrounding the project area, these activities could result in disturbance, injury, and/or mortality of the VELB if the elderberry shrub is occupied by this species.

6.2.1.2 Erosion and Sedimentation

Elderberry shrubs, and therefore potentially the VELB, if present, could be affected by potential erosion and sedimentation during construction activities.

Construction of the Alamo Creek Detention Basin

Heavy equipment would be used to construct the inlet, outlet, and basin structures. The movement of equipment and the placement of permanent structures along the creek embankment could cause erosion of the bank, bank instability, and increased erosion and sedimentation in the creek. The loss of soil and potentially riparian habitat along the creek bank could adversely affect the survival of elderberry shrubs in the project area, and therefore, the beetle that may inhabit that shrub. These effects could be minimized through the implementation of standard BMPs that the City would be required to implement through its compliance process with Sections 401, 402, and 404 of the Clean Water Act of 1972, Section 1600 *et seq.* of the California Fish and Game Code, local regulations or by local regulatory agencies.

Operation and Maintenance Activities

Debris removal would mostly occur after winter and spring, but may infrequently occur during the winter in the wet season. Depending on where these activities occur (e.g., near the riparian habitat at the inlet or outlet structures versus in the upland area within the basin) and if they are conducted during the wet season, the heavy equipment used (i.e., backhoe or excavator) to conduct the debris removal could cause erosion and sedimentation that could adversely affect riparian habitat, elderberry shrubs, and VELBs, if this species is present in the shrub. These effects could be minimized through the implementation of standard BMPs that the City would be required to implement through its compliance process with Sections 401, 402, and 404 of the Clean Water Act of 1972, Section 1600 *et seq.* of the California Fish and Game Code, local regulations or by local regulatory agencies.

6.2.1.3 Adverse Effects on Riparian Habitat

Construction activities could permanently and temporarily disturb potential habitat for the VELB within the project area.

Construction of the Alamo Creek Detention Basin

Besides the construction of the inlet and outlet structures, no other activities associated with the construction of the ACDB would occur inside the riparian zone.

At the proposed inlet location, about 0.683 acres of riparian habitat could be permanently removed. At the proposed outlet location, about 0.004 acres of riparian habitat could be permanently removed. The exact size of the temporary work areas adjacent to these locations is not known at this time but would be minimized to reduce potential adverse effects to the riparian habitat and Alamo Creek. In addition, temporarily disturbed soils within the project area would be hydroseeded.

Besides the two elderberry shrubs with stems at least 1 inch in diameter at ground level in the riparian habitat that may be permanently removed as a result of the construction of the inlet, no other riparian habitat with elderberry shrubs with stems at least 1 inch in diameter at ground level is expected to be permanently or temporarily disturbed.

Operation and Maintenance Activities

If the bottom of the basin is used for agriculture, runoff from applied herbicides, pesticides, and chemical fertilizer could potentially reach the riparian zone through the inlet or outlet locations, depending on the time of year these chemicals were applied. This runoff could damage riparian habitat adjacent to elderberry shrubs or the elderberry shrubs themselves.

6.2.2 Indirect Effects

According to the ESA Consultation Handbook, indirect effects are effects occurring later in time as a result of the proposed project (USFWS and NMFS 1998). Indirect effects could occur to the VELB potentially in the project area and in the 100-foot buffer surrounding the project area.

6.2.2.1 Dust Accumulation

Dust raised by construction equipment could potentially coat elderberry shrubs within the project area and in the 100-foot buffer surrounding the project area, which in time could lead to stress to these shrubs (e.g., water stress, dead stems, smaller leaves). Dust accumulation could adversely affect the survival of elderberry shrubs, and therefore, the beetle that may inhabit that shrub. These effects could be minimized through the implementation of standard BMPs that the City would be required to implement through its compliance process with Sections 401, 402, and 404 of the Clean Water Act of 1972, Section 1600 *et seq.* of the California Fish and Game Code, local regulations or by local regulatory agencies.

Potential Adverse Effects of the Preliminary Engineering and Environmental Investigation and Proposed Project

6.2.2.2 *Adverse Effects on Riparian Habitat*

Construction of the inlet and outlet would cause the permanent loss of soil and riparian habitat along the creek bank. While the majority of the riparian habitat that would be removed does not currently contain elderberry shrubs (Figure 9), this area is suitable habitat for the shrub. In the future, it could be possible for additional elderberry shrubs to become established in this habitat. The loss of riparian habitat through implementation of the proposed project would result in a reduced amount of habitat available for elderberry shrubs to establish in within the project area. in the future, and consequently, a reduced amount of suitable habitat available in the project area for the VELB.

6.3 PLANT SPECIES

No plant species federally listed or proposed to be listed under the Federal ESA were observed during botanical surveys conducted at appropriate flowering times in 2008 (FEMA 2008b). Therefore, no direct or indirect adverse effects are expected to occur as a result of the proposed project to plant species federally listed or proposed to be listed under the Federal ESA.

**SECTION SEVEN INTERRELATED PROJECTS, INTERDEPENDENT PROJECTS,
AND CUMULATIVE EFFECTS**

7.1 EFFECTS OF INTERRELATED PROJECTS

According to the ESA Consultation Handbook, interrelated projects are all other projects that would not occur but for a larger project and depend on the larger project for their justification (USFWS and NMFS 1998).

The ACDB would be constructed to prevent future flooding hazards in the City downstream, an event which has occurred frequently in previous years because of Alamo Creek's insufficient channel capacity. To FEMA's understanding, there are no other projects currently proposed that are dependent on the proposed ACDB project for their justification.

7.2 EFFECTS OF INTERDEPENDENT PROJECTS

According to the ESA Consultation Handbook, interdependent projects are all other projects that would not occur but for the project under consultation (USFWS and NMFS 1998).

No other projects are known of by FEMA that would depend on the ACDB project being built in order for them to occur.

7.3 CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private projects that are reasonably certain to occur in the project area considered in this BA. Future Federal projects that are unrelated to the proposed project are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA (ESA, Section 402.14[g][4]).

The elderberry shrub, the host plant for the VELB, was identified in the 100-foot buffer surrounding the project area during protocol-level surveys in 2008 conducted for the proposed project. The 100-foot buffer is based on guidance in the "*Conservation Guidelines for the Valley Elderberry Longhorn Beetle*" (USFWS 1999). Since elderberry shrubs have been identified within the 100-foot buffer, FEMA is including any future State, tribal, local, or private projects that it is aware of that are reasonably certain to occur in this 100-foot buffer in this analysis of cumulative effects. FEMA is aware of one such project, the City's proposed Florence Detention Basin (FDB).

The City has notified FEMA that it is investigating the feasibility of constructing the FDB approximately 0.25 mile northeast of the proposed ACDB project area at a site at the end of Florence Drive. As part of the FDB project, the City proposed to construct an access road from Rogers Lane to the FDB site. Part of this proposed access road would be within the 100-foot buffer surrounding the ACDB project area. The proposed footprint of the FDB would not overlap

Alamo Creek Detention Basin: Biological Assessment for USFWS

any portion of the ACDB project area and would be located outside of the 100-foot buffer of the ACDB project area.

The City has acquired an easement from the property owner for construction of FDB. A pre-design report has been completed, and the proposed FDB project is currently going through the California Environmental Quality Act compliance process. According to the City, no funding is available for construction of the FDB at this time, and preparation of a schedule by the City for completing this project would depend on funding. It is currently unclear if the proposed FDB would require a permit from the USACE under Section 404 of the Clean Water Act. Thus, FEMA is uncertain if there would be a Federal nexus for the proposed FDB project and if consultation with the USFWS under Section 7 of the ESA would take place.

The City has stated that the proposed FDB would provide flood mitigation by impounding sheetflows that occur during heavy rain events from adjacent orchards. Currently, sheetflows flow into the adjacent neighborhood and overwhelms the existing stormdrain system of the neighborhood. FDB would be an “offline” detention facility, because it would not impound stormwater flows directly from a creek. The sheetflows impounded by this facility would be metered into the City’s storm drainage system, which eventually flows into Alamo Creek. FDB would not be hydrologically connected to ACDB. FDB would have a storage capacity of 16 acre-feet.

The proposed location for the FDB, including the proposed access road, is currently used for agriculture and an orchard is located at this proposed site. FEMA is not aware of any analysis of habitat suitability for federally-listed species for this location. At its closest point, the proposed FDB project area is approximately 1,200 feet north of Alamo Creek. Due to the distance from Alamo Creek, it is unlikely that riparian habitat occurs at this site. Thus, suitable habitat for elderberry shrubs and VELB is not likely to occur in the FDB project area. Due to the close distance of the FDB project area to the ACDB project area and that 2008 CRLF protocol-level surveys for the ACDB project area were negative, it is not likely that the CRLF would occur in the FDB project area. Without an assessment of the habitat at this site, it cannot be ruled out that valley and foothill grassland habitat occurs at the FDB project area. Thus, if valley and foothill grassland is present within the FDB project area, this habitat could support federally-listed plant species discussed in this BA. No federally-listed plant species were observed in the ACDB project area during 2008 protocol-level survey for those species. Due to the current and active use of the FDB project area as an orchard, if valley and foothill grassland occurs in this location it is expected to be minimal. Given that suitable habitat for federally-listed species is not likely present at the FDB project area, the construction, operation, and maintenance of the proposed FDB in conjunction with the proposed ACDB project would not be expected to result in cumulative effects to federally-listed species.

SECTION EIGHT CONCLUSIONS AND DETERMINATION

Proposed project activities could result in temporary disturbance and permanent effects to habitats that are potentially utilized by species protected under the Federal ESA. These species include the California red-legged frog, Tiburon paintbrush, Contra Costa goldfields, showy Indian clover, and valley elderberry longhorn beetle.

8.1 CALIFORNIA RED-LEGGED FROG

Although the project area contains habitats suitable to support the breeding cycle of the California red-legged frog, USFWS protocol-level surveys for this species in the project area and a 1-mile radius surrounding the project area did not find this species to be present in the areas surveyed. Therefore, FEMA has determined that the proposed project would have **no effect** on the California red-legged frog.

No designated or proposed critical habitat for the CRLF is located in the project area, and therefore critical habitat for this species would not be adversely affected by the proposed project.

8.2 TIBURON PAINTBRUSH, CONTRA COSTA GOLDFIELD, AND SHOWY INDIAN CLOVER

Although the project area contains habitats suitable to support Tiburon paintbrush, Contra Costa goldfield, and showy Indian clover, focused surveys for these species during their appropriate blooming periods in the project area did not find these species present in the project area. FEMA has determined that the proposed project would have **no effect** on these three plant species.

The project area does not overlap proposed or designated critical habitat for these three plant species; therefore, critical habitat for these species would not be adversely affected by the proposed project.

8.3 VALLEY ELDERBERRY LONGHORN BEETLE

The VELB likely occurs within the project area, as indicated by the documented occurrences of the host plant for this species (i.e., elderberry shrub with stems at least 1 inch in diameter at ground level) within the project area and the identification of exit holes on elderberry shrub stems within the project area.

FEMA has determined that the fall 2008 geotechnical investigation did not adversely affect the VELB for the following reasons:

- Boring 4 (which occurred less than 20 feet from an elderberry shrub with stems of at least 1 inch in diameter) was conducted outside of the riparian area in an upland area that appears to have been historically used as an access road within the orchard.

Alamo Creek Detention Basin: Biological Assessment for USFWS

- The area of ground disturbance from the geotechnical investigation was minimized to the extent possible.
- The activities occurred during clear weather.
- The activities were conducted outside of the emergent period for VELB (March 15–June 15).
- Other than boring 4, all other geotechnical investigations were conducted more than 100 feet from the drip line of elderberry shrubs identified during the 2008 surveys in upland areas during clear weather.
- A biological monitor was present for the geotechnical investigation activities conducted after October 17, 2008.

FEMA has determined that the 2009 geoarchaeological testing and site evaluation program had **no effect** on VELB as it was conducted within the following constraints:

- Ground-disturbing activities occurred during the dry season, specifically between June 15 and October 15; and
- Ground-disturbing activities occurred 100 feet or more from the drip line of all elderberry shrubs.

FEMA has determined that potential future geotechnical investigations and geoarchaeological testing and site evaluation would have **no effect** on the VELB if they are conducted with the following constraints:

- Ground-disturbing activities would occur during the dry season, specifically between June 15 and October 15; and
- Ground-disturbing activities would occur 100 feet or more from the drip line of all elderberry shrubs.

If the City requires modifications to the above buffers, then the City shall notify FEMA prior to conducting the activity and FEMA would consult with the USFWS.

FEMA has determined that the activities associated with the construction of the ACDB and the operation and maintenance of the ACDB may adversely affect the VELB. Therefore, the proposed project **is likely to adversely affect** the VELB. This determination is based on the following:

- Construction of the inlet would likely require the removal and/or damage of two elderberry shrubs with stems of at least 1 inch in diameter at ground level within the project area that could potentially be occupied by the VELB.
- Operation and maintenance of the ACDB could disturb or injure the VELB during weed abatement activities and because of runoff from potential agricultural chemicals if the ACDB is used for agricultural purposes.

- Dust raised by construction equipment could potentially coat elderberry shrubs within the project area and in the 100-foot buffer surrounding the project area, which in time could lead to stress to these shrubs (e.g., water stress, dead stems, smaller leaves), and therefore, the beetle that may inhabit that shrub.

The potential adverse effects could be minimized through the implementation of standard BMPs, which the City will be required to implement through its compliance process for Sections 401, 402, and 404 of the Clean Water Act of 1972, Section 1600 *et seq.* of the California Fish and Game Code, local regulations, or the regulations of local agencies.

No designated or proposed critical habitat for the VELB is located in the project area; therefore, critical habitat for this species would not be adversely affected by the proposed project.

SECTION NINE REFERENCES

- Barr, C.B. 1991. *The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle* *Desmocerus californicus dimorphus*. Sacramento, CA: USFWS.
- Biosystems Analysis, Inc. 1994. *Life on the Edge*. A Guide to California's Endangered Natural Resources: Wildlife. BioSystems Books, Santa Cruz, California. 560 pp.
- Bulger, J.B., N.J. Scott Jr., and R. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs (*Rana aurora draytonii*) in coastal forests and grasslands. *Biological Conservation* 110:85–95.
- CDFG (California Department of Fish and Game). 2005. California Interagency Wildlife Task Group. California Wildlife Habitat Relationships version 8.1 personal computer program. Sacramento, California.
- _____. 2009. Rarefind 3, a program created by CDFG allowing access to the California Natural Diversity Database (CNDDDB). USGS 7.5-minute quadrangles Fairfield North (project area), Denverton, Fairfield South, Cordelia, Allendale, Elmira, Mt. Vaca, Capell Valley, and Mt. George for species federally listed or proposed to be listed under the Federal ESA. June version.
- CNPS (California Native Plant Society). 2008. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*. Available at <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>. Accessed December.
- FEMA (Federal Emergency Management Agency). 2008. *California Red-Legged Frog Site Assessment Report for the Alamo Creek Detention Basin Project*.
- _____. 2009a. *California Red-Legged Frog Protocol-Level Field Survey Report for the Alamo Creek Detention Basin Project*.
- _____. 2009b. *Federally Protected Plant Species Survey Letter Report for the Alamo Creek Detention Basin Project*.
- _____. 2009c. *Elderberry Shrub Stem Count Survey Letter Report for the Alamo Creek Detention Basin Project*.
- Hansen G.E., and J.M. Brode. 1980. Status of the giant garter snake, *Thamnophis couchi gigas* (Fitch). California Department of Fish and Game. *Inland Fisheries Endangered Species Program Special Publication Report No. 80-5*. 14 pp.
- Hayes, M.P., and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*): implications for management. In *Management of Amphibians, Reptiles and Small Mammals in North America*, R.C. Szaro, K.E. Severson, and D.R. Patton (Tech. Coords.), pp. 144-158. General Technical Report RM-166. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Alamo Creek Detention Basin: Biological Assessment for USFWS

- Jennings, M.R. and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.
- Miles, S.R. and C.B. Goudey. 1998. Ecological Subregions of California, Section and Subsection descriptions. U.S. Forest Service, Pacific Southwest Region, San Francisco CA. Prepared in cooperation with: USDA, Natural Resources Conservation Service and USDI, Bureau of Land Management. Internet publication R5-EM-TP-005-NET. Available at: <http://www.fs.fed.us/r5/projects/ecoregions/>. Accessed December.
- Reis, D.K. 1999. Habitat characteristics of California red-legged frogs (*Rana aurora draytonii*): Ecological differences between eggs, tadpoles, and adults in a coastal brackish and freshwater system. MS thesis, San Jose State University, CA.
- Schaffer, B.H., G.M. Fellers, S.R. Voss, J.C. Oliver, and G.B. Pauly. 2004. Species boundaries, phylogeography and conservation genetics of the red-legged frog (*Rana aurora draytonii*) complex. *Molecular Ecology* (2004) 13, 2667–2677.
- Stebbins, R. 2003. *A Field Guide to Western Reptiles and Amphibians*. New York: Houghton Mifflin.
- Storer, T.I. 1925. A Synopsis of the Amphibia of California. *University of California Publications in Zoology* 27: pp. 1-43, 231-245, 330, 331, 336-339. Berkeley, CA: The University of California Press.
- USFWS (U.S. Fish and Wildlife Service). 1980. *Listing the Valley Elderberry Longhorn Beetle as a Threatened Species with Critical Habitat; Final Rule*. Federal Register Vol. 45 (155): 52803-52807. August 8.
- _____. 1984. *Valley Elderberry Longhorn Beetle Recovery Plan*. Portland, Oregon: U.S. Fish and Wildlife Service.
- _____. 1996. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog; Final Rule*. Federal Register Vol. 61 (101): 25813-25833. May 23.
- _____. 1997. *Endangered and Threatened Wildlife and Plants; Endangered Status for Four Plants From Vernal Pools and Mesic Areas in Northern California*. Federal Register Vol. 62 (117):33029-33038. June 18.
- _____. 1998. *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area*. Portland, Oregon. 330+ pp.
- _____. 1999. *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*. Sacramento, CA: U.S. Fish and Wildlife Services. July 9.
- _____. 2002. *Recovery Plan for the California Red-Legged Frog (Rana aurora draytonii)*. Portland, Oregon: U.S. Fish and Wildlife Service.

- _____. 2004. *Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii); Proposed Rule*. Federal Register Vol. 69 (71): 19620-19642. April 13.
- _____. 2005a. *Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog*. August.
- _____. 2005b. *Endangered and Threatened Wildlife and Plants; Revised Proposed Designation of Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii); Proposed Rule*. Federal Register Vol. 70 (212): 66906-67064. November 3.
- _____. 2005c. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Portland Oregon: U.S. Fish and Wildlife Service, Region 1. December 15.
- _____. 2006a. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii), and Special Rule Exemption Associated with Final Listing for Existing Routine Ranching Activities; Final Rule*. Federal Register Vol. 71 (71): 19244-19346. April 13.
- _____. 2006b. *Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) 5-Year Review: Summary and Evaluation*. Sacramento, CA: U.S. Fish and Wildlife Service. September.
- _____. 2006c. *Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants; Final Rule*. Federal Register Vol. 71 (28): 7118-7316. February 10.
- _____. 2007a. *U.S. Fish and Wildlife Service to Review 8 Endangered Species Decisions*. News Release, Office of Public Affairs. July 20. Available at http://www.fws.gov/endangered/pdfs/macdonald/ESA_Review_NR_FINAL.pdf. Accessed July.
- _____. 2007b. *Q's and A's: Review of Endangered Species Decisions, July 20, 2007*. Office of Public Affairs. July 20. Available at http://www.fws.gov/endangered/pdfs/macdonald/ESA_Review_Q&A_FINAL.pdf. Accessed July.
- _____. 2007c. *November 23, 2007, U.S. Fish and Wildlife Service Letter to Congressman Rahall*. July 20. Available at <http://www.fws.gov/endangered/news/macdonald/rahallsigned.pdf>. Accessed July.
- _____. 2008a. *Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the California Red-Legged Frog (Rana aurora draytonii); Proposed Rule*. Federal Register Vol. 73 (180): 53492–53680. September 16.
- _____. 2008b. *Species accounts*. Sacramento, CA: U.S. Fish & Wildlife Service. Accessed at http://www.fws.gov/sacramento/es/spp_info.htm. Accessed December.
- _____. 2009. *USFWS database of Federal species listed as endangered or threatened, proposed for listing or candidates that may occur in or may be affected by projects in USGS 7.5-minute quadrangles Denverton, Fairfield North (project area) Fairfield South*.

Alamo Creek Detention Basin: Biological Assessment for USFWS

Cordelia, Allendale, Elmira, Mt. Vaca, Capell Valley, and Mt. George. Available at http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm. Accessed September 2009.

USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service). 1998. *Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act*. March.

Western Regional Climate Center 2009. Historical weather records. Vacaville Station. Period of Record : 1/ 1/1893 to 12/31/2008. Available at: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9200>. Accessed June 29.

**Appendix A:
Federally Listed Species under USFWS Jurisdiction
with Potential to Occur in the Vicinity of the Project Area**

Federally Listed Species under USFWS Jurisdiction with Potential to Occur in the Vicinity of the Project Area

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
Plants				
<i>Catilleja affinis</i> ssp. <i>neglecta</i>	Tiburón paintbrush	E	Valley and foothill grassland (serpentine). Blooms April-June. Elevation ranges: 60-400 m.	Potential. Suitable habitat (valley and foothill grassland) present in project area. The closest documented occurrence of this species is approximately 18 miles southwest of the project area (CDFG 2009, Occurrence Number 5).
<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>	Suisun thistle	E	Marshes and swamps. Blooms July-September. Elevation ranges: 0-1 m.	No potential. No suitable habitat (marshes and swamps) within project area. The closest documented occurrences of this species are in the USGS Fairfield South quadrangle, approximately 10 miles south of the project area (CDFG 2009, Occurrence Numbers 1). The location information for these occurrences is sensitive and suppressed by the CDFG.
<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	soft bird's-beak	E	Marshes and swamps (coastal salt). Blooms July-August. Elevation ranges: 0-3 m.	No potential. No suitable habitat (marshes and swamps) within project area. The closest documented occurrence of this species is approximately 10 miles south of the project area (CDFG 2009, Occurrence Number 19).
<i>Lasthenia conjugens</i>	Contra Costa goldfields	E	Cismontane woodland, playas, valley and foothill grassland, vernal pools/mesic. Blooms March-June. Elevation ranges: 0-470 m.	Potential. Suitable habitat (valley and foothill grassland and cismontane woodland) present in project area. Closest documented occurrence of this species is approximately 4 miles southeast of the project area (CDFG 2009, Occurrence Number 36).

Alamo Creek Detention Basin: Biological Assessment for USFWS

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i>	few-flowered navarretia	E	Vernal pools (volcanic ash flow). Blooms May-June. Elevation ranges: 400-855 m.	No potential. No suitable habitat (vernal pools) within project area. Closest documented occurrence of this species is approximately 12 miles northwest of the project area (CDFG 2009, Occurrence Number 7).
<i>Orcuttia inaequalis</i>	San Joaquin Valley Orcutt grass	T	Vernal pools. Blooms April-September. Elevation ranges 10-755 m.	No potential. No suitable habitat (vernal pools) within project area. Closest documented occurrence of this species is approximately 10 miles southeast of the project area (CDFG 2009, Occurrence Number 63).
<i>Trifolium amoenum</i>	showy Indian clover (or two-fork clover)	E	Coastal bluff scrub and valley and foothill grassland (sometime serpentinite). Blooms April-June. Elevation ranges 5-415 m.	Potential. Suitable habitat (valley and foothill grassland) present in project area. Closest documented occurrence of this species is approximately 2 miles southeast of the project area (CDFG 2009, Occurrence Number 11).
Invertebrates				
<i>Branchinecta conservation</i>	Conservancy fairy shrimp	E	Vernal pools. Found in large, turbid pools. Currently known from several disjunct populations, including the Solano-Colusa vernal pool region on the greater Jepson Prairie area in Solano County.	No potential. Suitable habitat (large vernal pools) not present in project area. Closest documented occurrence of this species is approximately 10 miles southeast of the project area (CDFG 2009, Occurrence 27).
<i>Branchinecta lynchi</i>	vernal pool fairy shrimp	T	Vernal pools (seasonal wetlands) or vernal pool-like habitats from Southern Oregon south to Riverside County.	No potential. Suitable habitats (vernal pool-like habitats) not present in project area. Closest documented occurrence of this species is approximately 4 miles northeast of the project area (CDFG 2009, Occurrence 19).

Federally Listed Species under USFWS Jurisdiction with Potential to Occur in the Vicinity of the Project Area

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
<i>Desmocerus californicus dimorphus</i>	valley elderberry longhorn beetle	T	Almost always found in relation to elderberry (<i>Sambucus</i> sp.) shrubs throughout the California Central Valley. Elderberry shrubs are associated with riparian forests along rivers and streams.	Potential to occur. Elderberry shrubs with and without exit holes have been identified within the project area.
<i>Elaphrus viridis</i>	Delta green ground beetle	T	Grasslands interspersed with vernal pools, including several larger vernal pools. Only known to occur in the greater Jepson Prairie area in south-central Solano County.	No potential. Suitable habitats not present in project area. Closest documented occurrence of this species is approximately 10 miles southeast of the project area (CDFG 2009, Occurrence 7).
<i>Lepidurus packardii</i>	vernal pool tadpole shrimp	E	Ephemeral wetland habitats and vernal pools containing clear to highly turbid water. Found across California Central Valley and San Francisco Bay area.	No potential. Suitable habitats (vernal pool-like habitats) not present in project area. Closest documented occurrence of this species is approximately 3 miles southeast of the project area (CDFG 2009, Occurrence 26).
<i>Speyeria callippe callippe</i>	callippe silverspot butterfly	E	Grassland with a significant component of native grasses. Larval host plant Johnny jump-up (<i>Viola pedunculata</i>) must be present. Host plant blooms February to April.	Not likely. Grasses within project area mostly non-native. Host plant not observed during botanical surveys (Apr-July) of project area. No documented occurrences of this species within the 9 quadrangles surrounding and including the project area (CDFG 2009).
<i>Syncaris pacifica</i>	California freshwater shrimp	E	Low elevation, low gradient freshwater coastal streams in Sonoma, Napa, and Marin Counties.	No potential. Project area is outside of the range of this species (USFWS 1998, 2008). No documented occurrences of this species in all of Solano County (CDFG 2009).

Alamo Creek Detention Basin: Biological Assessment for USFWS

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
Amphibians				
<i>Ambystoma californiense</i>	California tiger salamander	T	Annual grasslands and grassy understory of valley-foothill hardwood habitats. Needs underground refuges during dry season and vernal pools or other seasonal water sources for breeding. Known elevational range of this species extends up to 3,460 feet.	Not likely to occur. No vernal pools or stock ponds are located within project area. The closest occurrence of this species is approximately 6 miles southeast of the project area (CDFG 2009, Occurrence 828).
<i>Rana draytonii</i> , formerly <i>Rana aurora draytonii</i>	California red-legged frog	T	Lowlands and foothills in or near pools of deep water with dense, shrubby or emergent riparian vegetation.	Potential to occur. Habitats suitable to support the CRLF breeding cycle present in the project area and vicinity. Closest documented occurrence of this species is approximately 8.5 miles northwest of the project area (CDFG 2009, Occurrence 401).
Reptiles				
<i>Thamnophis gigas</i>	giant garter snake	T	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	Not likely to occur. Riparian woodlands typically do not provide suitable habitat for this species (Hansen and Brode 1980). No documented occurrences of this species within the 9 USGS quadrangles surrounding and including the project area (CDFG 2009).
Birds				
<i>Charadrius alexandrinus nivosus</i>	western snowy plover	T	Sandy coastal beaches, salt pans, coastal dredged spoils sites, dry salt ponds, levees and gravel bars. Nests occur in flat, open areas with sandy or saline substrates.	Not likely to occur. No suitable habitats located in the project area or immediate vicinity. No documented occurrences of this species in all of Solano County (CDFG 2009).

Federally Listed Species under USFWS Jurisdiction with Potential to Occur in the Vicinity of the Project Area

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
<i>Pelecanus occidentalis californicus</i>	California brown pelican	E	Forages in estuarine, marine subtidal, and marine pelagic waters along the California coast. Nests on rocky, or low, brushy slopes of undisturbed islands, usually on the ground, but occasionally in bushes.	Not likely to occur. No suitable habitats located in the project area or immediate vicinity. No documented occurrences of this species in all of Solano County (CDFG 2009).
<i>Rallus longirostris obsoletus</i>	California clapper rail	E	Salt-water and brackish water marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed (<i>Salicornia virginica</i>), but feeds away from cover on invertebrates from mud-bottomed sloughs.	Not likely to occur. No suitable habitats (salt marsh and tidal slough) located in the project area or immediate vicinity. Closest documented occurrence of this species is approximately 7 miles south of the project area (CDFG 2009, Occurrence 331).
<i>Sterna antillarum (albifrons) browni</i>	California least tern	E	Forages in shallow estuaries or lagoons where small fish are abundant. Nests on barren to sparsely vegetated sites near water, usually on sandy or gravelly substrate, and free of human or predatory disturbance.	Not likely to occur. No suitable habitats (sandy beaches) located in the project area or immediate vicinity. No documented occurrences of this species within the 9 USGS quadrangles surrounding and including the project area (CDFG 2009).
<i>Strix occidentalis caurina</i>	northern spotted owl	T	Found in old growth forests (typically conifer, occasionally hardwood) with a moderate to high (60-90 percent) canopy closure, that is multi-layered with multiple species with large overstory trees (with diameter at breast height greater than 30 inches), with a high incidence of large trees with various deformities, and large snags and large accumulations of fallen trees and other woody debris on the ground, but still sufficient open space below the canopy for spotted owls to fly.	Not likely to occur. Project area lacks the large old growth trees and canopy cover required for northern spotted owl nesting and foraging. There are no documented occurrences of this species in all of Solano County (CDFG 2009).

Alamo Creek Detention Basin: Biological Assessment for USFWS

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
Mammals				
<i>Reithrodontomys raviventris</i>	salt marsh harvest mouse	E	Primary habitat is saline emergent wetlands with abundant pickleweed, but also requires non-submerged, salt-tolerant vegetation for escape during highest tides.	No potential. Suitable habitats (emergent wetlands with pickleweed) missing from project area. Closest documented occurrence of this species is approximately 9 miles south of the project area (CDFG 2009, Occurrence 114).
Fish				
<i>Hypomesus transpacificus</i>	delta smelt	T	Brackish water. Endemic to the Sacramento-San Joaquin estuary, river channels and sloughs. Occurs in the Delta primarily below Isleton on the Sacramento River, below Mossdale on the San Joaquin River, and in Suisun Bay. Moves into freshwater when spawning and can occur in: the Sacramento River as high as Sacramento, the Mokelumne River system, the Cache Slough region, the Delta, and the Montezuma Slough area of the estuary. In high flow periods can enter Suisun Bay and San Pablo Bay.	No potential. Project area is outside of the range of this species (USFWS 1996). No documented occurrences of this species within the 9 USGS quadrangles surrounding and including the project area (CDFG 2009).

¹ The species in this table were identified in a search of the following references:

California Department of Fish and Game. 2009. Rarefind 3, a program created by CDFG allowing access to the California Natural Diversity Database (CNDDDB). Search of USGS 7.5-minute quadrangles Denverton, Fairfield South, Cordelia, Allendale, Elmira, Mt. Vaca, Capell Valley, Mt. George, and Fairfield North. June.
 U.S. Fish and Wildlife Service. 2009. Federal Endangered and Threatened Species that May Occur in or May be Affected by Projects in USGS 7.5-minute quadrangles Denverton, Fairfield South, Cordelia, Allendale, Elmira, Mt. Vaca, Capell Valley, Mt. George, and Fairfield North. Available at http://www.fws.gov/sacramento/es/spp_lists/auto_list_form.cfm.

² Federal status codes:

E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.

T = Threatened. Species likely to become endangered within the foreseeable future.

³ Preferred habitat description compiled from the following references:

Federally Listed Species under USFWS Jurisdiction with Potential to Occur in the Vicinity of the Project Area

Table A-1. Federally listed species under USFWS jurisdiction with potential to occur in the vicinity of the project area.¹

Scientific Name	Common Name	Federal Status ²	Preferred Habitat ³	Likelihood of Occurring in the Project Area
<p>California Department of Fish and Game 2005. California Interagency Wildlife Task Group. California Wildlife Relationships version 8.1 personal computer program. Sacramento, California.</p> <p>California Department of Fish and Game 2008. California Natural Diversity Database (CNDDDB) Program Rarefind 3. Created by the California Department of Fish and Game, September 2008 version.</p> <p>California Native Plant Society. 2008. California Native Plant Society's Inventory of Rare and Endangered Plants of California. Online Inventory: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi</p> <p>Goals Project. 2000. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, Calif.</p> <p>United States Fish and Wildlife Service. 1996. Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes. Region 1, Portland, Oregon.</p> <p>U.S. Fish and Wildlife Service. 1998. Recovery Plan for the California Freshwater Shrimp (<i>Syncaris pacifica</i>). Region 1, Portland, Oregon.</p> <p>United States Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Region 1, Portland, Oregon.</p> <p>United States Fish and Wildlife Service. 2008. Species accounts. U.S. Fish & Wildlife Service Office, Sacramento Division. Accessed at http://www.fws.gov/sacramento/es/spp_info.htm</p>				

**Appendix B:
Photographs of the Project Area**

Appendix B
Photographs of the Project Area



**Photo 1. Abandoned orchard
(April 2008).**



**Photo 2. Abandoned Orchard
(June 2008).**

Appendix B
Photographs of the Project Area



**Photo 3. Agricultural field
(June 2008).**



**Photo 4. Alamo Creek.
Approximate Location of
Outlet. Picture taken facing
east (February 2008).**

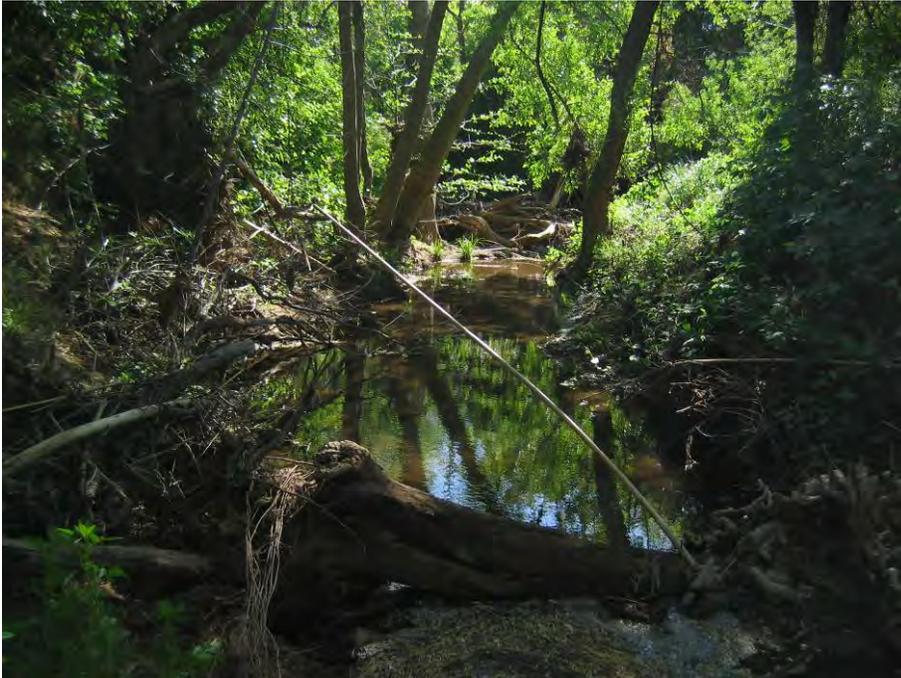


**Photo 5. Alamo Creek.
Approximate Location
of Inlet. Picture taken
facing south (February
2009).**



**Photo 6. Alamo Creek.
Approximate Location
of Inlet. Picture taken
facing west (February
2009).**

Appendix B
Photographs of the Project Area



**Photo 7. Alamo Creek
(April 2008).**



**Photo 8. Alamo Creek
(July 2008).**

Appendix B
Photographs of the Project Area



**Photo 9. Alamo Creek
(July 2008).**



**Photo 10. Elderberry
shrub cluster - Stem
ID N14–N15; N17-
N22; N91–N94 (June
2008).**



Photo 11. Elderberry shrub cluster in non-riparian area - Stem ID N64–N74 (June 2008).

Appendix C:
Photographs of the Geotechnical Investigations

Appendix C
Photographs of the Geotechnical Investigations



**Photo 1. Test boring 1
(October 2008).**



**Photo 2. Test boring 6
(October 2008).**

Appendix C
Photographs of the Geotechnical Investigations



**Photo 3. Test Pit 6
(October 2008).**



**Photo 4. Test Pit 9
(October 2008).**

Appendix C
Photographs of the Geotechnical Investigations



Photo 5. Test Pit 13
(October 2008).



Photo 6. Test Pit 14
(October 2008).

Appendix C
Photographs of the Geotechnical Investigations



**Photo 7. Test Pit 16
(October 2008).**



**Photo 8. Test Pit 17
(October 2008).**

Appendix C
Photographs of the Geotechnical Investigations



**Photo 9. Test Pit 19
(October 2008).**

