APPENDIX D BIOLOGICAL RESOURCES

APPENDIX D1 BIOLOGICAL RESOURCES SPECIES LIST

Table BIO-1. Special-Status Species With Potential to Occur in the PG&E Natural Gas Pipeline 021G/R-708 Replacement Project Area

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Invertebrates			
Western bumble bee (*Bombus occidentalis*)	--/SC/--	Found in any area with sufficient flowers for nutrition, and underground burrows for nest for the queen.	**Low.** Limited suitable burrowing habitat for this species.
Monarch butterfly (*Danaus plexippus plexippus*) (overwintering sites)	FC/--/--	Monarch butterfly breeding and larval habitat is on milkweed plants in open fields and meadows. During winter it stays in colonies in eucalyptus, Monterey cypress and other trees in California and at high altitudes in Mexico.	**Low.** Lack of large trees suitable for wintering monarchs.
California freshwater shrimp (*Syncaris pacifica*)	FE/SE/--	Shallow pools away from main streamflow. Winter: undercut banks with exposed roots. Summer: leafy branches touching water.	**Absent.** Freshwater stream and pool habitat not found on-site.
Fish			
Coho salmon *Oncorhynchus kisutch* Central California Coast ESU	FE/SE/--	Federal listing refers to populations south of Punta Gorda, California as well as such Coho salmon originating from tributaries to San Francisco Bay. Larger rivers serve as migration pathways for adults; juveniles rear in smaller tributaries.	**Low.** Petaluma River is accessible to this species, but they are considered extirpated from this area.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Green sturgeon *Acipenser medirostris* Southern DPS	FT/SSC	Spawns in upper Sacramento River and tributaries and migrates to coastal Pacific Ocean from Alaska to Mexico; often found in coastal estuaries including SF Bayk and Columbia River estuary. Juvenile fish overwinter in estuaries before migrating to sea.	**Moderate.** Juvenile and sub-adult sturgeon may stray into the Petaluma River though they do not spawn in the area.
Steelhead *Oncorhynchus (=Salmo) mykiss irideus* Central California Coast DPS	FT/--/--	Spawns and rears in coastal streams between the Russian River in Sonoma County and Soquel Creek in Santa Cruz County, as well as drainages tributary to San Francisco Bay, where gravelly substrate and shaded riparian habitat occurs.	**High.** Petaluma River is critical habitat for this species and steelhead may spawn upstream.
Longfin smelt *(Spirinchus thaleichthys)*	FC/ST	Anadromous fish which spawns in streams of San Francisco Bay estuary on sand or gravelly substrate from November to May and feeds in nearshore waters as adults.	**Moderate.** Juvenile and sub-adult smelt may stray into the Petaluma River though they do not spawn in the area.
Amphibians			
California tiger salamander - Sonoma DPS *(Ambystoma californiense)*	FE/ST/--	Vernal or temporary pools in annual grasslands, or open stages of woodlands. Typically adults use mammal burrows.	**Absent.** Aquatic habitat in the Project area is not suitable for this species, and outside the species' known range.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
California giant salamander (*Dicamptodon ensatus*)	--/SSC/--	Wet coastal forests near clear perennial waters in montane or valley-foothill riparian habitats. Typically adults use mammal burrows.	**Absent**. No suitable perennial aquatic habitat present on-site.
Foothill yellow-legged frog (*Rana boylii*)	--/SSC/--	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats; requires at least some cobble-sized substrate for egg-laying.	**Low**. Recorded in Adobe Creek in 2008 (CDFW 2022), but Petaluma River is too saline for this species.
California red-legged frog (*Rana draytonii*)	FT/SSC/--	Streams, freshwater pools, and ponds with overhanging vegetation. Also found in woods adjacent to streams. Requires permanent or ephemeral water sources such as reservoirs and slow-moving streams and pools of >0.5 m depth for breeding.	**Low to Moderate**. Recorded in Ellis Creek near Petaluma Marsh in 1994 (CDFW 2022). While brackish water may host red-legged frogs, Petaluma River is too saline for this species.
Red-bellied newt (*Taricha rivularis)*	--/SSC/--	Found in rivers and streams in coastal woodlands and redwood forests. Hide in vegetation and under stones during the day.	**Low.** Project area lacks suitable habitat for this species.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Reptiles			
Western pond turtle (*Actinemys marmorata*)	--/SSC/--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation <6,000' in elevation. Require basking area and upland habitat for egg laying (sandy banks and open, grassy fields).	**High.** Recorded in Ellis Creek near Petaluma Marsh in 2007 and Shollenberger Park in 2008 (CDFW 2022). May occur in Shollenberger during wet season.
Birds			
Tricolored blackbird (*Agelaius tricolor)*	--/ST/--	Colonial nester in freshwater marsh and wetlands; forages in wetland, grassland and agricultural fields; sometimes in mixed flocks with other blackbirds.	**Low.** This species may utilize grasslands near the project area for foraging, but it is unlikely to nest in the vicinity.
Grasshopper sparrow (*Ammodramus savannarum)*	--/SSC/--	Prefer grasslands, including weedy areas, agricultural fields, and prairies. Avoid areas with significant shrub cover.	**Low.** Grassland habitat for this species is disturbed and fragmented.
Golden eagle (*Aquila chrysaetos)*	--/CFP/--	Ranges widely across North America, foraging in open areas of tundra, prairie, rangeland or desert that support small mammal prey; nests on cliffs or tall trees.	**Low.** No suitable nesting habitat for this species but it may forage over Shollenberger Park.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Burrowing owl (*Athene cunicularia*)	--/SSC/--	Subterranean nester, dependent upon burrowing mammals, often California ground squirrel, for burrows and prey. Found in open, dry grasslands, deserts and scrublands with low-growing vegetation.	**Low**. Project area grassland is disturbed and fragmented and unlikely to provide suitable habitat for this species.
Swainson's hawk (*Buteo swainsoni)*	--/ST/--	Forages over agricultural land, rangeland or grassland; nests in preferably tall trees close to suitable foraging habitat	**Low.** This species may forage in the area but is not known to nest nearby. No nearby records in CNDDB (CDFW 2022).
Western snowy plover (*Charadrius alexandrines nivosus*)	FT/SSC/--	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	**Absent.** Suitable nest habitat for this species is absent or highly disturbed.
Yellow rail (*Coturnicops noveboracensis)*	--/SSC/--	Found in shallow marshes or wet meadows, often dominated by grasses or sedges.	**Low.** Species is extremely rare in California; nearest occurrences are in Suisun Marsh from 100 years ago.
Black swift (*Cypseloides niger)*	BCC/SSC/--	Occur in wide range of habitats, but nest in specialized sites, in forested areas near rivers, often behind waterfalls or on damp cliffs.	**Low.** Species may fly over site but no nesting habitat is present.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
White-tailed kite (*Elanus leucurus*)	--/CFP/--	Found in open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Low.** Species may forage in vicinity but no suitable nest habitat is present.
American peregrine falcon (*Falco peregrinus anatum*)	BCC/CFP/--	Nest consists of a scrape or a depression on rock, cliff or building ledge over an open site.	**Low.** Suitable foraging habitat on-site, but nesting habitat is not present.
Salt-marsh common yellowthroat (*Geothylpis thrichas sinuosa*)	--/SSC/--	In brackish and saline tidal marsh habitat around San Francisco Bay, associated with a high percent cover of bulrushes (*Scirpus* spp.), peppergrass (*Lepidium latifolium*), and rushes (*Juncus* spp.)	**Moderate.** Suitable marsh habitat is present and known occurrences are nearby (CDFW 2022).
California black rail (*Laterallus jamaicensis*)	BCC/ST/CFP	Found in salt, brackish and freshwater marsh with dense vegetation for nesting habitat.	**Moderate.** Records from Petaluma Marsh and River within the last decade (CDFW 2022). May be present in brackish marsh vegetation near the Project area.
San Pablo song sparrow (*Melospiza melodia samuelis*)	BCC/SSC/--	Inhabits tidal marshes; nests in *Grindelia* or other marsh plants bordering slough channels. Its year-round range is confined to tidal and brackish marshes fringing San Pablo Bay.	**High.** Recorded in Petaluma Marsh in 1981, and near the mouth of Petaluma River in 2004 (CDFW 2022). Suitable marsh habitat is present in Shollenberger Park.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Ridgway's rail (=California clapper rail) (*Rallus obsoletus obsoletus)*	FE/SE/CFP/--	Found in salt and brackish marsh with well-defined tidal channels and dense growth of pickleweed; feeds on invertebrates in mud-bottomed sloughs.	**Moderate.** Records from Petaluma Marsh and River within the last decade (CDFW 2022). May be present in salt marsh vegetation near the Project area.
Bank swallow (*Riparia riparia*)	--/ST/--	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	**Absent.** Suitable bank habitat not found on-site.
Northern spotted owl (*Strix occidentalis caurina*)	FT/ST/--	In Marin County, northern spotted owls nest in secondary-growth redwood and fir forests, featuring dense canopy closure of mature trees, abundant logs, standing snags, and live trees with broken tops.	**Absent.** Suitable forest habitat not present at site.
Mammals			
Pallid bat (*Antrozous pallidus*)	--/SSC/--	Grasslands, shrublands, woodlands, and forests. Common in arid regions with rocky outcroppings, particularly near water. Roosts in rock crevices, buildings, and under bridges; may also roost in trees. Very sensitive to disturbance.	**Low**. May forage over site, but suitable roost habitat is limited.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Point Reyes mountain beaver (*Aplodontia rufa phaea*)	--/SSC/--	Burrows in cool, moist, north-facing slopes in moderately dense coastal scrub in Point Reyes.	**Absent.** Project area outside of subspecies' known range.
Townsend's big-eared bat (*Corynorhinus townsendii*)	--/SSC/--	Montane forests, herbaceous, shrub, and open stages of most habitats with dry, friable soils. Roosts in caves and cave-like settings; sensitive to disturbance.	**Low.** May forage over site but suitable roost habitat not present.
Hoary bat (*Lasiurus cinereus*)	--/-- /WBWG Medium	Prefers open habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths.	**Moderate.** Suitable tree roosting habitat present on-site and in the vicinity.
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE/SE/CFP	Pickleweed is primary habitat, but may occur in other marsh vegetation types and in adjacent upland areas. Does not burrow; builds loosely organized nests. Requires higher areas for flood escape.	**Moderate.** Recorded in Petaluma River marsh west of alignment in 1990 (CDFW 2022) and in 2022 (unpublished data); may be present in pickleweed or seek refugia in marsh vegetation in Shollenberger.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Suisun shrew *(Sorex ornatus sinuosus)*	--/SSC/--	Inhabits salt and brackish marshes around northern San Pablo and Suisun bays with low, dense vegetation and invertebrate prey.	**Low to Moderate.** Recorded southeast of Project area along the bay.
American badger (*Taxidea taxus*)	--/SSC/--	Herbaceous, shrub, and open stages of most habitats with dry, friable soils. Sensitive to human disturbance	**Low.** Friable open habitat near the Project area is disturbed and close to human traffic.
Plants			
Franciscan onion *(Allium peninsulare* var. *franciscanum)*	--/--/1B.2	Cismontane woodland, valley and foothill grassland. Blooms April-June. Elevation 50 – 300 meters.	**Low.** Suitable valley and foothill grassland or woodland habitat is not present.
Napa false indigo (*Amorpha californica* var. *napensis*)	--/--/1B.2	Broadleafed upland forest, chaparral, or cismontane woodland. Blooms April - July. Elevation up to 2000 meters.	**Low.** Suitable forest or woodland habitat is not present.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	--/--/1B.2	Cismontane woodland, valley and foothill grassland, and coastal bluff scrub. Blooms March – June. Elevation up to 500 meters.	**Low.** Suitable montane woodland habitat is not present.
Mt. Tamalpais manzanita (*Arctostaphylos montana* subsp. *montana*)	--/--/1B.3	Serpentine chaparral. Blooms February - April. Elevation ranges from 250 – 800 meters.	**Low.** Site lacks serpentine chaparral habitat.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Marin manzanita (*Arctostaphylos virgata*)	--/--/1B.2	Sandstone, granite outcrops in chaparral, and conifer forests. Blooms December - March. Elevation up to 500 meters.	**Low.** Site lacks suitable chaparral habitat.
alkali milk-vetch (*Astragalus tener* var. *tener*)	--/--/1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools. Blooms March to June. Elevation up to 60 meters	**Absent.** Site lacks suitable playa, vernal pool or adobe clay habitat.
Big-scale balsamroot *(Balsamorhiza macrolepis)*	--/--/1B.2	Chaparral, cismontane woodland, valley and foothill grassland. Blooms March to June. Elevation 150 to 1500 meters.	**Low.** Site lacks suitable chaparral or grassland habitat.
Sonoma sunshine (*Blennosperma bakeri)*	FE/SE/1B.1	Valley and foothill grassland (mesic). Vernal pools. Blooms March to May. Elevation 10 to 110 meters.	**Low.** Site lacks suitable grassland or vernal pool habitat.
Narrow-anthered brodiaea *(Brodiaea leptandra)*	--/--/1B.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland. Blooms May to July. Elevation 100 to 900 meters.	**Low.** Site lacks suitable forest or woodland habitat.
Seaside bittercress *Cardamine angulata*	2	Wetland-riparian areas in mixed evergreen forest. Blooms April to June. Elevation 0 to 900 meters.	**Low.** No mixed evergreen forest present onsite.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Tiburon paintbrush (*Castilleja affinis* var. *neglecta*)	FE/ST/1B.2	Open serpentine grassland slopes. Blooms April – June. Elevation 60 – 400 meters.	**Low.** Site lacks serpentine grassland habitat.
Nicasio ceanothus (*Ceanothus decornutus*)	--/--/1B.2	Open, rocky serpentine slopes and ridges. Blooms March – May. Elevation 235 - 290 meters.	**Low.** Site lacks serpentine slopes and ridges.
Mason's cceanothus (*Ceanothus masonii*)	--/--/1B.2	Chaparral (openings, rocky, serpentinite). Blooms March – April. Elevation 230-500 meters.	**Low.** Site lacks serpentine chaparral.
Rincon Ridge ceanothus (*Ceanothus confusus)*	--/--/1B.1	Closed-cone coniferous forest, chaparral, cismontane woodland. Blooms February to June. Elevation from 75 to 1,060 meters	**Low.** Site lacks suitable forest or woodland habitat.
Pappose tarplant (*Centromadia parryi* ssp. *parryi)*	--/--/1B.2	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic). Blooms May to November. Elevation to 420 meters.	**Low.** Site lacks suitable chaparral or meadow habitat.
Soft salty bird's-beak (*Chloropyron molle* ssp. *molle)*	FE/SR/1B.2	Coastal salt marshes and swamps. Blooms June to November. Elevation to 3 meters.	**Low.** Nearby salt marsh habitat is highly disturbed. Records from 1993 are possibly extirpated (CDFW 2022).

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Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	--/--/1B.2	Coastal salt marsh. Blooms May to October. Elevation up to 10 meters.	**Low.** Record from 1993 counted 1675 plants in Petaluma Marsh (CDFW 2022). May be present in the vicinity, but unlikely in project area which is highly disturbed.
Sonoma spineflower (*Chorizanthe valida*)	FE/SE/1B.1	Costal sandy prairie. Blooms June to August. Elevation up to 300 meters.	**Absent.** No sandy habitat on-site.
Mt. Tamalpais thistle (*Cirsium hydrophilum* var. *vaseyi*)	--/--/1B.2	Serpentine seeps. Blooms June to September. Elevation 300 – 450 meters.	**Low.** Site is dry and lacks serpentine.
Baker's larkspur *(Delphinium bakeri)*	FE/SE/1B.1	Broadleafed upland forest, coastal scrub, valley and foothill grassland. Blooms March to May. Elevation 80 to 305 meters.	**Low.** No suitable forest, scrub or grassland habitat on-site.
Golden larkspur (*Delphinium luteum)*	FE/SR/1B.1	Chaparral, coastal prairie, coastal scrub. Blooms March to May. Elevation to 100 meters.	**Low.** No chaparral or coastal scrub habitat on-site.
Dwarf downingia *(Downingia pusilla)*	--/--/2B.2	Valley and foothill grassland (mesic), vernal pools. Blooms March to May Elevation up to 445 meters.	**Low.** Site lacks suitable vernal pool or mesic grassland habitat.

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Tiburon buckwheat (*Eriogonum luteolum* var. *caninum*)	--/--/1B.2	Serpentine. Blooms May - September. Elevation up to 700 meters.	**Low.** No serpentine habitat on-site.
Koch's cord moss (*Entosthodon kochii)*	--/--/1B.3	Cismontane woodland (soil). Riverbanks on newly exposed soil. Elevation 180 to 1,000 meters.	**Low.** No woodland habitat on-site.
Fragrant fritillary (*Fritillaria liliacea*)	--/--/1B.2	Heavy soils on open hills and fields near the coast. Blooms from February - April. Elevation up to 400 meters.	**Low.** Seasonal wetland onsite provides marginally suitable habitat.
Marin checker lily (*Fritillaria lanceolata* var. *tristulis*)	--/--/1B.1	Coastal scrub, prairie and woodland. Blooms February to May. Elevation ranges from 15-150 meters.	**Low.** Seasonal wetland onsite provides marginally suitable habitat.
Woolly-headed gilia *Gilia capitata ssp. tomentosa*	--/--/1B.1	Coastal bluff scrub, valley and foothill grassland, rocky outcrops, serpentinite. Blooms May to July. Elevation 10 -220 m.	**Low.** Site lacks scrub or grassland habitat.
Congested-headed hayfield tarplant (*Hemizonia congesta* subsp. *congesta*)	--/--/1B.2	Grassy sites and marsh edges. Blooms April to November. Elevation up to 560 meters.	**Low.** Seasonal wetland onsite provides marginal habitat.
Marin western flax (*Hesperolinon congestum*)	FT/ST/1B.1	Serpentine grassland. Blooms April to August. Elevation up to 200 meters.	**Low.** Site lacks serpentine soil habitat.

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Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Project Area
Thin-lobed horkelia (*Horkelia tenuiloba*)	--/--/1B.2	Sandy soils within open chaparral. Blooms April to July. Elevation from 50 – 500 meters.	**Low.** Site is outside preferred elevation range and lacks chaparral habitat.
Burke's goldfields *(Lasthenia burkei)*	FE/SE/1B.1	Meadows and seeps (mesic), vernal pools. Blooms April to June. Elevation 15 to 600 meters.	**Low.** Site lacks suitable vernal pool or mesic grassland habitat.
Contra Costa goldfields *(Lasthenia conjugens)*	FE/--/1B.1	Cismontane woodland (mesic), playas (alkaline). valley and foothill grassland, vernal pools. Booms March to June. Elevation up to 470 meters.	**Low.** Site lacks suitable vernal pool or mesic grassland habitat.
Legenere *(Legenere limosa)*	--/--/1B.1	Vernal pools. Blooms April to June. Elevation up to 880 meters.	**Low.** Site lacks suitable vernal pool habitat.
Jepson's leptosiphon (*Leptosiphon jepsonii*)	--/--/1B.2	Chaparral, cismontane woodland, valley and foothill grassland. Blooms March to May. Elevation 100 to 500 meters.	**Low.** Site is outside preferred elevation range and lacks chaparral habitat.
Tamalpais lessingia (*Lessingia micradenia* var. *micradenia*)	--/--/1B.2	Thin, gravelly soils of serpentine outcrops and roadcuts. Blooms July – October. Elevation from 60 – 305 meters.	**Low.** Serpentine habitat not present on-site.
Sebastopol meadowfoam *(Limnanthes vinculans)*	FE/SE/1B.1	Meadows and seeps, valley and foothill grassland, vernal pools. Blooms April to May. Elevation 15 to 305 meters.	**Low.** Site lacks suitable vernal pool, meadow seep or grassland habitat.

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Pitkin marsh lily *(Lilium pardalinum ssp. pitkinense)*	FE/SE/1B.1	Cismontane woodland, meadows and seeps, marshes and swamps (freshwater). Blooms June to July. Elevation 35 to 65 meters.	**Low.** No suitable forest or grassland habitat on-site. Nearby occurrence dates from 1880 (CDFW 2022).
Cobb Mountain lupine *(Lupinus sericatus)*	--/--/1B.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest. Blooms March to June. Elevation 275 to 1525 meters.	**Absent.** Project is outside of species' known range.
Marsh microseris (*Microseris paludosa*)	--/--/1B.2	Moist grassland and open woodland. Blooms April – June. Elevation up to 300 meters.	**Low.** Moist grassland habitat not present on-site.
Marin County navarretia (*Navarretia rosulata*)	--/--/1B.2	Rocky serpentine areas. Blooms May – July. Elevation from 200 – 600 meters.	**Low.** Serpentine habitat not present on-site.
Baker's navarretia (*Navarretia leucocephala ssp. bakeri)*	--/--/1B.1	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools. Blooms April to July. Elevation to 1740 meters.	**Low.** No suitable forest, meadow seep or grassland habitat on-site.
White-rayed pentachaeta (*Pentchaeta bellidiflora*)	FE/SE/1B.1	Valley grasslands. Blooms March – May. Elevation up to 620 meters.	**Low.** Site lacks suitable grassland habitat.

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North Coast semaphore grass (*Pleuropogon hooverianus*)	--/ST/1B.1	Wet grassy areas. Blooms March – June. Elevation up to 1,300 meters.	**Low.** Seasonal wetland onsite provides marginally suitable habitat.
Marin knotweed (*Polygonum marinense*)	--/--/3.1	Coastal salt and brackish marshes, swamps. Blooms April – August. Elevation up to 10 meters.	**Low.** Suitable salt marsh habitat present in vicinity but nearby occurrence dates from 1945 (CDFW 2022).
Tamalpais oak (*Quercus parvula* var. *tamalpaisensis*)	--/--/1B.3	Understory of conifer woodlands. Blooms March – April. Elevation from 100 – 750 meters.	**Low.** No conifer woodlands in vicinity.
Point Reyes checkerbloom (*Sidalcea calycosa* subsp. *rhizomata*)	--/--/1B.2	Freshwater marshes. Blooms May – July. Elevation up to 30 meters.	**Low.** Marshes in the vicinity are primarily brackish and nearby record dates from 1880 (CDFW 2022).
Marin checkerbloom (*Sidalcea hickmanii* subsp. *viridis*)	--/--/1B.1	Dry ridges near coast in serpentine areas. Blooms May – June. Elevation ranges from 50 – 430 meters.	**Low.** No serpentine habitat present on-site
Mt. Burdell jewelflower *(Streptanthus anomalus)*	--/--/1B.1	Cismontane woodland openings. Blooms May to June. Elevation 50 to 150 meters.	**Low.** No woodland habitat present on-site.
Mt. Tamalpais jewelflower (*Streptanthus batrachopus*)	--/--/1B.3	Serpentine barrens and chaparral. Blooms April – July. Elevation ranges from 335 – 670 meters.	**Low.** No serpentine habitat present on-site.

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Mt. Tamalpais bristly jewelflower (*Streptanthus glandulosus ssp. pulchellus*)	--/--/1B.2	Dry, open grassland, chaparral, open conifer/oak woodland; occasionally serpentine. Blooms May – August. Elevation ranges from 125 – 670 meters.	**Low.** No serpentine grassland habitat on-site.
Two-fork clover (*Trifolium amoenum*)	FE/--/1B.1	Moist, heavy soils in disturbed areas, coastal bluff scrub/serpentine, and grassland. Blooms April – June. Elevation ranges from 5 – 415 meters.	**Low.** No serpentine grassland habitat on-site.
Saline clover *(Trifolium hydrophilum)*	--/--/1B.2	Marshes and swamps, mesic and alkaline valley and foothill grasslands (mesic, alkaline), vernal pools.	**Low.** Site lacks vernal pools and marsh habitat on-site is disturbed.
Pacific Grove clover *(Trifolium polyodon)*	--/SR/1B.1	Closed-cone coniferous forest, coastal prairie, meadows and seeps, valley and foothill grassland. Blooms April to June. Elevation 5 to 425 meters.	**Low.** No suitable forest or grassland habitat on-site.
Oval-leaved viburnum *(Viburnum ellipticum)*	--/--/2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. Blooms May to June. Elevation 210 to 1,400 meters	**Low.** No suitable forest or woodland habitat on-site.

ABBREVIATIONS:
DPS = Distinct Population Segment
ESA = Evolutionary Significant Unit

STATUS CODES:
USFWS (U.S. Fish and Wildlife Service)
FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government.
FC = Listed as Candidate
BBC = USFWS Bird of Conservation Concern

CDFW (California Department of Fish and Wildlife)
SC = State Candidate for Listing
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SR = Listed as Rare by the State of California
CFP = California Fully Protected species
SSC = Species of Special Concern
WBWG = Western Bat Working Group

CALIFORNIA NATIVE PLANT SOCIETY:
List 1A=Plants presumed extinct in California
List 1B=Plants rare, Threatened, or Endangered in California and elsewhere
List 2= Plants rare, Threatened, or Endangered in California but more common elsewhere
List 3= Plants about which more information is needed
List 4= Plants of limited distribution

An extension reflecting the level of threat to each species is appended to each rarity category as follows:
.1 – Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Potential to Occur Categories:
Absent = The Project and/or immediate vicinity does not support suitable habitat for a particular species. Project site may be outside of the species' known range.
Low Potential = The Project and/or immediate vicinity only provides limited habitat. In addition, the species' known range may be outside of the Project site.
Moderate Potential = The Project and/or immediate vicinity provides suitable habitat.
High Potential = The Project and/or immediate vicinity provides ideal habitat conditions or the species has been recently observed.
Present = Species has been recorded within the Project Site or immediate vicinity.

SOURCES: California Department of Fish and Wildlife (CDFW), California Natural Diversity Data Base, 2022, Petaluma Point, Petaluma, Sears Point, Cotati, Novato, Sonoma, Glen Ellen, Petaluma River, San Geronimo USGS 7.5 minute quads. Available online at http://dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp; California Native Plant Society, Inventory or Rare, Threatened and Endangered Plants of California, 2022. Available online at http://www.rareplants.cnps.org/; U.S. Fish and Wildlife Service (USFWS), iPac Information for Planning and Conservation. Online database powered by ECOS Environmental Conservation Online System, 2022. Available online at https://ecos.fws.gov/ipac/.

APPENDIX D2 PG&E BAY AREA HABITAT CONSERVATION PLAN MEASURES

HCP FIELD PROTOCOLS

As part of the implementation of the Project, PG&E would adhere to the following field protocols (FPs) listed in the PG&E Bay Area Habitat Conservation Plan (HCP) to avoid impacts to sensitive biological resources (PG&E, 2017; GANDA, 2020).

FP-01: Hold annual training on habitat conservation plan requirements for employees and contractors performing covered activities in the Plan Area that are applicable to their job duties and work.

FP-02: Park vehicles and equipment on pavement, existing roads, or other disturbed or designated areas (barren, gravel, compacted dirt).

FP-03: Use existing access and ROW roads. Minimize the development of new access and ROW roads, including clearing and blading for temporary vehicle access in areas of natural vegetation.

FP-04: Locate off-road access routes and work sites to minimize impacts on plants, shrubs, and trees, small mammal burrows, and unique natural features (e.g., rock outcrops).

FP-05: Notify conservation land owner at least two business days prior to conducting covered activities on protected lands (state and federally owned wildlife areas, ecological reserves, or conservation areas); more notice will be provided if possible or if required by other permits. If the work is an emergency, as defined in PG&E's Utility Procedure ENV-8003P-01, PG&E will notify the conservation land owner within 48 hours after initiating emergency work. While this notification is intended only to inform the conservation land owner, PG&E will attempt to work with the conservation land owner to address concerns.

FP-06: Minimize potential for covered species to seek refuge or shelter in pipes and culverts. Inspect pipes and culverts, of diameter wide enough to be entered by a covered species that could inhabit the area where pipes are stored, for wildlife species prior to moving pipes and culverts. Immediately contact a biologist if a covered species is suspected or discovered.

FP-07: Vehicle speeds on unpaved roads will not exceed 15 miles per hour.

FP-08: Prohibit trash dumping, firearms, open fires (such as barbecues), hunting, and pets (except for safety in remote locations) at work sites.

FP-09: During fire season in designated State Responsibility Areas, equip all motorized equipment with federally approved or state-approved spark

arrestors. Use a backpack pump filled with water and a shovel and fire-resistant mats and/or windscreens when welding. During fire "red flag" conditions as determined by Cal Fire, curtail welding. Each fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C. Clear parking and storage areas of all flammable materials.

FP-10: Minimize the activity footprint and minimize the amount of time spent at a work location to reduce the potential for take of species.

FP-11: Utilize standard erosion and sediment control BMPs (pursuant to the most current version of PG&E's Stormwater Field Manual for Construction Best Management Practices) to prevent construction site runoff into waterways.

FP-12: Stockpile soil within established work area boundaries and locate stockpiles so as not to enter water bodies, stormwater inlets, or other standing bodies of water. Cover stockpiled soil prior to precipitation events.

FP-13: Fit open trenches or steep-walled holes with escape ramps of plywood boards or sloped earthen ramps at each end if left open overnight. Field crews will search open trenches or steep-walled holes every morning prior to initiating daily activities to ensure wildlife are not trapped. If any wildlife are found, a biologist will be notified and will relocate the species to adjacent habitat or the species will be allowed to naturally disperse, as determined by a biologist.

FP-14: If the covered activity disturbs 0.1 acre or more of habitat for a covered species in grasslands, the field crew will revegetate the area with a commercial "weed free" seed mix.

FP-15: Prohibit vehicular and equipment refueling 250 feet from the edge of vernal pools, and 100 feet from the edge of other wetlands, streams, or waterways. If refueling must be conducted closer to wetlands, construct a secondary containment area subject to review by an environmental field specialist and/or biologist. Maintain spill prevention and cleanup equipment in refueling areas.

FP-16: Maintain a buffer of 250 feet from the edge of vernal pools and 50 feet from the edge of wetlands, ponds, or riparian areas. If maintaining the buffer is not possible because the areas are either in or adjacent to facilities, the field crew will implement other measures as prescribed by the land planner, biologist, or HCP administrator to minimize impacts by

flagging access, requiring foot access, restricting work until dry season, or requiring a biological monitor during the activity.

FP-17: Directionally fell trees away from an exclusion zone if an exclusion zone has been defined. If this is not possible, remove the tree in sections. Avoid damage to adjacent trees to the extent possible. Avoid removal of snags and conifers with basal hollows, crown deformities, and/or limbs over 6 inches in diameter.

FP-18: Nests with eggs and/or chicks will be avoided: contact a biologist, land planner or the Avian Protection Program manager for further guidance.

HCP: BIOLOGICAL RESOURCE AVOIDANCE MEASURES

In addition to the HCP field protocols listed above, PG&E also proposes Project-specific resource avoidance measures for nesting birds, wetlands, western pond turtle (WPT), California red-legged frog (CRLF) and salt-marsh harvest mouse (SMHM):

1. If work occurs during the typical nesting bird season (February 1 – September 1), surveys will be conducted prior to work. Crews will contact the PG&E Biologist two weeks prior to work to schedule this survey and coordinate with the PG&E biologist, land planner or the Avian Protection Program manager for further guidance. If nesting birds are located within the work areas, the PG&E will establish a construction set back to allow for the completion of nesting.
2. Prior to construction, the project biologist will flag wetland features next to and within work areas for avoidance. Where possible, no ground disturbing activities will take place within 50 feet of a wetland. At the southern work area crews will install plating or a temporary bridge to allow for travel across the ditch surrounding the farmed wetland.
3. Pre-construction environmental awareness training will be provided to work crews prior to access and construction. The training will focus on sensitive biological resources having potential to be found at the work location, regulatory protections afforded to these resources, and measures to be employed to avoid impacts to special-status species.
4. Crews shall stay on the designated access routes within the project area. Materials staging will be avoided along the edges of the access routes within 500 feet of the entrance to Shollenberger Park during the wet and

dry seasons to avoid entrapment or crushing of migrating CRLF and nesting WPT.

5. If any CRLF or WPT are found within the work area or along access routes, they will be allowed to move out of the work area on their own or relocated to the banks of the nearest suitable aquatic habitat by a qualified/permitted biologist.
6. A qualified biologist will survey for burrows and potential WPT nests along the proposed access routes within 2,500 feet of the entrance to Shollenberger Park, and flag them for avoidance.
7. Ground disturbing activities will only occur during dry conditions. Dry conditions are defined as: (a) less than 0.25 inch of precipitation within the 48 hours prior to construction, (b) no precipitation falling during active construction, and (c) no likelihood of precipitation of 60 percent or greater in the weather forecast for any potential work day. Weather data and forecasts can be obtained from http://forecast.weather.gov/. Contact the PG&E Biologist for any assistance.

For activities that will result in ground disturbance in pickleweed dominated habitat, including the removal of marsh vegetation, a biologist will flag access routes for crews in order to minimize impacts on SMHM. A biologist will direct equipment and crews will use protection mats (landing pads, pallets) to minimize ground disturbance when working within pickleweed or smooth cordgrass. Areas of healthy vegetation will be cleared prior to placement of protective mats. To avoid take of SMHM, the biologist will assess the site to determine if: vegetation protection mats are appropriate, vegetation removal is needed, and an onsite biological monitor is needed. Prior to placement of mats or removal of vegetation, the vegetation will be disturbed (i.e., flushed) to force movement of SMHM into adjacent tidal marsh areas. Following flushing, the field crew will place a mat or manually remove vegetation to the bare ground with non-motorized tools (e.g., hoe, rake, trowel, or shovel, or short duration grazing). Conduct work within 700 feet (or a distance approved by USFWS or CDFW) of wetlands suitable for the Ridgway's rail outside of their nesting season (between September 1- January 15).

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APPENDIX D3 WETLAND DELINEATION REPORT

PRELIMINARY DELINEATION OF AQUATIC RESOURCES, FOR THE

R-708 GAS LINE 021G REPLACEMENT PROJECT, PETALUMA, CALIFORNIA

SUBMITTED TO:

U.S. Army Corps of Engineers
San Francisco District
Regulatory Division
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San Francisco, California 94103-1398

PREPARED FOR:

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PREPARED BY:

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(530) 564-4132

June 2022

Pacific Gas and Electric Company

Pacific Gas and Electric Company. 2022. *Preliminary Delineation of Aquatic Resources, for the R-708 Gas Line 021G Replacement Project*. June 2022. (Sonoma County, CA). Prepared by Kleinfelder/GANDA, Rancho Cordova, CA.

Contents

Figure

Tables

Appendices

Acronyms and Abbreviations

CWA	Clean Water Act
GPS	Global Positioning System
HTL	High Tide Line
MHW	Mean High Water
NWS	National Weather Service
PG&E	Pacific Gas and Electric Company
USACE	United States Army Corps of Engineers

R-708 Gas Line 021G Replacement Project

Preliminary Delineation of Aquatic Resources

Summary

The Pacific Gas and Electric Company (PG&E) proposes the R-708 Gas Line 021G Replacement Project within the City of Petaluma in Sonoma County, California (Project). Kleinfelder/GANDA delineated 12.307 acres of aquatic resources within the 49.349-acre study area. These features may meet the definition of waters of the U.S. as defined by the Clean Water Act (CWA). The study area supports brackish seasonal wetland features, dredge disposal pond features, freshwater marsh features, non-tidal perennial open water features, non-tidal salt marsh features, tidal perennial open water features, tidal salt marsh, and willow scrub wetland. These aquatic resources lie adjacent to, or flow into, the Petaluma River, a traditional navigable water and subject to the ebb and flow of the tide.

This investigation followed the onsite routine wetland delineation methods described in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008).

This report provides the aquatic resources information to support a U.S. Army Corps of Engineers (USACE) jurisdictional determination in accordance with Section 404 of the CWA. Supporting documentation includes wetland determination data forms in Appendix A, maps of the location and extent of aquatic resources in Appendix B, site photographs in Appendix C, a hydric soils list and soil map in Appendix D, and a WETS table in Appendix E. This report does not assess potential impacts to aquatic resources.

Introduction

PG&E proposes to replace the Gas Line 21G crossing beneath the Petaluma River in the City of Petaluma and Sonoma County, to ensure reliability and pipeline safety. This investigation considers the 49.349-acre area that may be potentially affected by the Project (study area). The following provides a description of the Project location and a description of the site, as well as directions to the site.

Contact Information

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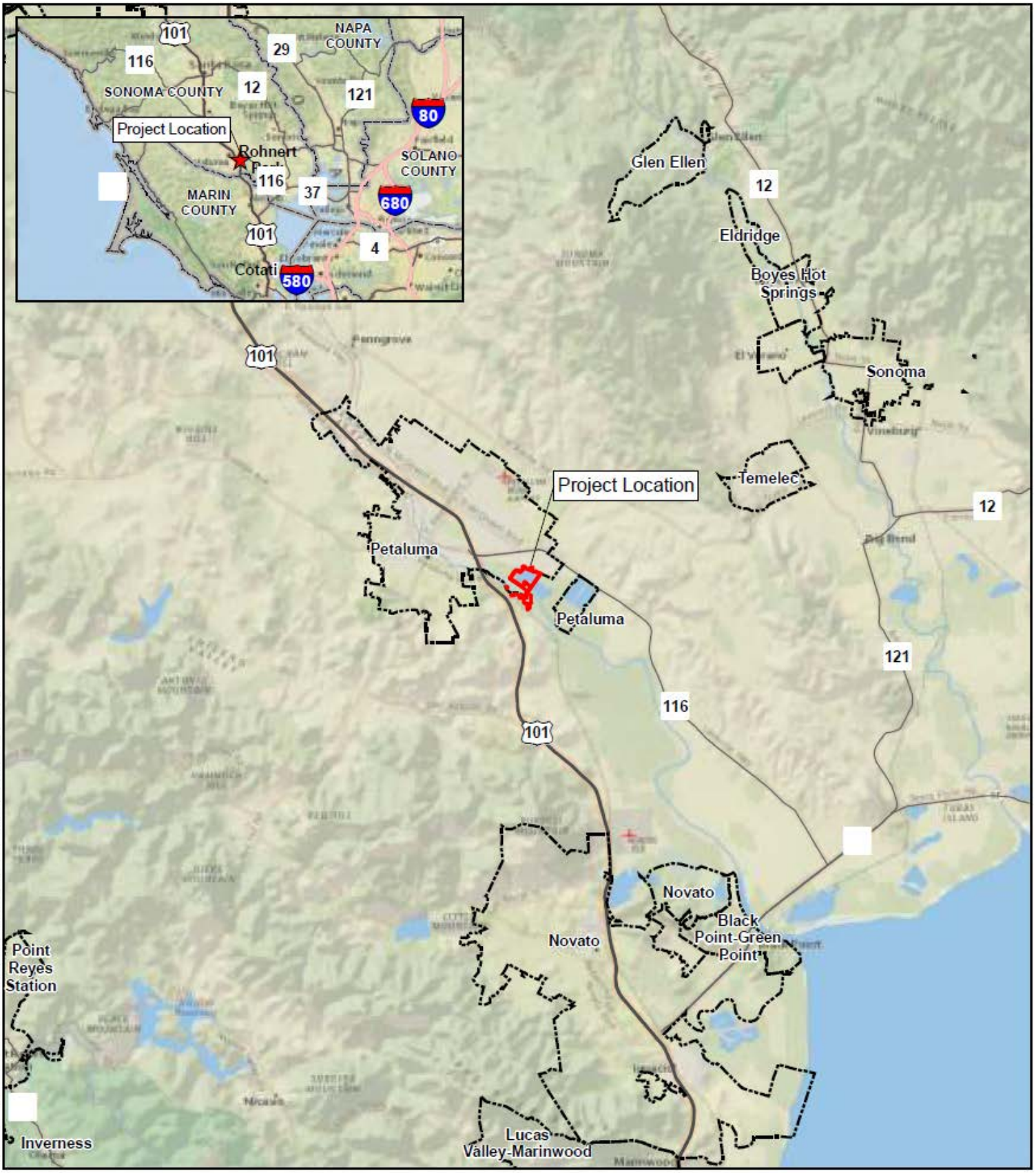
Site Description and Location

The Project straddles the Petaluma River in the City of Petaluma north of San Pablo Bay in Sonoma County. The 49.349-acre study area encompasses all areas potentially disturbed by Project activities as displayed in Appendix B. The proposed Project lies between 0 feet and 20 feet in elevation in T4N, R7W, Sections 2 and 3 on the Petaluma River U.S. Geological Survey 7.5-minute topographic quadrangle map.

The study area encompasses the Project work areas on both sides of the Petaluma River just south of urban developments in the City of Petaluma and includes brackish seasonal wetlands, dredge disposal ponds, freshwater marshes, non-tidal perennial open waters, non-tidal salt marshes, tidal perennial open waters, tidal salt marsh, and willow scrub wetland. The work areas north of the Petaluma River lie within the Shollenberger Park Dredge Disposal Site. The surrounding landscape includes a mosaic of tidal and non-tidal marshes, urban developments, farm land, rural landowners, and rolling hills.

Driving Directions

Figure 1 identifies the Project location in the City of Petaluma and Sonoma County, and illustrates the Project location just east of State Route 101. To reach the southern work area from downtown San Francisco, drive north on State Route 101 to the City of Petaluma. Take the exit for Kastania Road, turn right onto Kastania Road and at the end of this short road turn left onto Petaluma Boulevard and travel for approximately 0.25 mile. Then turn right onto Landing Way to access the southern extent of the Project. The northern work area is accessed from 1400 Cader Lane south of the Lakeville Highway The project also requires one satellite work are on the north bank of the Petaluma River and two satellite work areas located at the northern extent of the project, and accessed from South McDowell Boulevard.



Source: Bing Maps

0 1.5 3 Miles

0 2.5 5 Kilometers

N

Scale 1:190,080
1 in = 3 miles

Figure 1. Regional Vicinity
R-708 L-021G Replacement Project
Sonoma County, California

KLEINFELDER

Delineation Methods

This investigation followed the routine wetland delineation methods described in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). The study area lies within the Arid West Region as described in the supplement. Prior to field investigations, Kleinfelder/GANDA biologists reviewed the National Wetlands Inventory, available aerial imagery, topographical maps, and soil maps of the study area to characterize the vegetation, soils, topography, and hydrology in the area. Following these initial reviews, Kleinfelder/GANDA conducted a field survey to map and document aquatic resources within the study area.

Senior Vegetation Ecologist Andy Mieske conducted a field survey on November 17 and December 14, 2019. The investigator completed a paired set of data forms at plots on either side of the lateral edge of representative wetlands in the study area to record the vegetation, hydrology, and soils present. The surveyor mapped the location and extent of tidal water features where evidenced by a high tide line (HTL), which in the field corresponded to the location of the mean high water (MHW) line. Field evidence of the HTL/MHW line includes a natural line impressed on the bank, sediment deposits, shelving, water marks, water-stained leaves, and changes in vegetation type. The wetland mapping was revised in May of 2021 to account for a revised western access route to the northern work area and an expanded work area to remove the existing pipeline crossing. These revisions were based on previously collected wetland data and air photo review.

The investigator mapped features using a sub-meter accurate Global Positioning System (GPS) device on a 1:1,200 scale base map. Kleinfelder/GANDA downloaded and differentially corrected the GPS data using the nearest available base-station data.

The field investigator identified plant species using the Jepson Manual (Baldwin et al. 2012); plant nomenclature follows the Jepson online interchange (UC Berkeley 2019). The *2016 National Wetland Plant List* reports the specific wetland indicator status of each species observed (Lichvar et al. 2016). The list below defines each wetland indicator status.

Indicator Status	Indicator Code	Wetland Indicator Status description
Obligate Wetland	OBL	Almost always occur in wetlands
Facultative Wetland	FACW	Usually occur in wetlands, but may occur in non-wetlands
Facultative	FAC	Occur in wetlands and non-wetlands
Facultative Upland	FACU	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland	UPL	Almost never occur in wetlands

Environmental Setting

The following contains a brief description of the precipitation and growing season in the Project region followed by general descriptions of the vegetation, hydrology, and soil types within the study area.

Precipitation and Growing Season

The Project area has moderate temperatures throughout the year. Summers typically have warm temperatures during the day and cool temperatures at night. Summer fog commonly occurs especially in the morning from June through mid-August. Winters have moderately cold temperatures and commonly sunny skies with some rainfall. Rainfall primarily occurs from October to April with an average annual precipitation of 25.70 inches. Appendix E provides a WETS table from the nearest National Weather Service (NWS) meteorological station with sufficient available data (Petaluma Airport, CA). The Petaluma Airport station is located approximately 4 miles northward of the project. The WETS table does not report the growing season start and end dates. The United States Department of Agriculture reports 26.29 inches of rain in 2019 preceding the date of the survey, which totals 120 percent of the average annual precipitation by this time of year. In the months preceding the field surveys, the NWS station reported 0.76 inches of rain during November 2019, and 7.78 inches of rain in December 2019.

Vegetation

The Project lies within the San Francisco Bay Subregion of the California Floristic Province. The results section describes the vegetation within the aquatic resources in the study area. The following contains a discussion of the vegetation within the upland habitat types in the study area.

Urban developments and a ruderal community occupy the upland portion of the Project study area. Urban developments include the non-vegetated roadways and parking lots. The ruderal community in the study area predominantly supports non-native plant species, including a herbaceous assemblage of Bermudagrass (*Cynodon dactylon*, FACU), black mustard (*Brassica nigra*, UPL), bristly ox-tongue (*Helminthotheca echioides*, FAC), cardoon (*Cynara cardunculus*, UPL), common mallow (*Malva neglecta*, UPL), English plantain (*Plantago lanceolata*, FAC), Harding grass (*Phalaris aquatica*, FACU), Italian thistle (*Carduus pycnocephalus*, UPL), Oregon gumweed (*Grindelia stricta*, FACW), perennial pepperweed (*Lepidium latifolium*, FAC), prickly lettuce (*Lactuca serriola*, FACU), pungent false tarplant (*Centromadia pungens*, FAC), rip-gut brome (*Bromus diandrus*, UPL), ryegrass (*Festuca perennis*, FAC), salt grass (*Distichlis spicata*, FAC), soft chess (*Bromus hordeaceus*, FACU), stinkwort (*Dittrichia graveolens*, UPL), sweet fennel (*Foeniculum vulgare*, UPL), and wild oats (*Avena fatua*, UPL), as well as scattered coyote brush (*Baccharis pilularis*, UPL) shrubs.

Hydrology

The Project lies within the San Pablo Bay watershed (USGS 1999). The principle hydrologic feature of the study area is the Petaluma River, with distinct hydrologic zones north and south of the river.

The Petaluma River drains a watershed of approximately 93,400 acres, collects drainage from its numerous, mostly intermittent tributaries and conveys flows southward into San Pablo Bay. Within the study area, the river conveys year-round flows (including flood flows), is subject to tidal influences of San Pablo Bay, and is constrained by levees on both banks.

North of the river, the study area is located within Shollenberger Park Dredge Disposal Site. This combined use area covers nearly 170 acres, and is entirely enclosed with levees along the perimeter. Within the perimeter levees, approximately 115 acres is used for dredge disposal, and 50 acres is devoted to Shollenberger Marsh. The dredge disposal ponds discharge into the Northern Channel (which forms the northern border of the park and convey flows (through water control structures)

into Adobe Creek which forms the western border of the parcel. Adobe Creek flows into the Petaluma River. Under normal conditions, the perimeter levees separate Shollenberger Marsh and the Dredge Disposal Site from surface waters of the Petaluma River. However, during significant storm events (i.e. 100-year), the berm dividing the marsh from the Petaluma River becomes overtopped and floodwaters inundate the marsh.

South of the Petaluma River, the southern work area lies within former marsh lands now separated from the river with a series of earthen levees and drainage ditches. These flood protection facilities have allowed for agricultural uses (i.e. hay production), but are not sufficient to prevent inundation during a 100-year flood event. The site is drained by a 10-inch pipe with a tidal gate.

Soils

Table 1 describes the inclusions of the soil map units within the study area. The table also lists landforms associated with each inclusion and the criteria for designating these landforms as hydric. Field investigations identified "hydric" soil based on observations of at least one hydric soil indicator. Appendix D provides the National Resources Conservation Service hydric soils listing and soil map for this Project site. The 301 Reyes silty clay loam, 0 to 2 percent slopes and CeA Clear Lake clay, sandy substratum, drained, 0 to 2 percent slopes, MLRA 14 soil map units dominate the study area. Hydric soil inclusions typical of basin floors, drainageways, salt marshes, tidal flats, and tidal marshes occupy over 90 percent of these soil map units. Soils in the 301 soil map unit range from slightly saline to strongly saline. Soils in the CeA soil map unit range from non-saline to very saline.

Table 1 Soil Map Units in the Study Area

Map Symbol	Map Unit	Inclusions (landforms) [1]	Hydric Status	Hydric Criteria [2]
301	Reyes silty clay loam, 0 to 2 percent slopes	Reyes (3,4)	Yes	2
		Novato (3)	Yes	2
		Reyes-Overwashed (3,4)	Yes	2
		Water	---	---
		Typic Xerorthents-Levees (3)	No	---
		Clear Lake (5)	Yes	2
CeA	Clear Lake clay, sandy substratum, drained, 0 to 2 percent slopes, MLRA 14	Clear Lake-Drained, sandy substratum (2)	Yes	2
		Haire	No	---
		Reyes (6)	Yes	2,3
		Whight	No	---
GID	Goulding cobbly clay loam, 5 to 15 percent slopes	Goulding (7)	No	---
		Spreckles	No	---
		Toomes	No	---
		Rock outcrop	No	---
		Henneke	No	---
TmA	Tidal marsh	Tidal marsh (4)	Yes	2,3,4
		Unnamed	No	---
W	Water	Water	---	---
ZaB	Zamora silty clay loam, moist, 0 to 8 percent slopes, MLRA 14	Zamora (1,9)	No	---
		Yolo	No	---
		Cortina	No	---
		Pajaro	No	---
		Unnamed (8)	Yes	2

Notes:

1. Landforms

Alluvial fans (1); basin floors (2), tidal marshes (3); tidal flats (4); drainageways (5); salt marshes (6); hills (7); depressions (8); stream terraces (9)

2. Hydric criteria codes

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     1). a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches; or
     2). a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches; or
     3). a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

SOURCES: NRCS 2019

Results

Field investigations identified brackish seasonal wetlands, dredge disposal ponds, freshwater marshes, non-tidal perennial open waters, non-tidal salt marshes, tidal perennial open waters, tidal salt marsh, and willow scrub wetland within the study area. Aquatic resources have been assigned an alphanumeric binomial label (e.g., BSW-01) displayed on the maps in Appendix B. The first part of the binomial consists of an acronym for the feature type (i.e., BSW for brackish seasonal wetland). Each wetland and upland plot have a three-digit number included on the wetland determination data forms (e.g., 001). The maps in Appendix B display the plot locations as well as the location and extent of the wetland and water features mapped in this survey. Wetland determination data forms

describe the dominant vegetation, hydrology, and soil observations at each sample plot (see Appendix A). Aquatic features cover a total of 12.307 acres.

The mapping of the lateral edge of tidal water features followed the HTL/MHW line. Field evidence of the HTL, MHW line includes a natural line impressed on the bank, sediment deposits, shelving, water marks, water-stained leaves, and changes in vegetation type. Tidal aquatic resources occurring in the study area cover a total of 1.199 acre.

Table 2 below lists the feature and acreage of each aquatic resource. Table 3 lists the Cowardin code, type of aquatic resource in accordance with the "Rapanos Guidance," and latitude/longitude coordinates of each feature mapped.

Table 2 Acreage of Aquatic Resources in the Study Area

Feature Type	Map Label	Acreage
Non-tidal Section 404 Wetlands/Waters		
Brackish Seasonal Wetland	BSW-01	0.012
Brackish Seasonal Wetland	BSW-02	0.051
Brackish Seasonal Wetland	BSW-03	0.055
Brackish Seasonal Wetland	BSW-04	0.165
Brackish Seasonal Wetland [1]	BSW-05	0.222
Total		**0.505**
Freshwater Marsh	FM-01	0.005
Freshwater Marsh	FM-02	0.012
Freshwater Marsh	FM-03	0.128
Freshwater Marsh	FM-04	0.064
Freshwater Marsh	FM-05	0.036
Total		**0.245**
Non-tidal Salt Marsh	NSM-02	0.045
Non-tidal Salt Marsh	NSM-03	0.100
Non-tidal Salt Marsh	NSM-04	0.087
Non-tidal Salt Marsh	NSM-05	0.038
Non-tidal Salt Marsh	NSM-06	0.018
Non-tidal Salt Marsh	NSM-07	0.011
Total		**0.299**
Willow Scrub Wetland	WSW-01	0.086
Total		**0.086**
Dredge Disposal Pond	DDP-01	0.024
Dredge Disposal Pond	DDP-02	0.103
Dredge Disposal Pond	DDP-03	0.269
Dredge Disposal Pond	DDP-04*	0.244
Dredge Disposal Pond	DDP-06*	0.211
Dredge Disposal Pond	DDP-07	9.022
Total		**9.837**
Non-tidal Perennial Open Water	NPOW-01	0.062
Non-tidal Perennial Open Water	NPOW-02	0.038
Total		**0.100**
Total Section 404 wetlands/waters		***11.108***
Tidal Section 10 and Section 404 Waters		
Tidal Perennial Open Water	TPOW-01	0.983
Tidal Perennial Open Water	TPOW-02	0.039
Total		**1.022**
Tidal Salt Marsh	TSM-01	0.177
Total Section 10/Section 404 wetlands/waters		***1.199***
		12.307

Notes:

1 A portion of BSW-05 was disturbed to address a gas leak under Reginal General Permit No. 5

* Feature DDP-05 previously mapped along the western access route, which has been realigned to avoid this feature.

Table 3 Aquatic Resources Data

Feature	Cowardin Code	Resource Type	Latitude	Longitude
Brackish seasonal wetland (BSW-01)	PEM	NRPWW	38.2271314410	-122.591231091
Brackish seasonal wetland (BSW-02)	PEM	NRPWW	38.2268047215	-122.591458432
Brackish seasonal wetland (BSW-03)	PEM	TNWW	38.2221445501	-122.595957388
Brackish seasonal wetland (BSW-04)	PEM	TNWW	38.2217317864	-122.596737736
Brackish seasonal wetland (BSW-05)	PEM	TNWW	38.2201801293	-122.596348090
Freshwater marsh (FM-01)	PEM	NRPWW	38.2291233577	-122.598375160
Freshwater marsh (FM-02)	PEM	NRPWW	38.2292277214	-122.598220398
Freshwater marsh (FM-03)	PEM	NRPWW	38.2285438347	-122.594950354
Freshwater marsh (FM-04)	PEM	NRPWW	38.2278653221	-122.594019971
Freshwater marsh (FM-05)	PEM	NRPWW	38.2273568984	-122.591783822
Non-tidal salt marsh (NSM-02)	PEM	RPWWD	38.2195160626	-122.596065773
Non-tidal salt marsh (NSM-03)	PEM	RPWWD	38.2194721659	-122.597094466
Non-tidal salt marsh (NSM-04)	PEM	RPWWD	38.2159193540	-122.596226562
Non-tidal salt marsh (NSM-05)	PEM	RPWWD	38.2159320776	-122.596124073
Non-tidal salt marsh (NSM-06)	PEM	RPWWD	38.2194878121	-122.599193349
Non-tidal salt marsh (NSM-07)	PEM	RPWWD	38.2203690812	-122.602555774
Tidal salt marsh (TSM-01)	E2	RPW	38.2224246165	-122.595370893
Willow scrub wetland (WSW-01)	PEM	NRPWW	38.2278929053	-122.593277275
Dredge disposal pond (DDP-01)	L2	NRPW	38.2289685379	-122.598035937
Dredge disposal pond (DDP-02)	L2	NRPW	38.2252751898	-122.597944995
Dredge disposal pond (DDP-03)	L2	NRPW	38.2277336768	-122.593726628
Dredge disposal pond (DDP-04)	L2	NRPW	38.2271569653	-122.591719848
Dredge disposal pond (DDP-06)	L2	NRPW	38.2280573745	-122.591247581
Dredge disposal pond (DDP-07)	L2	NRPW	38.2230693737	-122.592486482
Non-tidal perennial OW (NPOW-01)	R2	RPW	38.2194984014	-122.596342501
Non-tidal perennial OW (NPOW-02)	R2	RPW	38.2159938812	-122.596065773
Tidal perennial open water (TPOW-01)	E1	TNW	38.2209013965	-122.596663712
Tidal perennial open water (TPOW-02)	E1	RPW	38.2203135917	-122.602661220

E1: estuarine subtidal
E2: estuarine intertidal wetland
L2: lacustrine littoral wetlands and waters
NRPW: non-RPWs that flow directly or indirectly into TNWs
NRPWW: wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
PEM: palustrine emergent wetlandR2: lower perennial riverine
RPW: relatively permanent waters that flow directly or indirectly into traditionally navigable waters (TNWs)
RPWWD: wetland directly abutting RPWs that flow directly or indirectly into TNWs
RPWWN: wetland adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
TNW: traditional navigable water
TNWW: wetlands adjacent to TNWs

The following describes the wetland and water features in the study area.

Brackish Seasonal Wetlands

Brackish seasonal wetlands occur within the study area, where depressional features underlain by saline soils collect direct precipitation and runoff from adjacent watershed areas. These areas support halophytic and freshwater plant associations. Photo 1 in Appendix C shows a typical brackish seasonal wetland.

A distinct vegetation transition divides the predominance of hydrophytic vegetation within the brackish seasonal wetlands and adjacent non-wetlands dominated by upland plant species. Kleinfelder/GANDA mapped wetland boundaries to include areas dominated by a mix of freshwater and saline-tolerant hydrophytic vegetation. The brackish seasonal wetland community supports a sparse to dense canopy of herbs consisting of multiple saline-tolerant and freshwater species in the study area. Dominant species include alkali sea-heath (*Frankenia salina*, FACW), bristly ox-tongue, curly dock (*Rumex crispus*, FAC), fat-hen (*Atriplex prostrata*, FACW), opposite-leaf Russian-thistle (*Salsola soda*, FACW), and salt grass. Other plant species observed in the brackish seasonal wetland include annual rabbit's-foot grass (*Polypogon monspeliensis*, FACW), Oregon gumweed, perennial pepperweed, and poison-hemlock (*Conium maculatum*, FACW). The brackish seasonal wetlands receive rainwater and runoff from the surrounding upland environment.

Freshwater Marsh

The field investigator observed a distinct transition between the predominance of hydrophytic vegetation within the freshwater marshes and adjacent uplands dominated by upland plant species. Photo 4 in Appendix C shows freshwater marsh FM-02. Kleinfelder/GANDA mapped wetland boundaries to include areas dominated by hydrophytic vegetation that also have wetland hydrology and hydric soil. The following describes the vegetation, hydrology, and soils observed within this community.

Vegetation

Plot 001 within the freshwater marsh FM-02 had a predominance of hydrophytic vegetation where more than half of the dominant plant species across strata are assigned a wetland indicator status. Broadleaf cattails (*Typha latifolia*, OBL) and narrowleaf cattails (*T. angustifolia*, OBL) dominate the freshwater marsh. Associated species include annual fireweed (*Epilobium brachycarpum*, UPL), beardless wild rye (*Elymus triticoides*, FAC), bristly ox-tongue, curly dock, Douglas' false willow (*Baccharis glutinosa*, FACW), hard-stem club-rush (*Schoenoplectus acutus*, OBL), Mexican rush (*Juncus mexicanus*, FACW), perennial pepperweed, salt grass, and tall flat sedge (*Cyperus eragrostis*, FACW).

Hydrology

As recorded at Plot 001, field investigations noted or observed drainage patterns, a high water table, saturation, sediment deposits, water marks, and water stained leaves as wetland hydrology indicators within the freshwater marsh wetland community. The freshwater marshes receive groundwater, rainwater, and runoff from the surrounding environment.

Soils

The field investigator observed a depleted matrix soil indicator in the freshwater marsh evidenced by low chroma colors.

Salt Marsh (Tidal/Non-tidal)

Within the study area, tidal and non-tidal salt marshes support a similar association of halophytic vegetation. As noted under the discussion of hydrology below, these mapping types are differentiated by tidal inundation.

The field investigator observed a distinct transition between the predominance of hydrophytic vegetation within the salt marshes and adjacent uplands dominated by upland plant species. Photo 3 in Appendix C shows a narrow strip of non-tidal salt marsh NSM-03 between the open water in the foreground. Photo 7 in Appendix C shows tidal salt marsh TSM-01. Kleinfelder/GANDA mapped wetland boundaries to include areas dominated by hydrophytic vegetation that also have wetland hydrology and hydric soil. The following describes the vegetation, hydrology, and soils observed within this community.

Vegetation

Plot 005 within the non-tidal salt marsh NSM-07 and plot 007 within non-tidal salt marsh NSM-02 had a predominance of hydrophytic vegetation where more than half of the dominant plant species across strata are assigned a wetland indicator status. A dense herbaceous canopy of saline-tolerant species dominates non-tidal salt marshes, including alkali sea-heath, fat-hen, opposite-leaf Russian-thistle, Oregon gumweed, perennial pepperweed, pickleweed, and salt grass.

Salt marsh bulrush and pickleweed dominate the tidal salt marsh.

Hydrology

As recorded at plots 005 and 007, field investigations observed water marks, water stained leaves, oxidized rhizospheres along living roots, and a positive result on the FAC-neutral test as wetland hydrology indicators within the salt marsh community. Direct precipitation, and groundwater support the non-tidal salt marshes. Additionally, NSM-01 receives water and mud dredge disposals following dredging of the Petaluma River.

Kleinfelder/GANDA mapped the boundary between uplands and the tidal salt marsh to coincide with the HTL/MHW line.

Soils

The field investigator observed a depleted matrix soil indicator in the non-tidal salt marsh community evidenced by low chroma colors.

Willow Scrub Wetland

The field investigator observed a distinct transition between the predominance of hydrophytic vegetation within the willow scrub wetland and adjacent uplands dominated by upland plants. Photo 8 in Appendix C shows WSW-01. Kleinfelder/GANDA mapped wetland boundaries to include areas dominated by hydrophytic vegetation that also have wetland hydrology and hydric soil. The following describes the vegetation, hydrology, and soils observed within this community.

Vegetation

Plot 003 within the willow scrub wetland had a predominance of hydrophytic vegetation where more than half of the dominant plant species across strata had assigned wetland indicator status. A dense thicket of arroyo willow (*Salix lasiolepis*, FACW) shrubs dominates the willow scrub wetland. While an herbaceous understory is generally absent, fringed willowherb (*Epilobium ciliatum*, FACW) and narrowleaf cattail occur at scattered locations.

Hydrology

At Plot 003, field investigations noted or observed a high water table, saturation, and a positive result on the FAC-neutral test as wetland hydrology indicators within the willow scrub wetland community. The willow scrub wetland receives groundwater, rainwater, and runoff from the surrounding environment.

Soils

The field investigator observed a depleted matrix soil indicator in the willow scrub wetland community evidenced by low chroma colors and redoximorphic concentrations.

Dredge Disposal Pond

The dredge disposal ponds within the study area (see Photo 2 in Appendix C) consist of periodically ponded open water with less than five percent emergent vegetation. The ponded water originates from storm water runoff, groundwater influenced by saline soils, and brackish water and mud from deposited dredge spoils following Petaluma River dredging. A distinct transition exists between the dredge disposal ponds and adjacent uplands. Plant species present especially at the lateral edges include fat-hen, opposite-leaf Russian-thistle, pickleweed (*Salicornia pacifica*, OBL), rough cocklebur (*Xanthium strumarium*, FAC), and sea purslane (*Sesuvium verrucosum*, FACW).

Perennial Open Water (Tidal/Non-tidal)

Perennial open water occurs within the Petaluma River and adjacent tidal channels as well as non-tidal ditches dug below the tidally-influenced water table. The field investigator observed a distinct transition between perennial open water and adjacent uplands. The lower-right foreground of Photo 3 in Appendix C shows non-tidal perennial open water NPOW-01. Photo 6 in Appendix C shows tidal perennial open water TPOW-01 (Petaluma River). Kleinfelder/GANDA mapped the edge of the tidal perennial open water features at the location of the HTL/MHW line. Plant species at the lateral edge of tidal perennial open water features include Oregon gumweed, pickleweed, salt grass, and salt marsh bulrush (*Bolboschoenus maritiumus*, OBL).

References Cited

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.

Lichvar, R. W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The *National Wetland Plant List:* 2016 wetland ratings. Phytoneuron: 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X. Accessed via: http://wetland_plants.usace.army.mil/

Natural Resources Conservation Service (NRCS) 2019, United States Department of Agriculture. Web Soil Survey. Accessed via: http://websoilsurvey.nrcs.usda.gov/ (December 2019)

University of California, Berkeley (UC Berkeley) 2019. Jepson online interchange. Accessed via: http://ucjeps.berkeley.edu/interchange.html (December 2019)

United States Army Corps of Engineers (USACE) 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 100 pp. plus appendices.

United States Army Corps of Engineers (USACE) 2008. Regional supplement to the Corps of Engineers wetland delineation manual: arid west region. Technical Report ERDC/EL TR-08-28. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

United States Geological Survey (USGS). 1999. California Interagency Watershed Map of 1999 (Calwater 2.2.1). Accessed via: http://atlas.ca.gov/ (December 2019)

Appendix A

Arid West Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 001

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): C Lat: 38.2291640128536 Long: -122.598235571354 Datum: NAD 83

Soil Map Unit Name: Clear Lake clay, sandy substratum, drained, 0 to 2 % slopes NWI classification: R4SBA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha latifolia*	38	yes	OBL
2. *Elymus triticoides*	32	yes	FAC
3. *Epilobium brachycarpum*	21	yes	UPL
4. *Helminthotheca echioides*	7	no	FAC
5. *Lepidium latifolium*	1	no	FAC
6. *Rumex crispus*	1	no	FAC
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	5Y 5/1	100					gravelly silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water Marks (B1) (**Riverine**)
- X Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes X No _____ Depth (inches): 7

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 6

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 002

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Convex Slope (%): 15

Subregion (LRR): C Lat: 38.2291559207908 Long: -122.598266981004 Datum: NAD 83

Soil Map Unit Name: Clear Lake clay, sandy substratum, drained, 0 to 2 % slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Lactuca serriola*	9	yes	FACU
2. *Helminthotheca echioides*	7	yes	FAC
3. *Epilobium brachycarpum*	4	no	UPL
4. *Vicia sativa*	2	no	FACU
5.			
6.			
7.			
8.			
Total Cover:	22		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 78 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: 002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10Y 3/3	100					gravelly sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 003

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): C Lat: 38.2279225071081 Long: -122.593592572897 Datum: NAD 83

Soil Map Unit Name: Clear Lake clay, sandy substratum, drained, 0 to 2 % slopes NWI classification: R4SBA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Salix lasiolepis*	97	yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	97		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = 0
FAC species _____	x 3 = 0
FACU species _____	x 4 = 0
UPL species _____	x 5 = 0
Column Totals: _____ (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	5Y 4/1	90	5YR	10	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes X No _____ Depth (inches): 9

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 8

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 004

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): Convex Slope (%): 8

Subregion (LRR): C Lat: 38.2278913717067 Long: -122.59357281023 Datum: NAD 83

Soil Map Unit Name: Clear Lake clay, sandy substratum, drained, 0 to 2 % slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Bromus diandrus*	9	yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	9		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 91 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: 004

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10Y 3/2	100					gravelly clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 005

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): C Lat: 38.2203405971817 Long: -122.602580363655 Datum: NAD 83

Soil Map Unit Name: Reyes silty clay loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Salicornia pacifica*	52	yes	OBL
2. *Grindelia stricta*	39	yes	FACW
3. *Distichlis spicata*	7	no	FAC
4. *Lepidium latifolium*	2	no	FAC
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	0
FAC species	x 3 =	0
FACU species	x 4 =	0
UPL species	x 5 =	0
Column Totals: (A)		0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 005

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10Y 5/1	100					gravelly silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 006

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): fillslope Local relief (concave, convex, none): convex Slope (%): 7

Subregion (LRR): C Lat: 38.2278913717067 Long: -122.59357281023 Datum: NAD 83

Soil Map Unit Name: Reyes silty clay loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis pilularis*	61	yes	UPL
2.			
3.			
4.			
5.			
Total Cover:	61		
Herb Stratum			
1. *Bromus diandrus*	28	yes	UPL
2. *Foeniculum vulgare*	14	yes	UPL
3. *Carduus pycnocephalus*	1	no	UPL
4.			
5.			
6.			
7.			
8.			
Total Cover:	43		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 57 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = 0
FAC species _____	x 3 = 0
FACU species _____	x 4 = 0
UPL species _____	x 5 = 0
Column Totals: _____ (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: 006

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10Y 4/2	100					gravelly sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 007

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): C Lat: 38.2195230399373 Long: -122.596366704114 Datum: NAD 83

Soil Map Unit Name: Reyes silty clay loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Salsola soda*	42	yes	FACW
2. *Frankenia salina*	37	yes	FACW
3. *Salicornia pacifica*	21	yes	OBL
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = 0
FAC species _____	x 3 = 0
FACU species _____	x 4 = 0
UPL species _____	x 5 = 0
Column Totals: _____ (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10Y 5/2	92	10YR 5/8	8	C	M	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: R-708 REPLACEMENT PROJECT City/County: Sonoma County Sampling Date: Dec 14, 2019

Applicant/Owner: PG&E State: CA Sampling Point: 008

Investigator(s): Andy Mieske Section, Township, Range: Section 2, T4N, R7W

Landform (hillslope, terrace, etc.): fillslope Local relief (concave, convex, none): convex Slope (%): 6

Subregion (LRR): C Lat: 38.2195538846273 Long: -122.596354203845 Datum: NAD 83

Soil Map Unit Name: Reyes silty clay loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis pilularis*	17	yes	UPL
2. *Picea pungens*	5	yes	FAC
3.			
4.			
5.			
Total Cover:	22		
Herb Stratum			
1. *Helminthotheca echioides*	22	yes	FAC
2. *Bromus hordeaceus*	12	yes	FACU
3. *Centaurea solstitialis*	6	no	UPL
4. *Brassica nigra*	3	no	UPL
5. *Carduus pycnocephalus*	2	no	UPL
6.			
7.			
8.			
Total Cover:	45		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 55 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = 0
FAC species _____	x 3 = 0
FACU species _____	x 4 = 0
UPL species _____	x 5 = 0
Column Totals: _____ (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

Ornamentally planted Picea pungens

SOIL

Sampling Point: 008

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	10Y 4/3	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

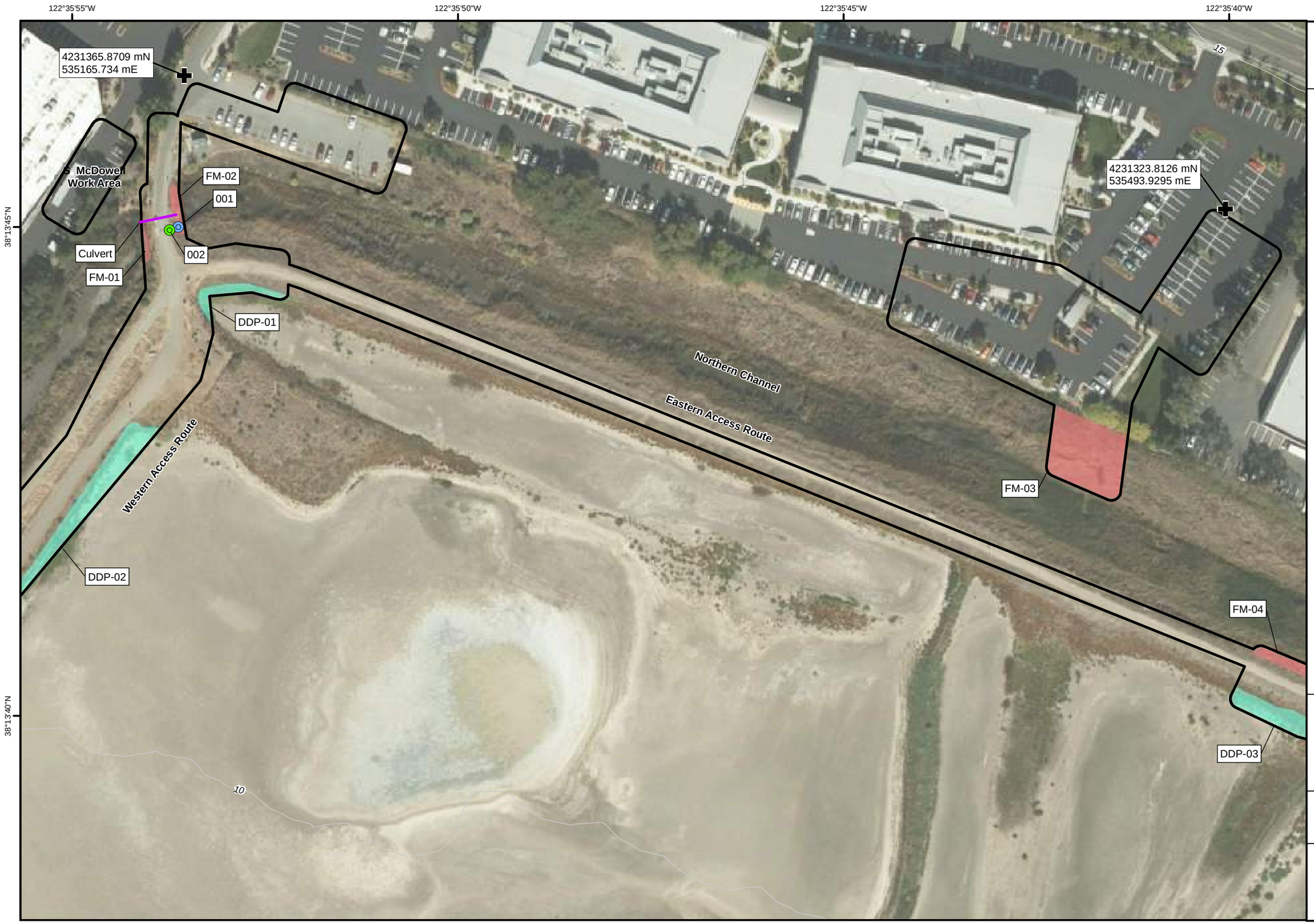
Remarks:

Appendix B

Delineation of Aquatic Resources Maps

Appendix B

Delineation of Aquatic Resources Maps



R-708 L-021G Replacement Project
June 2022

- Delineation Area (49.349 ac.)
- Upland Data Point
- Wetland Data Point
- Culvert
- Coordinate Marker
- 5-foot Contour

Non-tidal Section 404 Waters

- Dredge Disposal Pond - DDP (9.873 ac.)
- Freshwater Marsh - FM (0.245 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 1 of 11

122°35'40"W
122°35'35"W
122°35'30"W
38°13'40"N
38°13'35"N

R-708 L-021G Replacement Project June 2022

- Delineation Area (49.349 ac.)
- Upland Data Point
- Wetland Data Point
- Culvert
- Water Control Structure
- Coordinate Marker
- 5-foot Contour

Non-tidal Section 404 Waters

- Brackish Seasonal Wetland - BSW (0.505 ac.)
- Dredge Disposal Pond - DDP (9.873 ac.)
- Freshwater Marsh - FM (0.245 ac.)
- Willow Scrub Wetland - WSW (0.086 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 2 of 11

122°36'5"W
122°36'0"W
122°35'55"W
38°13'40"N
38°13'35"N
4231233.7289 mN
534931.3086 mE
10
Western Access Route
Western Access Route
DDP-02
Adobe Creek

R-708 L-021G Replacement Project June 2022

Delineation Area (49.349 ac.)

Coordinate Marker

5-foot Contour

Non-tidal Section 404 Waters

Dredge Disposal Pond - DDP (9.873 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

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Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources

122°36'15"W

122°36'10"W

122°36'5"W

38°1'3"35"N

38°1'3"30"N

Adobe Creek

Western Access Route

4230924.9595 mN
534690.8019 mE

R-708 L-021G Replacement Project June 2022

Delineation Area (49.349 ac.)

Coordinate Marker

5-foot Contour

N

0 50 100

Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

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Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 4 of 11

122°36'5"W

122°36'0"W

122°35'55"W

38°13'30"N

38°13'25"N

Western Access Route

DDP-07

5

DDP-07

4230635.197 mN
535141.8511 mE

R-708 L-021G Replacement Project June 2022

Delineation Area (49.349 ac.)

Coordinate Marker

5-foot Contour

Non-tidal Section 404 Waters

Dredge Disposal Pond - DDP (9.873 ac.)

N

0 50 100

Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

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Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 5 of 11

R-708 L-021G
Replacement Project
June 2022

- Delineation Area (49.349 ac.)
- Coordinate Marker
- 5-foot Contour

Non-tidal Section 404 Waters

- Dredge Disposal Pond - DDP (9.873 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

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Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 6 of 11

122°35'55"W
122°35'50"W
122°35'45"W
122°35'40"W
38°13'20"N
38°13'15"N

DDP-07
DDP-06
DDP-07
4230635.197 mN
535141.8511 mE
Northern
Work Area
BSW-03
Eastern Access Route
BSW-03
BSW-04
BSW-03
TSM-01
Northern
Va ve Lot
TPOW-01
Peta luma River

R-708 L-021G Replacement Project June 2022

- Delineation Area (49.349 ac.)
- Gas Line Crossing Sign Location
- Pipeline Marker
- Coordinate Marker
- 5-foot Contour
- High Tide Line / Mean High Water (HTL/MHW)

Tidal Section 10 and Section 404 Waters

- Tidal Perennial Open Water - TPOW (1.022 ac.)
- Tidal Salt Marsh - TSM (0.177 ac.)

Non-tidal Section 404 Waters

- Brackish Seasonal Wetland - BSW (0.505 ac.)
- Dredge Disposal Pond - DDP (9.873 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

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Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources

122°35'55"W
122°35'50"W
122°35'45"W
122°35'40"W
38°13'10"N

TPOW-01
Southern
Va ve
Lot
Locat on of
Cross ng Structure
Petaluma River
BSW-05
NSM-06
NPOW-01
NSM-03
007
008
NSM-02
NPOW-01
NSM-03
5
Cropland
Southern
Work Area

R-708 L-021G Replacement Project June 2022

- Delineation Area (49.349 ac.)
- Gas Line Crossing Sign Location
- Pipeline Marker
- Upland Data Point
- Wetland Data Point
- 5-foot Contour
- High Tide Line / Mean High Water (HTL/MHW)

Tidal Section 10 and Section 404 Waters

- Tidal Perennial Open Water - TPOW (1.022 ac.)

Non-tidal Section 404 Waters

- Brackish Seasonal Wetland - BSW (0.505 ac.)
- Non-tidal Perennial Open Water - NPOW (0.100 ac.)
- Non-tidal Salt Marsh - NSM (0.299 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources

R-708 L-021G Replacement Project June 2022

- Delineation Area (49.349 ac.)
- Coordinate Marker
- 5-foot Contour

Non-tidal Section 404 Waters

- Non-tidal Perennial Open Water - NPOW (0.100 ac.)
- Non-tidal Salt Marsh - NSM (0.299 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources

122°36'10"W
122°36'5"W
122°36'0"W
38°13'15"N
38°13'10"N

Petaluma River

4230356.2467 mN
534740.918 mE
TPOW-02
005
NSM-07
006
4230320.1953 mN
534728.8422 mE
NSM-06
NSM-06
NSM-06
Culvert
Cropland
5

R-708 L-021G Replacement Project June 2022

- Delineation Area (49.349 ac.)
- Upland Data Point
- Wetland Data Point
- Culvert
- Water Control Structure
- Coordinate Marker
- 5-foot Contour
- High Tide Line / Mean High Water (HTL/MHW)

Tidal Section 10 and Section 404 Waters

- Tidal Perennial Open Water - TPOW (1.022 ac.)

Non-tidal Section 404 Waters

- Non-tidal Salt Marsh - NSM (0.299 ac.)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources

R-708 L-021G
Replacement Project
June 2022

- Delineation Area (49.349 ac.)
- Gas Line Crossing Sign Location
- Sign Post Work Area
- 5-foot Contour
- High Tide Line / Mean High Water (HTL/MHW)

N

0 50 100
Feet

1 inch = 100 feet

Notes:
1. Acreage shown for each class refers to the entire delineation area.
2. Feature label key provided below.
3. ESRI Aerial Imagery (03/26/2021)
4. Projection: UTM Nad 83 Z10N
5. Vertical datum NAVD88
6. Topographic elevation in feet

USGS 7.5' Quad: PETALUMA RIVER (1980)
PLSS: T04N, R07W, SEC 1 and 2;
T05N, R07W, SEC 35 and 36
Land Grant PETALUMA, WETLANDS

PG&E Contact: Jeff Warshauer
Prepared by: Kleinfelder/530-823-3151
Delineated by: Andrew Mieske
Delineation Survey Date: 11/17/2019, 12/14/2019 and 1/17/2020
Drawn By: Chelsea Barker-Switzer

Pacific Gas and Electric Company

Aquatic Resources Map
R-708 L-021G Replacement Project
Delineation of Aquatic Resources
Page 11 of 11

Appendix C

Site Photographs

R-708 L-021G Replacement Project Photographs

Photo 1 Facing north: brackish seasonal wetland BSW- 01 (11/2020)

Photo 2 Facing northeast: dredge disposal pond DDP-02, DDP-03, and DDP-04 (11/17/19)

Photo 3 **Facing southwest: non-tidal perennial open water (NPOW-01) in front of narrow strand of non-tidal salt marsh (NSM-03) (12/14/19); Ruderal vegetation in the background, previous used a cropland**

Photo 4 **Facing northeast: freshwater marsh FM-02 (12/14/19)**

Photo 5 Water gate enabling periodic flow from dredge disposal ponds to freshwater marsh FM-04 (12/14/19)

Photo 6 Facing west: tidal perennial open water (Petaluma River) TPOW-01 (11/17/19)

Photo 7 Facing southwest: tidal salt marsh TSM-01 (11/17/19)

Photo 8 Facing northwest: willow scrub wetland WSW-01 (11/17/19)

Appendix D

Hydric Soils List and Soil Map

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–CA097-Sonoma County, California					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
301: Reyes silty clay loam, 0 to 2 percent slopes	Reyes	90	Tidal flats,tidal marshes	Yes	2
	Novato	5	Tidal marshes	Yes	2
	Reyes-Overwashed	2	Tidal marshes,tidal flats	Yes	2
	Water	1	—	—	—
	Typic Xerorthents-Levees	1	Tidal marshes	No	—
	Clear Lake	1	Drainageways	Yes	2
CeA: Clear Lake clay, sandy substratum, drained, 0 to 2 percent slopes, MLRA 14	Clear Lake-Drained, sandy substratum	85	Basin floors	Yes	2
	Haire	5	—	No	—
	Reyes	5	Salt marshes	Yes	2,3
	Whight	5	—	No	—
GID: Goulding cobbly clay loam, 5 to 15 percent slopes	Goulding	85	Hills	No	—
	Spreckels	4	—	No	—
	Toomes	4	—	No	—
	Rock outcrop	4	—	No	—
	Henneke	3	—	No	—
TmA: Tidal marsh	Tidal marsh	85	Tidal flats	Yes	2,3,4
	Unnamed	15	—	No	—
W: Water	Water	100	—	—	—
ZaB: Zamora silty clay loam, moist, 0 to 8 percent slopes, MLRA 14	Zamora	85	Alluvial fans,stream terraces	No	—
	Yolo	6	—	No	—
	Cortina	5	—	No	—
	Pajaro	3	—	No	—
	Unnamed	1	Depressions	Yes	2

Data Source Information

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 13, Sep 16, 2019

Soil Map—Sonoma County, California
(R-708 Replacement Project in Petaluma)

Map Scale: 1:9,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 13, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 16, 2019—Apr 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
301	Reyes silty clay loam, 0 to 2 percent slopes	252.1	61.8%
CeA	Clear Lake clay, sandy substratum, drained, 0 to 2 percent slopes, MLRA 14	121.5	29.8%
GID	Goulding cobbly clay loam, 5 to 15 percent slopes	3.2	0.8%
TmA	Tidal marsh	4.8	1.2%
W	Water	22.3	5.5%
ZaB	Zamora silty clay loam, moist, 0 to 8 percent slopes, MLRA 14	4.2	1.0%
Totals for Area of Interest		**408.1**	**100.0%**

Appendix E

WETS Table

WETS Table

WETS Station: PETALUMA AIRPORT, CA								
Requested years: 1971 - 2000								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	57.2	38.2	47.7	5.29	2.39	6.45	8	0.0
Feb	62.0	40.7	51.3	5.19	2.19	6.31	8	0.0
Mar	64.5	42.1	53.3	3.87	1.58	4.70	7	0.0
Apr	68.7	43.6	56.2	1.44	0.57	1.74	4	0.0
May	72.9	47.0	60.0	0.63	0.17	0.59	2	0.0
Jun	78.6	50.5	64.6	0.12	0.00	0.07	0	0.0
Jul	82.1	52.1	67.1	0.05	0.00	0.00	0	0.0
Aug	82.2	52.4	67.3	0.08	0.00	0.00	0	0.0
Sep	81.3	51.4	66.4	0.30	0.00	0.27	1	0.0
Oct	76.0	47.2	61.6	1.37	0.65	1.61	2	0.0
Nov	65.0	41.6	53.3	3.62	1.62	4.42	6	0.0
Dec	57.6	37.5	47.6	3.75	1.99	4.51	7	0.0
Annual:					19.27	29.09		
Average	70.7	45.4	58.0	-	-	-	-	-
Total	-	-	-	25.70			45	0.0

GROWING SEASON DATES

Years with missing data:	24 deg = 7	28 deg = 6	32 deg = 5
Years with no occurrence:	24 deg = 21	28 deg = 4	32 deg = 0
Data years used:	24 deg = 23	28 deg = 24	32 deg = 25
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	No occurrence	1/22 to 12/30: 342 days	3/5 to 11/27: 267 days
70 percent *	No occurrence	1/2 to 1/20: 383 days	2/22 to 12/9: 290 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1893		2.34	6.41	1.24	0.65	0.00	0.00		M0.12	0.19	3.75	3.54	18.24
1894	M8.61	M2.92	0.85	0.69	0.69	0.69			1.61	1.72		10.15	27.93
1895	9.89	M2.47	2.55	0.61	0.81		0.08		0.36	0.15			16.92
1896													
1897													
1898													
1899													
1900													
1901													
1902													
1903													
1904													

1905													
1906													
1907													
1908													
1909													
1910													
1911													
1912													
1913		0.70	1.95	1.01	0.69	0.01	0.11	T	T	0.00	6.68	9.17	20.32
1914	15.77	5.97	1.02	1.04	0.37	0.14	0.00		0.02	1.07	0.48	7.49	33.37
1915	8.77	11.70	3.14	0.45	3.19		M0.02			0.06	0.83	6.26	34.42
1916	16.59	3.31	1.92	0.02	M0.15	0.08	0.12	0.22	0.73	0.46	1.14	6.03	30.77
1917	2.12	5.46	1.16	0.63	0.09	0.00			0.10		0.59	1.91	12.06
1918	1.43	4.76	2.79	0.64	0.00	0.11		0.00	2.85	0.63	4.15	2.32	19.68
1919	3.78	7.60	2.13	0.19	T	0.00			0.25	0.37	0.31	4.35	18.98
1920	0.24	1.00	3.00	1.71		0.44	0.06		0.10	2.59	4.79	8.03	21.96
1921	8.47	0.97	1.60	0.35	M2.93	0.02			0.25	0.85	1.64	6.51	23.59
1922	1.94	4.90	2.15	M0.24	0.34	0.12		0.00		2.28	3.43	10.06	25.46
1923	M2.48	1.27		4.56	0.05	0.06	MT	0.17	1.00	0.22	0.76	1.10	11.67
1924	3.40	3.29	1.72	0.23	0.14		0.00		0.00	3.57	1.70	M5.98	20.03
1925	1.66	11.17	2.89	M4.17	4.60	M0.06	0.03	0.16	0.38	0.55	3.65	1.28	30.60
1926	6.14	7.15	0.36	6.62	0.50	0.00	0.00	0.01	0.10	1.94	9.73	1.93	34.48
1927									MT	1.84	3.84	3.53	9.21
1928	2.35	2.71	5.23	1.82	0.17	0.00	0.00	0.00	0.03	0.07	4.02	4.75	21.15
1929	1.39	M2.08	M1.32	1.08	T	1.57	0.00	0.00		M0.06	0.00	M5.74	13.24
1930	M4.61	M2.62	3.35	1.30	0.20	0.00	0.00	0.00	0.48	0.97	1.29	0.38	15.20
1931	6.85	1.28	1.98	0.63	0.77	0.97	0.00	0.00	T	1.00	M1.53	11.26	26.27
1932	2.78	2.32	0.76	0.89	2.06	T	0.00	0.00	T	T	1.24	3.58	13.63
1933	6.25	1.39	3.16	0.15	1.40	0.00	0.00	0.00	T	M1.91	0.00	7.22	21.48
1934	0.75	4.49	0.38	0.74	1.75	0.48	0.00	T	0.30	M1.50	M3.81	3.90	18.10
1935	7.07	2.09	5.70	3.22	0.00	0.00	0.00	0.09	0.30	0.69	1.57	2.76	23.49
1936	6.85	9.68	1.17	1.30	0.22	0.71	T	T	0.00	0.35	0.02	2.79	23.09
1937	4.94	7.57	7.18	1.00	T	M0.85	T	0.00	0.00	1.19	3.61	4.35	30.69
1938	4.43	9.38	8.58	1.93	T	0.00	0.00	0.00	0.51	1.02	1.28	2.50	29.63
1939	3.40	2.07	2.23	0.15	0.48	T	0.00	0.00	0.08	0.19	0.18	1.50	10.28
1940	9.98	10.19	5.46	2.14	1.22	0.04	0.00	0.00	0.08	1.30	1.91	11.86	44.18
1941	9.58	8.50	5.91	5.43	0.90	0.30	0.00	T	T	1.48	2.18	6.72	41.00
1942	6.09	6.47	M3.61	4.50	1.12	0.00	0.00	0.00	0.	0.	4.71	M4.	31.

									08	99		19	76
1943	7.48	2.22	3.77	1.47	0.07	0.07	0.00	0.00	0.00	0.43	M0.43	2.46	18.40
1944	M4.72	7.03	2.10	2.12	1.20	0.24	0.00	0.02	T	1.59	5.01	4.66	28.69
1945	2.75	4.02	4.12	0.03	0.62	0.00	T	0.00	0.05	2.84	4.15	10.96	29.54
1946	2.15	2.59	2.09	0.29	0.08	0.00	0.04	0.00	0.04	0.23	3.52	2.97	14.00
1947	0.76	2.63	M4.03	0.69	0.29	M1.26	0.00	0.00	0.00	3.37	1.20	M0.45	14.68
1948	1.82	2.03	3.75	5.11	0.50	0.07	0.00	0.00	0.03	0.51	0.87	4.67	19.36
1949	1.50	2.54	7.16	0.00	0.24	0.00	M0.00	M0.10	T	0.12	1.18	2.77	15.61
1950	9.18	3.90	1.86	1.20	0.39	0.00	0.00	0.00	0.00	2.78	5.93	7.41	32.65
1951	4.03	3.38	1.30	0.74	0.86	0.00	0.00	0.00	0.00	1.36	3.17	6.99	21.83
1952	10.46	2.66	4.61	0.70	0.10	0.26	0.00	0.00	0.00	0.15	2.48	11.66	33.08
1953	4.68	0.08	1.87	3.04	0.66	0.35	0.00	0.20	0.00	0.28	3.58	0.60	15.34
1954	5.11	2.97	5.25	1.55	0.09	0.36	0.01	0.39	T	0.22	4.05	4.91	24.91
1955	4.06	0.95	0.37	3.34	0.00	0.00	0.00	0.00	0.55	0.18	2.22	15.48	27.15
1956	9.85	4.65	0.33	2.23	0.61	0.00	T	T	0.08	1.41	0.09	0.35	19.60
1957	3.52	5.46	2.34	1.50	2.16	T	0.00	0.00	0.99	4.87	0.88	3.08	24.80
1958	5.57	11.23	5.21	5.72	0.46	0.32	T	0.00	0.04	0.09	0.18	1.13	29.95
1959	6.35	6.26	0.59	0.35	0.08	0.00	0.06	T	1.85	0.04	T	1.31	16.89
1960	5.88	4.76	2.24	1.01	0.66	0.00	0.00	0.00	0.02	0.40	3.91	2.75	21.63
1961	4.37	1.99	3.25	1.15	0.37	0.07	0.00	0.02	0.63	0.07	3.29	4.11	19.32
1962	1.30	9.15	3.32	0.43	0.00	0.00	0.00	0.03	0.08	7.29	0.61	3.32	25.53
1963	4.97	3.04	4.58	4.58	0.46	0.00	0.00	0.00	0.05	1.52	5.60	0.92	25.72
1964	4.63	0.26	1.81	0.08	0.21	0.84	0.05	T	0.00	2.42	5.42	5.81	21.53
1965	5.19	0.66	1.53	3.57	0.00	T	0.00	0.41	0.00	0.20	5.93	3.70	21.19
1966	5.00	3.10	0.55	0.46	0.12	0.18	0.00	0.11	0.05	0.00	6.42	5.47	21.46
1967	12.78	0.49	4.47	4.96	0.07	2.02	0.00	0.00	0.03	0.82	2.35	3.15	31.14
1968	6.58	3.70	3.43	0.32	0.58	0.00	0.00	0.62	0.03	1.84	3.20	5.72	26.02
1969	7.72	7.57	1.63	2.52	0.00	0.01	0.00	0.00	T	1.65	0.88		21.98
1970	13.34	2.34	2.48	0.17	0.00	0.48	0.00	0.00	0.00	0.96	9.11	6.40	35.28
1971	1.87	0.31	3.38	0.85	0.33	0.00	0.00	0.00	0.15	0.21	2.37	5.48	14.95
1972	1.67	2.40	0.38	1.08	T	0.15	0.01	T	0.92	4.46	5.26	4.50	20.83
1973	11.27	8.55	2.81	0.08	0.02	T	0.00	0.00	0.27	1.25	9.70	4.65	38.60
1974	5.30	1.83	4.72	2.30	0.00	0.02	0.95	0.00	0.00	0.91	0.89	3.40	20.32
1975	1.97	7.17	6.41	1.13	T	0.11	0.12	0.03	T	4.64	0.68	0.79	23.05
1976	0.32	1.95	0.97	1.51	0.00	0.01	0.00	0.62	0.	0.	1.54	0.89	8.98

									57	60			
1977	1.80	1.26	2.00	0.06	0.82	0.00	0.00	0.00	0.73	0.41	4.70	4.16	15.94
1978	12.58	4.62	4.24	3.68	0.09	0.00	0.00	0.00	0.46	0.00	1.51	0.73	27.91
1979	10.45	5.61	1.73	1.17	0.38	0.00	0.00	0.00	0.09	3.40	M3.02	5.60	31.45
1980	5.89	10.26	M1.38	1.08	0.24	0.05	0.19	0.00	T	0.34	0.32	M3.30	23.05
1981	5.93	M1.37	4.24	0.07	0.38	0.00	0.20	0.00	0.00	2.19	M5.29	M8.11	27.78
1982	M9.48	3.44	5.58	3.28	0.00	0.01	0.00	0.00	0.64	2.91	6.72	2.74	34.80
1983		9.11	15.04	4.59	0.28	0.00	0.00	0.48	0.42	0.61	8.75	9.43	48.71
1984	0.41	1.92	1.43	1.33	0.19	0.26	T	0.13	0.15	2.25	7.43	1.64	17.14
1985	1.20	2.41	4.07	0.54	T	0.01	0.06	0.00	0.08	0.98	3.68	3.48	16.51
1986	4.58	15.26	7.07	1.15	0.44	0.00	T	0.00	1.67	0.24	0.26	2.33	33.00
1987	4.40	4.53	3.29	0.08	0.04	0.00	0.00	0.00	0.00	1.42	3.04	6.39	23.19
1988	5.43	0.55	0.08	M1.24	0.67	0.73	0.00	0.00	0.00	0.09	3.25	2.81	14.85
1989	1.39	0.99	6.14	1.08	0.15	0.01	0.00	0.00	1.77	1.69	1.77	0.00	14.99
1990	5.06	3.48	0.99	0.31	2.34	0.00	0.00		0.12				12.30
1991	0.36	4.33	8.67	0.46	0.20	0.60	M0.00	0.08					14.70
1992	2.14	M7.29	M5.11	M1.27	0.00	M1.12	0.00	T	0.04	M2.81	0.50	M7.89	28.17
1993	8.62	5.27	M2.10	M0.84	1.40	0.80	T	0.00	T	1.63	2.94	2.46	26.06
1994	2.38	4.45	0.29	1.51	1.21	0.04	0.00	0.00	0.00	1.20	7.21	3.22	21.51
1995	16.31	1.00	11.98	1.35	1.89	0.43	T	0.00	0.00	0.00	0.28	9.10	42.34
1996	5.58	8.04	2.54	3.40	2.37	T	T	0.00	0.10	1.01	2.73	10.82	36.59
1997	8.65	0.48	0.60	M0.30	0.38	M0.05	0.00	1.04	0.20	0.94	7.69	2.40	22.73
1998	9.49	19.59	2.55	2.95	3.74	0.01	0.00	0.00	0.04	0.85	5.47	1.24	45.93
1999	3.82	10.00	3.54	2.04	0.10		0.00	0.00	0.03	0.74	3.12	0.74	24.13
2000	4.95	10.25		1.65	1.21	0.16	0.00	0.01	0.20	2.00	1.35	0.71	22.49
2001	4.53		1.52	1.22	0.00	0.01	0.00	0.01	M0.10	0.59	5.39	8.64	22.01
2002	3.49	2.23	1.97	0.56	0.93	0.00	0.00	0.00	0.00	0.00	3.21	12.30	24.69
2003	2.12	1.49	0.76	3.34	1.22	T	T	0.00	0.03	0.27	1.76	7.27	18.26
2004	2.45	6.41	0.74	0.41	0.08	0.00	0.00	0.00	0.25	4.67	2.33	9.28	26.62
2005	4.64	4.35	4.35	1.54	3.03	0.86	0.00	0.01	0.00	0.62	1.61	13.12	34.13
2006	4.37	4.28	8.08	4.99	0.32	0.00	0.00	0.00	0.00	0.67	2.98	4.68	30.37
2007	0.79	5.31	0.20	1.36	0.23	0.00	0.10	0.00	0.10	1.82	0.69	3.67	14.27
2008	9.68	2.93	0.32	0.08	0.16	M0.00	0.00	0.00	0.04	0.54	2.11	2.15	18.01
2009	0.75	7.71	2.13	0.54	1.70	0.07	0.00	0.00	0.17	3.16	0.61	M2.01	18.85
2010	9.15	3.73	2.72	4.05	1.49	T	0.00	0.00	0.	M2.	2.53	8.35	34.

									00	46			48
2011	1.43	3.89	M9.88	0.55	1.60	2.32	0.00	0.00	0.00	2.06	1.62	0.10	23.45
2012	4.61	1.26	6.34	1.56	0.01	0.03	0.00	T	0.00	1.30	6.13	7.01	28.25
2013	0.60	0.44	0.80	1.15	0.21	0.56	0.00	0.00	0.61	0.00	0.87	0.38	5.62
2014	0.12	9.60	2.90	1.61	M0.00	0.00	0.02	0.05	0.42	0.59	3.25	15.60	34.16
2015	0.03	2.86	0.08	1.27	0.37	0.26	0.06	0.00	0.04	0.06	1.96	4.99	11.98
2016	6.96	0.88	6.63	1.05	0.31	0.00	0.00	0.00	0.00	5.56	3.09	3.92	28.40
2017	11.85	9.93	2.67	2.76	0.00	0.23	0.00	0.00	0.02	0.00	3.67	0.08	31.21
2018	4.80	0.15	5.24	4.55	0.35	0.00	0.00	0.00	0.00	1.34	4.19	2.42	23.04
2019	5.75	10.96	5.33	0.61	2.81	0.00	0.00	M0.00	0.05	0.02	M0.76	M4.28	30.57

Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.

Data missing for all days in a month or year is blank.

Creation date: 2016-07-22