BIOLOGICAL RESOURCES SUMMARY REPORT

FOR THE

HYLA CROSSING REPLACEMENT PROJECT, ARROYO GRANDE OIL FIELD

SAN LUIS OBISPO COUNTY, CALIFORNIA

Prepared for:

Freeport-McMoRan Oil & Gas
201 S. Broadway
Orcutt, California 93455

Prepared by:

URS
130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 692-0600 ⬍ Fax: (805) 964-0259

URS Project Number 28907356

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LIST OF ACRONYMS AND ABBREVIATED TERMS

AGOF	Arroyo Grande Oil Field
Cal-IPC	California Invasive Plant Council
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSC	California Species of Special Concern
CWA	Clean Water Act
DBH	Diameter at Breast Height
DOGGR	Department of Oil, Gas and Geothermal Resources
DPS	Distinct Population Segment
FAC	Facultative
FACW	Facultative Wetland
FM O&G	Freeport-McMoRan Oil & Gas
FT	Federally-listed Threatened
GIS	Global Information Systems
GPS	Global Positioning System
HDPE	High Density Polyethylene
NHD	National Hydrography Dataset
NMFS	National Marine Fisheries Service
NRCS	National Resource Conservation Service
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
PCE	Primary Constituent Elements
Project	Hyla Crossing Replacement Project
RWQCB	Regional Water Quality Control Board
SCCC	South-Central California Coast
SSURGO	Soil Survey Geographic
SWRCB	State Water Resources Control Board
URS	URS Corporation
USACE	United States Army Corps of Engineers
USFWS	Unites States Fish and Wildlife Service
USDA	United States Department of Agriculture
USGS	United States Geologic Survey

SECTION 1.0
INTRODUCTION AND BACKGROUND

On behalf of Freeport-McMoRan Oil & Gas (FM O&G), URS Corporation (URS) has prepared this Biological Resources Summary Report for the Hyla Crossing Replacement Project (Project) located within the Arroyo Grande Oil Field (AGOF), San Luis Obispo County, California (Figure 1). This report provides the results of biological surveys, describes the biological impacts that would result from the proposed Project, and identifies feasible avoidance, minimization, and mitigation measures that would reduce these impacts.

The existing Hyla Crossing is a low-water crossing structure intended to allow an unnamed oil field access road to traverse Pismo Creek and access a peninsular portion of the AGOF termed the Hyla Extension lease area. The existing crossing structure is currently structurally compromised, precluding vehicle access across Pismo Creek as well as steelhead (*Oncorhynchus mykiss*, a federally listed threatened species) passage along Pismo Creek through the crossing. The purpose of the Project is to provide safe, all-weather access to the Hyla Extension lease area and to allow for the removal of the existing crossing structure in a manner that would restore and permanently maintain fish passage. The proposed Project includes installation of a new permanent bridge, removal of the existing Hyla Crossing once the bridge is functional, and restoration of the streambed in affected areas.

1.1 BACKGROUND INFORMATION

FM O&G owns and operates the AGOF, a State-Designated Oil Field located in Price Canyon approximately three miles northeast of Pismo Beach in unincorporated San Luis Obispo County, California. The oil field is located on the east and west sides of Price Canyon Road, near the intersection of Ormonde Road, between Highways 101 and 227. The proposed Project lies entirely within the Price Canyon Unit as defined by the California Division of Oil, Gas and Geothermal Resources (DOGGR).

The upland areas in the vicinity of the Project Area are heavily impacted by human disturbance as part of standard oil field operations; these areas primarily consist of paved or graveled well pads, roadways, and tank batteries. The northeastern section of AGOF is currently utilized for cattle grazing, and the whole of AGOF west of Price Canyon Road is grazed by goats. Upland areas comprise the majority of the land surrounding the AGOF's active oil field operations. These areas are primarily vegetated with coast live oak woodlands, chaparral, and annual brome grasslands. Pismo Creek and four tributaries occur within AGOF, and primarily support coast live oak and arroyo willow thickets. The area south of the AGOF boundary is primarily utilized for agricultural operations including a vineyard, while areas to the northeast of the site are primarily utilized for rangeland.

1.2 PROJECT AREA DESCRIPTION

The Project Area evaluated in this report includes the limits of proposed ground disturbance where the new span bridge structure is proposed as well as the area that will be temporarily impacted due to Project activities including the area the existing crossing is to be removed (see Section 1.3). The Project Area is located on the east side of Price Canyon Road and can be accessed through FM O&G's Gate 3. The Project Area was established as the area indicated on the grading plans (Appendix A) which includes the new span bridge footprint, associated temporary impact areas including the existing crossing that will be removed, and upland staging/laydown areas. In total, the Project Area comprises 2.51 acres (Figure 2). The following sections discuss existing conditions within the Project Area and surrounding vicinity.

1.2.1 Site History and Land Use

The Project Area is designated Agriculture; meaning agriculture is the primary land use and any other secondary uses directly support the primary use. However, petroleum extraction is an allowed use under the agricultural land use category according to the San Luis Bay Inland Area Plan. Such use is subject to special standards and permit procedures described in Section 22.08.170 (Resource Extraction) of the San Luis Obispo County Land Use Ordinance. Mining of bituminous sandstone occurred in the Price Canyon area between 1880 and 1930, and oil development at AGOF began around 1906 (Arcadis 2008). Ongoing oilfield operations have created long-term disturbances in the landscape in the form of active and abandoned well pads and tank battery locations. In addition, vegetation clearance around existing well pads for maintenance and fire clearance excludes native vegetation from re-colonization. Overall, the historic distributions of vegetation types present in the Project Area are similar to the current distributions with slight shifts due to water availability or disturbance.

1.2.2 Vegetation

The Project Area is located within the California Central Coast geographic region (Sawyer *et al*. 2009). The upland areas located within the Project Area are heavily impacted by human disturbance as part of standard oilfield operations, and these areas are primarily comprised of paved or graveled well pads and roadways. Vegetated upland areas surrounding the oilfield operations are primarily composed of coast live oak woodlands (*Quercus agrifolia* woodland alliance), Santa Margarita manzanita (*Arctostaphylos pilosula*) stands, and annual brome grasslands (*Bromus* [*diandrus*, *hordeaceus*]-*Brachypodium distachyon* semi-natural herbaceous stands). The drainages located throughout the vicinity of the Project Area are primarily composed of coast live oak woodland and arroyo willow thickets (*Salix lasiolepis* shrubland alliance). Detailed discussions of vegetation mapping and botanical survey results can be found in Sections 3.2 and 3.3 of this report, respectively.

1.2.3 Soil Types

The Project Area is located within Price Canyon, which is surrounded by the Santa Lucia Mountain foothills. The Soil Survey Geographic Database for San Luis Obispo County, California (U.S. Department of Agriculture, National Resources Conservation Service [USDA-NRCS] Soil Survey Geographic [SSURGO] 2008) indicates that one non-hydric soil type, Arnold loamy sand, occurs within the Project Area. This soil type is described below, abridged from the USDA-NRCS Soil Series Name Search Query Facility (USDA-NRCS 2013). A map of soil types within the Project Area is presented on Figure 3.

1.2.3.1 Arnold Series

Arnold series soils are on hills and hilly uplands at elevations of 100 to 2,500 feet along the south-central portion of California's Coast Range usually located within 30 miles of the coast. These soils consist of deep soils that formed in material weathered from soft sandstone. These non-hydric soils are somewhat excessively drained and produce very low to medium runoff; they have rapid permeability above the sandstone and slow permeability within sandstone. Arnold series soils within the Project Area occur on slopes ranging from 5 to 15 percent, but they can more broadly occur on slopes up to 75 percent. Arnold series soils tend to support chaparral, coastal sagebrush (*Artemisia californica*), coast live oak (*Quercus agrifolia*), shrubs, annual grasses, and forbs. They are primarily used for rangeland, with very limited areas used for growing truck crops, Christmas trees, and improved pasture. These soils are classified as mixed, thermic Typic Xeropsamments. Arnold series soil is the only soil type within the Project Area (Figure 3).

1.3 PROJECT PURPOSE

The existing Hyla Crossing through Pismo Creek provides the only vehicle access to a peninsula, known as the Hyla Extension lease area, which is bounded by Pismo Creek and the Union Pacific Railroad. Steep terrain and the existing railroad embankments prevent land access to the Hyla Extension lease area from any other location, and access to this area for oil field business and emergency response purposes is critical. The access road and existing Hyla Crossing structure are in degraded condition and exhibit signs of erosion, surface cracking, and partial collapse. The existing Hyla Crossing consists of a concrete roadway with two embedded 18-inch-diameter corrugated metal culvert pipes. Photos of the existing condition of this structure can be seen in Appendix B.

The primary objectives of the Project are to provide safe, all-weather access to the Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is currently structurally compromised and presents a barrier to migration of steelhead. The basic steps to achieving these objectives include installation of the new bridge and removal of the existing roadway in 2015 followed by restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing.

1.4 PROPOSED ACTIVITIES

The proposed Project consists of six primary components to occur in 2015, as follows:

- Access road reconfiguration to facilitate bridge access at the approaches on both sides of the bridge;
- Dewatering/diversion of stream flow within the construction area;
- Addition of temporary construction pad (for bridge installation activities) on downstream side of existing roadway;
- Bridge installation;
- Roadway removal; and
- Stream restoration and enhancement.

Construction activities would be performed utilizing appropriate BMPs to: 1) minimize disturbance and fill in and adjacent to jurisdictional waters; 2) control erosion and sedimentation in order to protect water quality and aquatic resources in Pismo Creek; and 3) include appropriate spill contingency measures to protect aquatic resources and water quality in Pismo Creek.

In addition, following completion of the Project activities in the fall of 2015, the Project would include 5 years of monitoring of the stream gradient, morphology, and scour relative to the stream enhancement and restoration goals and bridge abutment scour. If necessary, corrective actions would be implemented. The following sections provide more details on each of these six primary Project components.

In total, approximately 570 cubic yards (cy) of soil, 100 cy of concrete, and 230 cy of rock are proposed to be moved, displaced, or otherwise disturbed as a result of proposed construction activities within the Project boundary. The following sections provide more detail on each of the six primary Project components. See Appendix A for detailed plan view, elevation, and cross section drawings for all proposed construction activities described below. Overview of the Project impact areas can be seen on Sheet 1 and 2 of Appendix A.

1.4.1 Access Road Reconfiguration at Bridge Approaches

Access road reconfiguration activities are planned to occur in 2015 at the bridge approaches on both sides of the Hyla Crossing of Pismo Creek. These activities will realign the existing access roads with the proposed bridge and improve road geometrics for safe truck turning. Access roads to and away from the bridge would meet or exceed the access road requirements of the California Department of Forestry and Fire Protection (Cal Fire) for this site. The road reconfiguration activities would include the following:

- Removal of vegetation in the reconfigured road realignment areas;
- Grading, removal of organic material, and compaction of the road footprint;
- Placement of 8 inches of road base material (aggregate) requiring an estimated 10 cy of class 2 aggregate;
- Placement of Portland cement concrete with an average depth of 6 inches requiring an estimated quantity of 10 cy of concrete and with a 28-day compressive strength of 3,000 psi on the class 2 aggregate base to a depth matching the existing roadway deck and the planned bridge deck elevation; and
- Removal of all debris and unused construction material and transport to an approved receiving facility.

1.4.2 Water Diversion and Dewatering of the Work Area

It is likely that surface water will be present during the proposed construction activities. In order to construct the proposed roadway bridge and perform streambed restoration activities, it will be necessary to dewater the construction zone. The diversion and dewatering activities will be conducted as described in the Water Diversion and Dewatering Plan (Section 1.4.2.1) and detailed in the dewatering notes in Appendix A, Sheet 3.

1.4.2.1 Water Diversion and Dewatering Plan

During the Project implementation period it is expected that a maximum of 45 gallons per minute (gpm) or 0.1 cubic feet per second (cfs) of flow will be present in Pismo Creek. Dewatering will be accomplished by first setting up block nets and relocating native aquatic organisms, then installing a temporary cofferdam upstream of the construction area and gravel bag check dams downstream of the construction area (Appendix A, Sheet 3.2) in order to isolate the construction area, installing a creek diversion pipe, and then dewatering the area. These steps are described in further detail below.

In order to minimize effects of water diversion and dewatering activities on aquatic and semi-aquatic organisms, including the federally-listed threatened California red-legged frog and south-central California coast (SCCC) steelhead, water diversion and dewatering activities would be conducted between May 1 and October 15, 2015. Before installation of the cofferdam, exclusionary nets would be placed both upstream and immediately downstream of the area where the cofferdam will be placed. The area between these nets would then be seined and cleared of aquatic organisms by qualified biologists. Any native aquatic species encountered would be relocated to adjacent areas of suitable aquatic habitat within Pismo Creek, or otherwise addressed based on the requested permits and Biological Opinions for the Project. After installation of the cofferdam, the exclusion net immediately downstream of the cofferdam will be removed and the construction area downstream of the cofferdam will be seined and all aquatic organisms relocated to adjacent areas of suitable aquatic habitat

within Pismo Creek, or otherwise addressed based on the requested permits and Biological Opinions for the Project. The block net will then be placed at the downstream extent of the construction area. The Applicant understands that the requested permits or Biological Opinions for the Project may specify different or additional means of protecting aquatic life.

The cofferdam will span the width of the creek from bank to bank and remain in place until the completion of the streambed restoration activities. The cofferdam will be constructed using Visqueen and gravel bags, with native soil used as a bedding layer over the Visqueen to level irregularities and improve the seal of plastic against the channel bed (see Appendix A, Sheet 3.1 – Diversion Dam Detail). The cofferdam will be designed and installed to ensure that the flow of Pismo Creek will not overtop or circumvent the dam. The cofferdam will be built to withstand flows up to 4.4 cfs, well above the expected maximum of 0.1 cfs. If a large storm or flow event is anticipated, sand bags will be used to buttress the cofferdam and gravel bags will be used to increase either the width or height of the cofferdam. Additionally, if a large storm or flow event is anticipated, the creek channel will be cleared of all construction tools, equipment, and materials and the diversion pipe would be braced to prevent movement or floating. Should the cofferdam fail, FMO&G will take immediate action to prevent adverse impacts to water quality or its beneficial uses and will notify the CCRWQCB by telephone/fax as soon as practicable, but no later than within 24 hours.

During construction of the cofferdam, the diversion pipe will be set in place. Immediately after construction of the cofferdam, water will begin to flow from the upstream side of the cofferdam to downstream of the construction area via a bypass pipe. The bypass pipe will consist of a 12 inch fused high density polyethylene (HDPE) plastic diversion pipe with periodic bolted, flanged, leak resistant joints. The section of bypass pipe upon which the temporary construction pad will be constructed (see Section 1.4.3) will have a steel casing placed around the pipe to further protect the bypass pipe. The bypass pipe will be located within the stream channel and the exact location and elevation of the pipe will be determined based on terrain and construction phasing requirements. The diversion pipe may be moved laterally within the stream channel during construction for adjustments due to construction activities. The diversion pipe may be disconnected during the stream restoration phase as necessary to shape and form the stream channel and step pools. The pipe will be capable of accommodating a flow range from 0.1 cfs (low-flow creek design flow) to 4.5 cfs (pipe capacity would overtop cofferdam at 4.6 cfs). The gravity outlet will be designed in such a manner as to match the ambient flow of the Creek to prevent erosion and scour at the outlet by incorporating an energy dissipater or other appropriate design. If the gravity outlet results in erosion and/or scour at the outlet, diversion activities would be immediately suspended until corrective actions are taken to prevent further erosion or scour.

As part of the dewatering process, gravel bag or geoweb gravel check dams will be placed periodically in the work zone and at the downstream end of the water diversion pipe to reduce and prevent turbidity and sedimentation of Pismo Creek water downstream of the

construction area. The gravel used for check dams shall be clean and free from contaminates. Loose gravel berms consisting of clean, crushed rock may be used in lieu of gravel bags. The check dams would be monitored and maintained regularly with accumulated sediment removed from behind the dams such that they filter and maintain stream flow. Removed sediment will be disposed of in an upland disposal location at either the soil beneficial reuse system of the site or local recycling or landfill, as appropriate.

The upstream cofferdam and downstream gravel bag check dams will completely isolate the construction area from the wetted channel. If surface water is still present after installation of the cofferdam, diversion pipe, and gravel check dams, or ground water is encountered during construction then surface water present between the upstream cofferdam and downstream gravel bag check dams will be removed via vacuum truck. When a vacuum hose is used it will draw creek water from a screened, perforated sump. The sump diameter would be at least 12 inches and covered in a 0.25-inch screen. It is expected, due to the current topography of the Pismo Creek channel, that water will be present within the channel after placement of water diversion measures. Water removed via vacuum truck will be disposed of either in an upland area off-site or in the FMO&G water reclamation facility. Before extraction of water via vacuum truck, the area will be seined and cleared of aquatic organisms by an approved biological monitor. Any native aquatic species encountered would be relocated to adjacent areas of suitable aquatic habitat within Pismo Creek, or otherwise addressed as required by the requested permits and Biological Opinions for the Project. The biological monitor will monitor dewatering activities and if the biological monitor believes semi-aquatic organisms have entered the water or if sufficient time has passed (i.e. more than 2 hours) since commencement of dewatering activities, then dewatering activities must be suspended until the area is once again cleared of aquatic organisms by the biological monitor.

Water diversion and dewatering activities are expected to commence on May 1, 2015. All construction activities, including removal of water diversion structures, will be completed by October 15, 2015. This timeframe coincides with the low-flow period of the year (April 15 to October 15), reducing potential impacts to steelhead, and avoids California red-legged frog breeding season (December to April). All areas impacted by water diversion and dewatering will be restored to preexisting conditions or better which will occur during the streambed restoration construction activities.

Removal of the cofferdam would occur following completion of the roadway bridge, and would be concurrent with the streambed restoration activities described in Section 1.4.6. Prior to removal of the cofferdam and gravel bag check dams, any buildup of sediment or debris will be removed from the upstream side of these structures. The artificial materials used to construct the cofferdam (Visqueen and gravel bags) would be removed from the stream channel and re-used or properly disposed of off-site. The natural materials present in the cofferdam (native soils) would be put to permanent purpose in the proposed stream channel restoration.

Site specific water quality monitoring, along with biological monitoring detailed in Section 4.6, will take place throughout the duration of the dewatering process. Daily monitoring and record keeping will occur which will document the dewatering/diversion activities and control measures and will include estimated volume of diversion discharges and visible water characteristics, such as visible turbidity, sedimentation, and/or erosion. Baseline monitoring will be conducted prior to implementation of the dewatering/diversion plan and will determine natural settleable solids or turbidity levels at the proposed project site. Based on these results, it will be determined whether monitoring and reporting will include settleable solids or turbidity during the dewatering/diversion activities; if these data are included in routine monitoring than they will follow the CCRWQCB's guidelines. Weekly monitoring reports will be submitted to the CCRWQCB on each Wednesday during dewatering/diversion activities. These reports will include the time, date, and location of dewatering/diversion and location of discharge. Additionally, a summary of daily visual monitoring and settleable solids or turbidity monitoring data, estimated volume of dewatering/diversion discharges, photographs, and maps will be included in the weekly reports. If monitoring results indicate noncompliance then follow-up sampling of receiving water will be implemented and reports shall include corrective actions to prevent erosion and sediment runoff and a corresponding schedule for implementation.

1.4.3 Addition of Temporary Construction Pad for Bridge Installation

In order to facilitate safe and efficient construction of the proposed bridge over Pismo Creek, a temporary construction pad is proposed to be constructed on the downstream side of the existing, stabilized roadway in 2015 (see Appendix A, Sheet 4). The temporary construction pad will be installed on top of the rock ballast to be installed in 2014 as part of the roadway stabilization activities. Dewatering and installation of the temporary construction pad will occur after April 2015 and clearance by the biologist to avoid the California red-legged frog breeding. Prior to any in-stream activities, a pre-construction biological survey for the presence of federally-listed threatened species (steelhead and California red-legged frog) would be performed followed by capture and relocation (in accordance with regulatory requirements) out of the work zone if found. Barrier nets would be installed both downstream and upstream of the work zone to prevent reentry for the duration of the work activities.

The pad construction is estimated to involve a pad area of approximately 800 square feet in Pismo Creek and the addition of approximately 160 cubic yards of additional large rocks. The pad would provide safe support for construction equipment for the bridge.

1.4.4 Bridge Installation

Prior to bridge installation the following activities would need to occur in 2015:

- If necessary to supplement the survey preceding the water diversion activities described above in Section 1.4.2 and the construction platform installation effort described above in

Section 1.4.3, conduct a pre-construction biological survey for the presence of federally listed threatened species (steelhead and California red-legged frog), capture and relocation (in accordance with USFWS and NMFS Biological Opinions) out of the work zone if found; and

- Construction crew to remove debris materials from bridge abutment footprint areas, including use of rubber tired backhoe, if necessary, to remove large boulders and debris; and haul and discharge removed material to either the soil beneficial reuse system of the site or local recycling or landfill, as appropriate, both locations are in upland areas away from Pismo Creek.

1.4.4.1 Bridge Design

The proposed bridge design consists of a steel bridge deck that is approximately 16 feet wide supported on five foundation supports (a northern and southern abutment, and three intermediate bent supports) as shown on Appendix A, Sheet 4. Additional bridge design details are as follows:

- A bridge travel lane width of 12 feet with a supporting structure to accommodate live loads of HL-93+ and HS20-44 design loads. This would accommodate all available fire, construction and production equipment.
- Traffic railings would be installed of height and strength necessary to redirect heavy equipment onto the bridge.
- Abutments, spread, and pile foundations would elevate the bottom of the bridge structure to a minimum of 1 foot above the 100-year flood elevation of Pismo Creek as determined in the Pismo Creek Flood Study Analysis prepared by EDA in 2007.

1.4.4.2 Pile Driving for Bridge Abutments

Installation of the bridge foundation supports would require pile driving at five locations to support the spread footings. The pile driving activities would occur during the low flow period for Pismo Creek following dewatering of the creek in the work zone and none of the piles or the pile driver itself would be located within the wetted portion of the creek. The proposed bridge design includes six pilings per footing for a total of 30 piles with a nominal depth of 50 feet each. The piles are planned to be installed using a diesel hammer type pile driver (Delmag 30-32). Pile driving activities are planned to occur 10 hours per day (in the time period between 7 a.m. and 7 p.m.), Monday through Friday, for up to two weeks. The measured noise levels associated with this specific pile driver are in the range of 86.2 dBA (average) to 101.3 dBA (maximum) at 50 feet.

1.4.4.3 Bridge Deck Installation

Once the support piles are installed, the bridge deck sections would be installed using a crane to be located on the construction pad added on the downstream side of the existing roadway, and from another crane location in uplands beyond the eastern bank of Pismo Creek. The key bridge deck installation and completion steps are as follows:

- Launching the bridge stringers from staging areas south of the creek;
- Placing the steel deck pans and attaching to the stringers;
- Installation of reinforcing steel in the deck pans; and
- Placement of Portland cement concrete to form the deck and side rails.

Although the majority of the proposed bridge would be suspended above Pismo Creek, rather than situated within the channel, it is expected that the bridge would cause substantial shade and exclude riparian vegetation from areas immediately beneath the bridge. Areas immediately beneath the bridge are therefore not expected to maintain habitat value, except for being passable by aquatic and terrestrial species. To account for this, the analysis presented in Section 4.0 of this report treats all impacts to Pismo Creek within the finished footprint of the proposed bridge, including areas between footings but beneath the suspended bridge deck, as permanent impacts.

1.4.5 Roadway Removal

Once the bridge deck is completed and ready for use, the existing roadway, including culverts and downstream construction pad, would be removed. The existing roadway and pad would be demolished using heavy equipment such as an excavator and backhoe prior to loading the demolition material into dump trucks to either the soil beneficial reuse system of the site or local recycling or landfill, as appropriate. It is currently estimated that approximately 150 cy of roadway-related material would be removed and hauled for disposal. The depth of roadway foundation removal will be dependent, in part, on the appropriate stream bottom elevations to be consistent with the planned stream restoration gradient in this area. The boulders and rock materials placed for roadway stabilization in 2014 as part of the separately permitted Hyla Crossing Culvert Maintenance Project and the majority of the materials used for the construction pad would be salvaged for reuse during stream restoration activities.

1.4.6 Stream Restoration and Enhancement

1.4.6.1 Purpose

Following installation of the bridge and removal of the existing roadway, stream restoration and enhancement activities would be implemented. The primary intent of the proposed

stream restoration and enhancement effort is to create a geomorphically stable step-pool system within the reach of Pismo Creek that has been altered due to the presence of the culvert crossing (Appendix A, Sheet 5). Restoration activities are proposed to provide a proper gradient, relatively stable stream conditions, and allow for migration of native steelhead and other aquatic life. It is expected that the preliminary conceptual stream restoration design will need to be revised and refined based on regulatory agency input and requirements as well as forthcoming detailed surveys and final design considerations.

1.4.6.2 Background

Step-pools result from a naturally occurring channel bed morphology commonly found in relatively steep mountainous streams. The channel bed materials are usually cobbles and boulders and the channels themselves would be classified as threshold channels for the purposes of natural stream design. Step-pools are characterized by an accumulation of cobbles and boulders into organized structures that span the channel. These structures form an alternating series of rough weirs and pools which results in a stepped longitudinal stream profile. Step-pools generally function to control the grade and flow velocity of a steep stream by allowing the flow to step down over a series of drops. Under low flow conditions, the flow becomes supercritical as it passes over each step and drops into the next pool, dissipating its energy in a roller eddy. This alternating sequence of supercritical flow over the steps and subcritical flow through the pools controls the velocity of the flow and provides aquatic habitat by introducing complexity into the flow and aerating the water.

1.4.6.3 Design Basis

The plans for the restoration reach upstream of the Hyla Crossing (SH+G 2009) include substantive in-channel restoration. The discussion below is primarily intended for those restoration efforts spanning the reach of Pismo Creek immediately upstream and downstream of the Hyla Crossing, and relies upon original data collection and research by others. The proposed footprint for the stream restoration and enhancement activities encompasses an area approximately 95 feet upstream and 170 feet downstream of the existing Hyla Crossing. The conceptual design includes installation of four step-pool cross vanes consisting of large boulders placed in a V shape on top of geotextile fabric at each location. It is currently envisioned that at least one of the four step-pool cross vanes would be placed upstream of the proposed new bridge location.

The basis for various design elements used in the stream restoration design included consideration of the following parameters as described in more detail in the Technical Memorandum, Conceptual Design for Channel Restoration within Pismo Creek at the Hyla Crossing, San Luis Obispo County, California (see Appendix C):

- Hydrology;

- Channel slope;
- Channel width and depth;
- Floodplain width;
- Sinuosity and meander wavelength;
- Step-pool parameters (spacing, height, boulder sizing, materials, sub-grade material, floodplain alluvia material, and active channel bed material);
- Geomorphic stability;
- Connection to existing floodplain terraces;
- Tree protection; and
- Maximize natural design.

Using the design parameters for natural channel design and National Oceanic and Atmospheric Administration (NOAA) specifications for fish passage, Appendix A in the attached Permitting Exhibits package provide a conceptual design for the step-pools proposed for this design. The design allows for 6-inch steps and holding pools for migrating species (e.g., steelhead) and provides for a geomorphically stable system to hold the stream dimension post-Hyla Crossing removal. Bankfull benches and riparian planting specifics (e.g., willows) will be developed during subsequent plan refinement.

Because the discharge of fill material into jurisdictional waters for restoration purposes is expected to be beneficial in the long run, impacts associated with restoration activities are treated as temporary impacts in the analysis presented in Section 4.0 of this report. While the discharges of rock and other material necessary to construct a step-pool sequence would be permanent, these discharges would not result in a loss of waters or streambeds.

1.5 PROPOSED SCHEDULE

Construction is planned to begin in the spring of 2014 and to end in September 2015, but would not be continuous. Creek area activities would be limited to May 1 to October 15, 2015, which coincides with the low-flow period of the year (April 15 to October 15) reducing potential impacts to steelhead and avoids California red-legged frog breeding season (December to April)), although California red-legged frog egg masses have potential to be present during May.. Bridge construction would occur from the spring through fall of 2015 with roadway removal and stream restoration activities taking place in summer/fall of 2015 after the completion of bridge construction.

In summary, the proposed Project consists of the following key components and activities scheduled for 2015:

- 2015 (dry season/low flow period):
  - Capture and relocate listed species (steelhead and California red-legged frog) out of work zone, as applicable and if authorized by NMFS and USFWS;
  - Reconfigure existing access roads at bridge approaches to align properly;
  - Dewater construction area by utilizing a cofferdam upstream of the proposed construction activities and convey stream flow through a temporary bypass pipe (i.e., completely dewater the creek);
  - Add temporary construction pad/platform on downstream side of roadway to facilitate construction of a new bridge across Pismo Creek upstream of the existing roadway;
  - Install new bridge abutments/footings, including pile driving;
  - Construct/erect bridge deck over Pismo Creek;
  - Remove existing Hyla Crossing roadway/culvert;
  - Perform stream restoration, including removal/reuse of the temporary construction pad material, and install gradient control structures in Pismo Creek for long-term stability during storm events; and
  - Remove cofferdam and temporary stream flow bypass pipe.
- 2015 to 2020:
  - Monitor stream gradient, morphology, and scour relative to stream enhancement and restoration goals and bridge abutment scour; and
  - Implement corrective actions, if necessary.

1.6 EQUIPMENT

Estimated equipment requirements by Project component construction activities are presented in Table 1. It is currently estimated that truck trips for material deliveries and waste/debris hauling would vary from two to five trips per day during the construction period.

1.7 PROCEDURAL BACKGROUND

In 2007, the CDFW (then CDFG) granted Streambed Alteration Agreement 2007-0044-R4, allowing the Plains Exploration and Production Company (former owner/operator of the AGOF, acquired by FM O&G in 2013) to perform maintenance of the Hyla Crossing. The scope of this Agreement was much more limited than that of the presently proposed Hyla Crossing Replacement Project, and the two projects are not related. The activities authorized under the prior Agreement were limited to removal of sediment from the clogged culverts

using a suction dredge and vacuum truck, without operating any equipment within the stream channel. The Agreement did not authorize substantial repair of the crossing structure, nor its replacement with a bridge or any associated geomorphic restoration of the stream. To date, the activities authorized under Agreement 2007-0044-R4 have not been performed. However, it is foreseeable that these activities may be conducted prior to winter rains in 2014 as part of a separately permitted project titled 'Hyla Crossing Culvert Maintenance Project' to alleviate stress on the crossing structure and decrease the chance that the structure may fail when subjected to storm flows.

TABLE 1
TYPICAL EQUIPMENT LIST FOR
HYLA CROSSING REPLACEMENT PROJECT

Project Component/Item	Fuel Type	Power Rating (Horsepower [hp])	No. of Equipment
Access Road Reconfiguration at Bridge Approaches			
Cat 450F backhoe loader	Diesel	127	1
Dump truck	Diesel	185	2
Water truck	Diesel	185	1
Pickup truck	Diesel	185	3
Water Diversion and Dewatering of the Construction Area			
Vacuum truck	Diesel	250	1
Addition of Temporary Construction Pad			
Dump truck	Diesel	185	4
Cat 450F backhoe loader	Diesel	127	1
Pickup truck	Diesel	185	3
Bridge Installation			
Bridge material delivery trucks	Diesel	185	5
Pile driver	Diesel	250	1
Concrete transit truck	Diesel	250	2
Welder generator (Lincoln SAE-300)	Diesel	70	1
Support, welding, testing pickup trucks (Ford F150)	Gas	250	1
Crane (Liebherr 1080)	Diesel	173	1
Cat 450F backhoe loader	Diesel	127	1
Dirt, concrete, and water trucks (Freightliner 108SD)	Diesel	200	3
Roadway Removal			
Cat 450F backhoe loader	Diesel	127	1
Dump trucks	Diesel	185	5
Pickup trucks	Gas	185	3
Stream Restoration and Enhancement			
Cat 450F backhoe loader	Diesel	127	1
Material delivery/dump trucks	Diesel	185	3
Pickup trucks	Gas	185	3

SECTION 2.0
METHODOLOGY

In order to document the existing biological conditions within the Project Area, URS relied upon a review of available literature as well as biological field investigations of the Project Area. Biological field investigations were conducted between February and November 2013 and included vegetation mapping, botanical survey, tree inventory, California red-legged frog non-protocol and protocol surveys, and a jurisdictional determination/wetland delineation. The methods employed are described below.

2.1 LITERATURE REVIEW

Prior to the field surveys, URS conducted a literature review of special-status plant and wildlife species that could potentially occur in and around the Project Area. This literature review included searches of the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2014), the CalFlora Inventory of Rare Plants Database (CalFlora 2014), and California Natural Diversity Database (CNDDB) (CDFW 2014). The latter database provided the locations of sensitive species and natural communities within a one mile search centered on the Project Area, which is located in the Arroyo Grande NE, CA United States Geologic Survey (USGS) 7.5-minute quadrangle. Additionally, URS obtained from FM O&G the 2012 Sensitive Plant Survey prepared for Phase IV development of the Arroyo Grande Oil Field, a separate FM O&G project within the Arroyo Grande Oil Field (Arcadis 2012). The report documented the previously mapped occurrences of sensitive plant species and confirmed the plant's presence and changes in distribution.

Prior to jurisdictional determination and wetland delineation field efforts, the USGS Arroyo Grande NE, CA 7.5 minute quadrangle map (USGS 2012), the Arroyo Grande Soil Survey (USDA-NRCS SSURGO 2008), the National Hydrography Dataset (NHD) (USGS 2013), the National Wetlands Inventory (NWI) (U.S. Fish and Wildlife Service [USFWS] 2013) and a high quality aerial photograph of the Project Area and the surrounding area (Bing Maps Aerial 2013) were reviewed to determine the locations of potential hydrologic features.

2.2 VEGETATION MAPPING

Within the Project Area, vegetation communities were classified using *A Manual of California Vegetation, 2nd Edition* (Sawyer *et al*. 2009), which establishes systematic classifications and definitions of vegetation communities. Each vegetation mapping unit was analyzed for characteristics to define the applicable vegetation community, such as dominant and/or co-dominant plant species and community membership rules. A desktop delineation of vegetation communities was performed utilizing high resolution aerial imagery, botanical survey results, and tree inventory results.

2.3 BOTANICAL SURVEYS

A botanical survey was conducted by URS on February 11, 2013 by biologists Julie Love and Tiffany Whitsitt. Biologists walked meandering transects throughout the Project Area documenting all plant species observed. In areas not accessible on foot due to poison oak (*Toxicodendron diversilobum*), steep slopes, or dense vegetation (i.e., red/Arrow willow [*Salix laevigata/lasiolepis*] thickets), the Project Area was surveyed from the edge of the impassible vegetation. A list of all plant species observed during the survey was compiled, and is presented in Appendix D. Plant nomenclature follows *The Jepson Manual: Vascular Plants of California*, Second Edition (Baldwin *et al*. 2012) with updates from the Jepson Flora Project (Jepson 2013).

2.4 TREE INVENTORY

A focused tree inventory was conducted by URS on November 7, 2013 by biologist Jamie Deutsch with support from geologist Natalie Evans. All trees within the Project area were identified to species, and the location of the trunk(s) was mapped using a global positioning system (GPS) unit capable of sub-meter accuracy (Trimble GeoXT 6000 series). Canopy size, measured as furthest canopy distance from the trunk utilizing a transect tape, and diameter at breast height (DBH, 4.5 feet above the ground surface) using a DBH tape was measured for each trunk. Some areas were inaccessible due to poison oak, dense vegetation (i.e., willow tree thickets), and/or steep slopes. Impassable areas were surveyed visually from the edge of the impassable barrier.

During the tree inventory of the Project Area, the exact location of the Project Area was not yet known, thus additional trees adjacent to the Project Area were surveyed and included in the general measurements (Appendix E). In a few instances, individual trees could not be accessed due to impassable barriers such as thick vegetation (i.e., red/arroyo willow thickets), steep slopes, or dense poison oak. In these cases the inaccessible area was surveyed from the edge of the impassable barrier and, if possible, approximate number of trees and associated dbh range were estimated. In the case of willow thickets it was difficult to observe individual willow trees and give an accurate estimate, thus the area of willow thickets, rather than number of individuals, was calculated. In one instance this methodology was used for a stand of young western sycamore trees located at the eastern extent of the Project Area.

Coast live oak trees are treated as special-status resources in this report due to the County's concern with the loss of oaks in the region from development or other factors and oak trees capability of providing valuable wildlife habitat. Coast live oak trees maintain no applicable federal or state sensitivity designation.

2.5 CALIFORNIA RED-LEGGED FROG SURVEYS

The immediate vicinity of the Hyla Crossing was surveyed using non-protocol survey methods on February 1 and 15, 2013 by URS biologists, Ms. Johanna Kisner, Mr. Christopher Julian, Ms. Kelly Kephart, and Mr. Jamie Deutsch (Appendix F). These surveys consisted of breeding season surveys that took place during night using binoculars and USFWS-approved hand held flashlights. Surveyors searched for California red-legged frog eye-shine as well as listened for California red-legged frog vocalizations.

USFWS protocol-level surveys were conducted beginning June 3, 2013, and were completed on July 24, 2013 for California red-legged frogs within the AGOF boundary according to *USFWS Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (USFWS 2005b) (Appendix G). Surveys were conducted within the Project Area and surrounding vicinity within the AGOF where suitable habitat was identified and where locations could be safely accessed. The specific survey locations shown in Figure 5 included accessible portions of Pismo Creek, Cañada Verde, Pad 17 pond, Retention Basin, and Drainage B. A larger section of Pismo Creek was surveyed on the first day and night shown in yellow on Figure 5; however much of the area was determined to be unsafe to continue surveys due to dense poison oak, steep slopes, and limited access. Pismo Creek could be safely accessed from downstream of the pipe crossing, the Hyla crossing, and a location at the furthest downstream end as shown in green in Figure 5. The area upstream of the pipe crossing was not surveyed for the first day and night surveys due to safety concerns, but was surveyed on the later dates. The area upstream of the pipe crossing, a tributary to Pismo Creek, and Drainage B were added to the survey locations, shown in orange on Figure 5, starting with day survey #2 and night survey #3 and continued for the remainder of surveys. URS biologist Ms. Johanna Kisner, a California red-legged frog recovery permit holder, led the protocol-level surveys and was supported by other URS biologists with experience surveying for California red-legged frogs including Ms. Kelly Kephart, Mr. David Kisner, Mr. Christopher Julian, Mr. Jamie Deutsch, Mr. Billy Fletcher, and Ms. Tiffany Whitsitt.

USFWS protocol surveys consisted of non-breeding and breeding season surveys that took place during daytime hours and at night using binoculars and USFWS-approved hand held flashlights. Surveyors searched for California red-legged frog eye-shine as well as listened for California red-legged frog vocalizations, and searched for egg masses and tadpoles. Two areas required access with a kayak due to deep water in order to get a closer look at frogs for identification. These locations included the area within Pismo Creek upstream of the Hyla Crossing and the retention basin. A kayak was used to access these two areas for most surveys, if a kayak was not used the survey was conducted by viewing with binoculars from the water's edge. Four nighttime breeding season surveys were conducted on June 4, 7, 22, and 30, 2013. Two daytime breeding season surveys were conducted on June 3 and 6, 2013

for the first survey and June 11, 14, and 21, 2013 for the second survey. The non-breeding season daytime survey was conducted on July 23 and the nighttime survey was conducted on July 24, 2013. Equipment used for the surveys included a thermometer, which was utilized to record air and water temperature. Binoculars (Eagle Optics 8x42, and Nikon Monarch 8x42) and lights (Maglite4D® and Surefire) were utilized to scan all available California red-legged frog habitat and to detect eye-shine during night surveys. Results of these protocol and non-protocol surveys are presented in Section 3.5.

2.6 DELINEATION OF JURISDICTIONAL WATERS AND STREAMBEDS

A formal field delineation of waters of the U.S. (including wetlands) and CDFW-jurisdictional streambeds was performed within the Project Area on February 11, 2013 by URS biologists Julie Love and Tiffany Whitsitt, with follow up surveys conducted by URS biologist Jamie Deutsch and geologist Natalie Evans on November 7, 2013 and URS biologists Christopher Julian and Tiffany Whitsitt on November 14, 2013. A summary of the regulations that apply to jurisdictional waters and streambeds and further details on delineation methods used during the field surveys are described below. Following completion of the surveys, watershed maps, aerial photographs, and other applicable literature were reviewed to ascertain whether waters identified in the field was a tributary to navigable waters. Photographs were taken to document site conditions, and are presented in Appendix B.

2.6.1 Summary of Agency Jurisdiction

Streams and waterways, including ephemeral drainages, dry streambeds, and wetlands can possess unique ecological functions and values, and are protected from human-induced destruction or degradation by a number of federal and state statutes. The federal and state agencies charged with administering these statutes and their responsibilities are described briefly below. For a more complete description of the Project's regulatory setting with regard to waters and streams, please refer to the Wetland Delineation and Jurisdictional Determination Report for the Project (URS 2014).

2.6.2 Clean Water Act – Section 404

Pursuant to Section 404 of the Clean Water Act (CWA), the United States Army Corps of Engineers (USACE) regulates the discharge of dredge and/or fill material into waters of the United States. Section 404 requires that any person proposing an activity that would discharge these materials must first obtain a permit from the USACE. For discharges proposed in the Project region, Section 404 Permits are issued by the USACE's Los Angeles District. The CWA stipulates that the USACE may not issue a Section 404 Permit if the proposed activity would be contrary to the public interest or would cause substantial degradation of the nation's waters, or if a less environmentally damaging practicable alternative exists.

Waters of the U.S. generally include navigable waterways and wetlands adjacent to navigable waterways, non-navigable tributaries to navigable waterways, and wetlands adjacent to non-navigable waters that are contiguous with navigable waterways. Regulatory definitions of wetlands and waters of the U.S., as well as recent Supreme Court decisions affecting the interpretation of those definitions, are discussed below.

2.6.3 Clean Water Act – Section 401

Under Section 401 of the CWA, every federal permit or license applicant for any activity which may result in a discharge of dredge or fill material to a water body must obtain a state-issued Water Quality Certification that the proposed activity will comply with state water quality standards (i.e., beneficial uses, water quality objectives, and anti-degradation policy). In California, the State Water Resources Control Board (SWRCB) has delegated the responsibility for issuing Section 401 Certifications to the nine Regional Water Quality Control Boards (RWQCBs) throughout the state. The Central Coast RWQCB issues Section 401 Certifications for projects in San Luis Obispo County. A CWA Section 404 Permit is a federal permit subject to the terms of Section 401 as described above, and the USACE therefore cannot issue a Section 404 permit in the project region until the permit applicant also receives a Section 401 Certification from the Central Coastal RWQCB. Because Section 401 of the CWA is restricted to activities requiring a federal license or permit, this section does not apply to activities affecting waters outside federal jurisdiction, such as isolated, intrastate waters or those excluded from federal jurisdiction based on the significant nexus standard.

2.6.4 California Fish and Game Code

Pursuant to Sections 1600–1616 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or substantial changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. In regulations promulgated by

the CDFW at 14 CCR 1.72, a stream is defined as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." In practice, CDFW has interpreted the term "streambed" to encompass all portions of the bed, banks, and channel of any stream, including intermittent and ephemeral streams, extending laterally to the upland edge of riparian vegetation. In the case of watercourses with vegetated floodplains, this interpretation often results in a geographic jurisdictional area that is much wider than the active channel of the stream. The upstream limit of CDFW-jurisdiction is the point upstream of which there is no evidence of a defined bed and bank, and riparian vegetation is not present.

2.6.5 Delineation of Waters of the United States – Ordinary High Water Mark

The extent of non-wetland waters within the Project Area was determined based on the location of the ordinary high water mark (OHWM). The channel banks were examined for signs of flow, terraces, drift deposits, changes in vegetation, and other indicators that would determine the location of the OHWM. Once the OHWM was identified in the field, the boundary was walked with a Trimble GeoXT 6000 series handheld GPS unit set to collect positional data in a "streaming" fashion. In areas not accessible on foot due to poison oak, steep terrain, and/or thick vegetation, the Jurisdictional Determination Project Area was surveyed from a safe distance and boundaries were estimated using field observations, a high quality aerial, and the USGS topographic map.

Average channel width and depth was estimated in the field and features such as substrate type and topography were recorded. When field data collection was complete, jurisdictional boundaries were downloaded from the Trimble GPS unit and converted into a Geographic Information Systems (GIS) shape file using ArcGIS software. Properties such as length, width, and jurisdictional acreage were calculated through ArcGIS.

2.6.6 Delineation of Waters of the United States – Adjacent Wetlands

A delineation of potential wetlands within the Jurisdictional Determination Project Area was conducted in accordance with the procedures described in the *Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* to that manual (USACE 2008). The methods are summarized below, and are described fully in those documents.

To ascertain whether jurisdictional wetlands occur within the Project Area, a sampling point was established and assessed in the area most likely to exhibit wetland characteristics, based on visual observations. In accordance with the *Wetland Delineation Manual*, the sampling location was analyzed for hydrophytic vegetation, hydric soil, and wetland hydrology, and a

Wetland Delineation Data Form was completed. Photographs were taken to document site conditions, and coordinates for the sample point were recorded using GPS technology. Methods used to evaluate each of the three wetland parameters are described in the Wetland Delineation and Jurisdictional Determination Report for the Project (URS 2014).

2.6.7 Delineation of CDFW-jurisdictional Streambeds

The extent of streambeds falling under the jurisdiction of the CDFW pursuant to Section 1600 *et seq.* of the California Fish and Game Code was determined based on the presence of a defined physical bed, bank, or channel, or the outer edge of riparian vegetation contiguous with the bank of the watercourse. Once the CDFW-jurisdictional boundary was identified in the field, the boundary was walked with a Trimble GeoXT 6000 series handheld GPS unit set to collect positional data in a "streaming" fashion. In areas not accessible on foot due to poison oak, dangerously steep terrain, or other safety considerations, the Project Area was surveyed from a safe distance and boundaries were estimated using field observations, a high quality aerial photograph, and the USGS topographic map.

When field data collection was complete, jurisdictional boundaries were downloaded from the Trimble GPS unit and converted into a GIS shape file using ArcGIS software. Properties such as length, width, and acreage of each stream or wetland feature were calculated through ArcGIS. Photographs were taken to document site conditions.

SECTION 3.0
RESULTS

This section presents the results of focused and general biological surveys conducted in the Project Area between February 2013 and November 2013. These surveys include:

- A literature review, performed prior to conducting field investigations, intended to identify special-status species with potential to occur within the Project Area, critical habitat, and any specific survey requirements for those species (see Section 3.1);
- A vegetation map delineating vegetation communities (see Section 3.2);
- Botanical survey (see Section 3.3);
- Tree inventory (see Section 3.4);
- Focused protocol surveys for the California red-legged frog (see Section 3.5); and
- A delineation of jurisdictional waters and streambeds (see Section 3.6).

3.1 LITERATURE REVIEW

Figure 4 provides a map of the designated critical habitat (USFWS 2014) within the vicinity of the Project. Critical habitat is defined to include "the specific areas within the geographical area currently occupied by the species … on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection." Critical habitat contains one or more Primary Constituent Elements (PCE), which are specific habitat features that support one or more life history stages of the listed species (Office of the Federal Register 2011). Critical habitat for one species, the South-Central California Coast (SCCC) steelhead Distinct Population Segment (DPS), occurs within the Project Area within Pismo Creek (National Marine Fisheries Service [NMFS] 2005). In total, designated critical habitat for the SCCC steelhead DPS includes areas within 28 watersheds, and includes a total of 1,240 miles of stream habitat and three square miles of estuarine habitat. According to the designation documents, PCEs occurring within Pismo Creek include freshwater rearing habitat and freshwater migration habitat (NMFS 2005). The location of SCCC streelhead designated critical habitat are depicted on Figure 4, and include the entire length of Pismo Creek from its confluence with the Pacific Ocean upstream to endpoints in East Corral de Piedra Creek and an unnamed tributary of Pismo Creek. No other areas of designated critical habitat occur within the Project Area.

Figure 6 provides a map of the CNDDB records search for sensitive species and natural community occurrences (CDFW 2014) within a one-mile buffer around the Project Area. The special status species shown in the CNDDB that are known to occur within the Project Area include steelhead and western pond turtle. Other species with potential to occur based on the

CNDDB map include California red-legged frog, American badger, Santa Margarita manzanita, Pismo clarkia, Brewer's spineflower, and San Luis Obispo owl's clover. The USGS 7.5 minute quadrangle map (USGS 2012) and the National Hydrography Dataset (USGS 2013) indicated the presence of one potential hydrological feature designated as a perennial stream (the mainstem of Pismo Creek) within the Project Area.

3.2 VEGETATION MAPPING

The Project is located within the Central California Coast ecological region (Sawyer *et al.* 2009), a unique vegetation region. Three natural vegetation communities occur in the Project Area (Figure 7). These native/naturalized vegetation communities include coast live oak woodland, red/arroyo willow thickets, and coyote brush scrub. In addition to these natural habitats, one anthropogenic vegetation community and two un-vegetated land covers occur within the Project Area. These land cover types include ruderal vegetation, developed, and open water.

This Section describes the characteristics, extent, and location of the vegetation communities within the Project Area, including dominant plant species observed within each community during site visits. Much of the Project Area consists of arroyo willow thickets near the creek and coast live oak woodland on the banks and upland areas. A map of the vegetation communities with acreages for each type within the Project Area is depicted in Figure 7.

3.2.1 Coast Live Oak Woodland (Sensitive Natural Community)

Coast live oak woodland (*Quercus agrifolia* woodland alliance) is characterized by dominant or co-dominant coast live oak in the tree canopy with a sparse to intermittent shrub layer and sparse or grassy herbaceous layer. Trees are less than 98 feet (30 meters) tall. Coast live oak woodland is found in alluvial terraces, canyon bottoms, stream banks, slopes, and flats. Associated soils are deep, sandy or loamy with high organic matter. Elevation ranges from sea level to 3,937 feet (1,200 meters) (Sawyer *et al.* 2009). Coast live oak woodlands are not classified by the CDFW (2010) as a sensitive community type. California Public Resources Code §21083.4 (Senate Bill 1334) protects and conserves coast live oak woodland as a sensitive natural community.

Within the Project Area, coast live oak woodland is present along the upper terraces of the Pismo Creek streambed and within upland areas (Figure 7). Coast live oak woodland comprises 0.32 acre of the Project Area.

3.2.2 Red/Arroyo Willow Thickets (Sensitive Natural Community)

Red willow thickets (*Salix laevigata* woodland alliance) are characterized by dominant or co-dominant red willow in the tree canopy. The canopy is open to continuous with an open to intermittent shrub layer and variable herbaceous layer. Trees are less than 65.5 feet (20 meters) tall. Red willow thickets are found in ditches, floodplains, lake edges, and low-gradient depositions along streams. Elevation ranges from sea level to 5,577 feet (1,700 meters). Along the Central California Coast stands are scattered along creeks and floodplains (Sawyer *et al*. 2009). Red willow thickets are classified by the CDFW (2010) as a sensitive natural community.

Arroyo willow thickets (*Salix lasiolepis* shrubland alliance) are characterized by dominant or co-dominant arroyo willow in the shrub or tree canopy. The canopy is open to continuous with a variable herbaceous layer. Shrubs are less than 32.8 feet (10 meters) tall. Arroyo willow thickets are found along stream banks and benches, slope seeps, and stringers along drainages. Elevation ranges from sea level to 7,119 feet (2,170 meters) (Sawyer *et al.* 2009). Arroyo willow thickets are classified by the CDFW (2010) as a sensitive natural community.

Within the Project Area, red/arroyo willow thickets including mature trees and saplings are present throughout the riparian corridor along the channel of Pismo Creek. Additionally, scattered saplings and mature western sycamores (*Platanus racemosa*) are present within this community type. This community is strongly associated with the stream channel, and does not occur in upland portions of the Project Area (Figure 7). Red/arroyo willow comprises 0.44 acre of the Project Area. Because the riparian canopy overhangs the Hyla Crossing, the existing road crossing location is within an area mapped as red/arroyo willow thickets.

3.2.3 Coyote Brush Scrub

Coyote brush scrub (*Baccharis pilularis* scrub alliance) is characterized by dominant or co-dominant coyote brush in the shrub canopy. Shrubs are less than 9 feet (2 meters) tall and the canopy and herbaceous layers are both variable. Coyote brush scrub is found along river mouths, stream sides, terraces, stabilized dunes of coastal bars, open slopes, and ridges. Elevation of coyote brush scrub ranges from sea level to 4,500 feet (1,370 meters) (Sawyer *et al*. 2009). Coyote brush scrub is not a sensitive community type, and has a ranking of G5, globally secure and S5, State secure (CDFW 2010).

Within the Project Area, coyote brush scrub is present within upland areas primarily located adjacent to the access roadways or developed areas (Figure 7). Coyote brush scrub comprises 0.01 acre of the Project Area.

3.2.4 Ruderal Vegetation

The areas classified as ruderal vegetation (Figure 7) do not correspond to a classification in *A Manual of California Vegetation, Second Edition* (Sawyer *et al.* 2009). Ruderal plants grow in disturbed areas as a result of activities such as road cuts, soil stockpiles, and areas that are continually disturbed. The ruderal areas have a high percentage of bare ground and are dominated by non-native species such as Russian thistle (*Salsola tragus*), black mustard (*Brassica nigra*), and red brome (*Bromus madritensis* ssp. *rubens*). Russian thistle is ranked by the California Invasive Plant Council (Cal-IPC) as having limited invasiveness, black mustard is ranked as moderately invasive, and red brome is ranked as highly invasive (Cal-IPC 2013).

Within the Project Area, ruderal vegetation is present along the roadsides and well pads within upland areas (Figure 7). Ruderal vegetation comprises 0.04 acre of the Project Area.

3.2.5 Developed

Developed areas are found throughout the Project Area and are comprised of active road and well pad locations; they have little vegetative cover due to soil compaction, road development, and the presence of permanent oil field structures. Human visitation in these areas occurs commonly, as they areas are part of an actively producing oil field.

Developed areas are generally situated in portions of the Project Area away from Pismo Creek, where prior oil field development has occurred, although the unvegetated roadway approaches on either side of the Hyla Crossing are also developed areas (Figure 7). Developed areas comprise 1.69 acre of the Project Area and generally provide very low quality habitat for native plants and wildlife.

3.2.6 Open Water

Within the Project Area, the active channel of Pismo Creek naturally lacks vegetation due to hydrologic scouring processes. While some of the channel is covered by the canopy of riparian trees rooted on the banks, and was mapped to correspond with the tree cover, other portions were mapped as open water to distinguish them from other unvegetated areas (e.g., developed areas) within the Project Area (Figure 7). Open water comprises 0.02 acre of the Project Area. Despite the absence of vegetation, open water areas provide habitat for fish and aquatic wildlife.

3.3 BOTANICAL SURVEY

The incised creek banks within the Project Area are heavily vegetated with riparian vegetation comprised of mature coast live oak, western sycamore, and red/arroyo willow trees. (Not all willow individuals could be identified to species due to lack of leaves at the time of assessment). Riparian ground cover is dominated by cape ivy (*Delairea odorata*), California blackberry (*Rubus ursinus*), and periwinkle (*Vinca major*). Vegetation within the Project Area is primarily comprised of the above mentioned riparian vegetation. The channel bottom of Pismo Creek is largely unvegetated with the exception of a few aquatic plants, such as watercress (*Nasturtium officinale*). The lower banks downstream of the Hyla Crossing are moderately vegetated with willow thickets, mulefat (*Baccharis salicifolia*), and common horsetail (*Equisetum arvense*). Upland areas located adjacent to the creek channel in the northern and southern sections of the Project Area are heavily impacted by human disturbance and primarily comprised of paved or graveled roadways and well pads. See Appendix D for complete list of plant species observed during the field investigation. Other than coast live oaks no sensitive plant species were observed within the Project Area. Although the botanical survey was conducted early in the growing season and some species may not have been observed because they were not yet flowering, based on the CNDDB and CNPS inventory searches there are no sensitive species that are expected to occur within the Project Area that would have been missed during the survey due to lack of flowering.

3.4 TREE INVENTORY

Tree removal areas and total individuals or acreages removed, potentially trimmed, or avoided are depicted on Figure 8. The dominant tree species within the Project Area is the red/arroyo willow. A total of 0.36 acre of red/arroyo willow thickets occur within the Project Area. These areas were surveyed from the edge of their populations due to the nature of these areas being very densely vegetated. Thus the acreage of these populations are reported rather than individual trees. Of the total 0.36 acre of red/arroyo willow trees, approximately 0.30 acre will need to be removed due to project activities, 0.06 acre occurs within the Project Area and may requiring trimming during construction activities, and 0.01 acre occurs within

the Project Area and will be avoided during the construction period. Two mature western sycamores occur within the Project Area, both of which will need to be removed to construct the span bridge structure. Additionally, 0.02 acres of western sycamore will require removal during streambed restoration activities and 0.01 acres may require trimming during construction activities. Of the total 38 coast live oak trees present within the Project Area, approximately 18 will need to be removed due to project activities and 20 trees will be avoided during the construction period. Trees that will be avoided include those located along upland terraces of Pismo Creek and near or within upland staging/laydown areas.

Tree trunk sizes within the Project Area varied from saplings with no measurable DBH (insufficient height) to mature trees with trunks having a DBH greater than 50 inches. Many of the sampled trees had multiple trunks; these observations along with associated measurements are presented in Appendix E.

3.5 CALIFORNIA RED-LEGGED FROG SURVEYS

During the February 15, 2013 non-protocol survey by Ms. Kelly Kephart and Mr. Jamie Deutsch, one adult California red-legged frog was positively identified approximately five feet downstream of the existing Hyla Crossing (Figure 5) resting on a rock present in the middle of the pool (Appendix F). During the July 24, 2013 protocol non-breeding nighttime survey conducted by Ms. Johanna Kisner and Mr. David Kisner, one adult California red-legged frog was positively identified at the retention basin (Appendix G), approximately 0.4 mile northwest of the Hyla Crossing (Figure 5). The California red-legged frog was observed very clearly from the platform extending over the edge of the retention basin as it was sitting on top of bulrush that had been flattened from previously accessing the pond with a kayak. No California red-legged frog adults, tadpoles, or egg masses were observed near the Hyla Crossing during protocol surveys. USFWS protocol survey forms are included in Appendix G. Additionally the CNDDB has a 2005 record of a California red-legged frog approximately 1.5 miles downstream of the Project site near Price Canyon Road.

Suitable breeding habitat occurs within and adjacent to the proposed Project site. During the site investigation, low velocity pooled areas were present both upstream and downstream of the Hyla structure (Appendix G). Upstream habitat varied from approximately six inches to five feet in depth and contained some woody vegetation present along the banks and some small patches of cattail (*Typha* sp.) present within the stream channel near the banks. Downstream, a deep (approximately 4 inches to 4.5 feet), very low velocity pool was present with willow (*Salix* sp.) located along the southern bank and branches stretching over and into the water. Both the upstream and downstream locations could be utilized by California red-legged frogs for breeding. Additionally, adjacent riparian vegetation present along both banks of Pismo Creek provides foraging, cover, and movement corridors for this species.

Due to the presence of suitable breeding habitat and adjacent riparian refugia along with the positive identification of an individual at the proposed Project site, California red-legged frogs are expected to occur within the Project Area. Evidence of breeding was not observed within the Project Area; however breeding may occur especially after trees are removed during Project construction which would create more sunny and warm water conditions better suited for growing tadpoles. It is difficult to determine the approximate population size within the Project Area due to dense vegetation and limited access.

3.6 WETLAND DELINEATION AND JURISDICTIONAL DETERMINATION

This section summarizes the results of the jurisdiction delineation that was conducted within the Project Area. Figure 9 depicts the jurisdictional determination boundaries within the Project Area. These results are presented more fully in the Wetland Delineation and Jurisdictional Determination Report for the Project (URS 2014).

3.6.1 Jurisdictional Drainages

A single drainage is located within the Project Area: the mainstem of Pismo Creek. This drainage is identified as a perennial stream on the USGS (2012) topographic map, and flows southward through the Edna Valley from the Los Padres National Forest to the Pacific Ocean. Pismo Creek is a perennial tributary to the Pacific Ocean, and is therefore a water of the United States as defined under Clean Water Act regulations.

Within the Project Area, the length of Pismo Creek is approximately 366 feet. Throughout this distance, the mainstem of Pismo Creek continuously exhibits a defined bed, bank, and channel, as well as an identifiable OHWM. The width of the active channel, as measured at the OHWM, ranges between approximately 10 and 50 feet, while the stream's riparian corridor ranges between approximately 80 and 160 feet wide. Depth of the active channel varies from 6 inches to over 5 feet upstream of the Hyla Crossing and from 4 inches to 4.5 feet downstream of the Hyla Crossing. With the exception of the area immediately adjacent to the Hyla Crossing structure, the creek is confined within a steep canyon with bank heights of approximately 40 feet on the south bank and 20 feet on the north bank. The southern bank is much steeper than the northern, and is vegetated with willow trees and other species including poison oak, mulefat (*Baccharis salicifolia*), and common horsetail (*Equisetum arvense*) near the stream channel and coast live oaks near the top. The northern bank, which exhibits a gradual slope, supports a mix of riparian trees and understory species that gradually transitions to an upland oak woodland community with distance from the active channel.

The twin corrugated metal pipes intended to allow base flows to pass beneath the existing Hyla Crossing concrete structure have become clogged, and flows are no longer able to pass through the pipes. This has caused a shallow, wide pool to form upstream of the structure and a deep, wide pool to form downstream of the structure, with flows overtopping the roadway (Appendix A). Concrete rip-rap on the downstream side of the existing Hyla Crossing helps confine the pooled water in this area. The substrate within the channel is composed mostly of a mix of cobble and sand. The channel bottom is primarily unvegetated with the exception of a few aquatic plants such as watercress.

3.6.2 Jurisdictional Wetlands

A single wetland delineation, including associated sampling point and Wetland Delineation Data Form, was conducted within the riparian corridor along Pismo Creek. Characteristics observed at this sampling location are presented below, and are documented in further detail on the data form in Appendix H.

3.6.2.1 Sampling Point 1

Sampling Point 1 (Figure 9) is located within a floodplain terrace of Pismo Creek, in a potential wetland area on the downstream side of the existing Hyla Crossing.

Indicators of hydrophytic vegetation were observed at this sampling point. At the time of the investigation, vegetation was dominated by common horsetail facultative (FAC) in the herb stratum, California blackberry (FAC) in the woody vine stratum, mulefat (FAC), western sycamore (FAC), and red/arroyo willow facultative wetland (FACW) in the shrub stratum, and red/arroyo willow (FACW) and California sycamore (FAC) in the tree stratum. All six dominant species present were hydrophytes.

Indicators of hydric soils were not observed at Sampling Point 1. The sample point is located on a terrace in the creek that is likely only inundated during high flow conditions resulting in some drift deposits; however it is not inundated enough to create hydric soils Hydrophytic vegetation is present but is likely supported by a higher ground water table rather than surface water. Further, the predominant soil texture was observed to be a sandy loam (not sandy enough to be problematic), suggesting that if hydric soil indicators had been present, they would have been visible.

Indicators of wetland hydrology were observed at Sampling Point 1. No primary wetland hydrology indicators were observed; however, this location exhibited drift deposits and passed the FAC-neutral test, both secondary indicators of wetland hydrology (To make a positive determination, either one primary or two secondary hydrology indicators are required.)

Because Sampling Point 1 exhibited indicators of hydrophytic vegetation and wetland hydrology but did not show evidence of hydric soils, this point is not within a wetland as defined by USACE regulations. Further, because this sampling point was intentionally sited in the area deemed by the investigators as most likely to exhibit wetland characteristics, the fact that this area was not under sufficient hydrologic influence to meet the USACE's wetland definition indicates that the Project Area does not contain jurisdictional wetlands.

As described above, the Project Area includes one drainage feature, the mainstem of Pismo Creek, and this feature exhibits bed/bank characteristics. A summary of the total acreage of waters subject to the permitting authority of the USACE and CDFW is presented below and quantified in Table 2.

3.6.3 Waters of the United States

The Project Area contains a total of 0.19 acre of waters of the U.S., all of which are comprised of non-wetland waters in the mainstem of Pismo Creek (Table 2). Pismo Creek is a perennial stream and therefore a "Relatively Permanent" tributary to the Pacific Ocean; thus, Pismo Creek is a water of the United States. No saline or tidal waters are present, and no wetlands or other special aquatic sites occur within the Project Area.

TABLE 2
SUMMARY OF JURISDICTIONAL ACREAGES FOR PISMO CREEK

	Waters of the U.S.				
Location	Non-Wetland Waters (Acres)	Non-Wetland Waters (Linear Feet)	Wetland Waters (Acres)	Total Waters of the U.S. (Acres)	CDFW-Jurisdictional Streambeds (Acres)
Project Area	0.19	366	0	0.19	0.75

3.6.4 California Department of Fish and Wildlife Jurisdictional Streams

Within the Project Area, a total of 0.75 acre was delineated as jurisdictional streambeds subject to the CDFW's permitting authority under Section 1600 *et seq*. of the California Fish and Game Code (Table 2). This acreage comprises all potions of the bed, bank, and channel of Pismo Creek within the Project Area, including riparian vegetation contiguous with the physical stream banks.

SECTION 4.0
IMPACTS ASSESSMENT AND MITIGATION

This section describes the impacts to biological resources that would be expected to result from the proposed project, and identifies feasible mitigation measures that would avoid, reduce, or compensate for these impacts. During environmental review of the project under California Environmental Quality Act (CEQA) the County will consider this information, and will exercise independent judgment when determining whether impacts are significant. Impacts of the proposed Project on biological resources and recommended mitigation measures are detailed in Section 4.1 through 4.6.

4.1 IMPACTS TO SPECIAL-STATUS PLANTS AND WILDLIFE

During the biological field investigations described above, no special-status plant species were detected and it is expected that no special-status plants occur in the Project Area. Pismo clarkia (*Clarkia speciosa* ssp. *immaculata*) is Federally-listed as endangered under the ESA, listed in California as a 'State listed rare' species (CDFW 2014b) and is listed by the California Native Plant Society (CNPS) as a 1B.1 rank (rare, threatened, or endangered in California and elsewhere) (CNPS 2014). This species commonly occurs in openings and margins of wooded and shrub-dominated habitats such as oak woodlands and chaparral, and may favor areas of recent disturbance (USFWS 1994). This species has been recorded by biologists at various locations within the AGOF, who conduct annual surveys as required by the County of San Luis Obispo. Occurrences in the vicinity of the Action Area are predominately west of Price Canyon Road and adjacent to West Ormonde Road, as generally indicated by the CNDDB (Figure 3). This species is not known to occur within the Project Area. Because proposed work activities will take place entirely within Pismo Creek, its adjacent riparian area, or on existing developed lands, which do not contain suitable habitat for the species, Pismo clarkia will not be affected by the proposed construction activities. Santa Margarita manzanita (*Arctostaphylos pilosula*, CNPS Rank 1B.2) and Brewer's spineflower (*Chorizanthe breweri*, CNPS Rank 1B.3) are also known to occur within the Project vicinity (Figure 3). Both of these species are not expected to occur within the Project Area due to lack of suitable habitat. Accordingly, impacts to these species will not occur and will not be discussed further in this report.

It is expected that two special-status wildlife species, California red-legged frog and steelhead utilize the Project footprint, due to availability of habitat for these species and documented occurrences. The Project's impacts on special-status species are described below.

4.1.1 Impacts to California Red-Legged Frog (*Rana draytonii;* Federally Threatened [FT], California Species of Special Concern [CSC])

This species was observed within the Project Area during California red-legged frog non-protocol surveys. An individual California red-legged frog was observed in the pooled area just downstream of the Hyla crossing within Pismo Creek. Additionally, during USFWS protocol

USFWS protocol surveys for the Phase V project, one California red-legged frog was observed at the retention basin 0.4 miles from the Project Area (Figure 5). The riparian habitat along Pismo Creek within the Project Area appears highly suitable for this species, and upland habitats within the Project Area may be used as transitory habitat as well.

4.1.1.1 Loss of Individuals Due to Injury or Mortality

Because construction activities will occur within known California red-legged frog habitat and they are able to move up to one mile through upland habitats, there is a possibility of this species being injured or killed during construction activities within the riparian corridor of Pismo Creek and within upland portions of the Project Area. Construction activities could result in the loss of individuals due to injury or mortality by contact with construction equipment, dewatering, or noise associated with pile driving. However, construction activities occurring within the Pismo Creek channel will be limited to May 1 to October 15 which coincides with the summer low-precipitation period (April 15 to October 15) and avoids the California red-legged frog breeding season (December to April), although California red-legged frog egg masses have potential to be present during May. The biologist will confirm California red-legged frog egg masses are not in the construction area prior to the start of work in the creek.

Additionally, Pismo Creek will be de-watered during bridge construction further reducing potential injury or mortality due to construction equipment. Furthermore, due to this species' cryptic nature and generally low population densities, traditional impact avoidance strategies such as pre-construction surveys are not highly effective for reducing impacts to California red-legged frogs. However, implementation of full time biological monitoring during construction in recommended Mitigation Measure BIO-1: General Measures for Biological Resources Minimization and Avoidance, and BIO-3: Pre-construction California Red-legged Frog Surveys and Relocation (see Section 4.6) would reduce potential impacts.

4.1.1.2 Loss or Modification of Suitable Habitat

The proposed Project would result in the permanent loss of 0.09 acre of riparian habitat suitable for California red-legged frog breeding, refugia, and transitory use and the temporary impact on 0.66 acre of suitable riparian habitat adjacent to the main stem of Pismo Creek. Suitable riparian breeding habitat was calculated within 30-meters of Pismo Creek, the distance which California red-legged frogs have been found from water during breeding (USFWS 2002). The acreages that will be permanently and temporarily disturbed by the Project are relatively small compared to the extensive acreage of suitable habitat for this species in the Project vicinity and the region. Additionally, after construction is complete, streambed restoration activities will take place as detailed in Appendix A, Sheet 3 and Appendix C (Conceptual Design for Channel Restoration within Pismo Creek at the Hyla Crossing). These activities will restore and enhance California red-legged frog breeding habitat along the stretch of Pismo Creek within the Project Area by creating more sunny open areas after tree removal with shallow water for tadpole development. Further, implementation of Mitigation Measures BIO-1: General Measures for Biological

Resources Minimization and Avoidance and BIO-7: Pre-construction California Red-legged Frog Surveys and Relocation (see Section 4.6) would further reduce this impact be minimizing effect on suitable habitats in adjacent areas.

4.1.2 Impacts to South-Central California Coast Steelhead (*Oncorhynchus mykiss*; FT, CSC)

This species was not directly observed during any biological surveys conducted between February 2013 and November 2013, yet Pismo Creek is considered to currently support anadromous steelhead based on relatively recent reports and incidental observations by site personnel. A report by Becker and Reining (2008) indicates that during several Pismo Creek site visits by CDFW personnel between 1996 and 2002, observations of multiple year classes were made, and in 2005 CDFW personnel observed young of year and age 1+ and 2+ steelhead throughout the main-stem of Pismo Creek. Additionally, there is a 2002 CNDDB record for steelhead within Pismo Creek (CDFW 2014a). Suitable rearing and migratory habitat for steelhead occur within the AGOF boundaries. Steelhead within the Project Area are designated as a component of the SCCC DPS which includes all naturally spawned populations and their progeny in streams from the Pajaro River located in Santa Cruz, California to, but not including, the Santa Maria River in San Luis Obispo County (USFWS 2013). Of the 29 watersheds comprising the SCCC DPS, eleven were designated as Core 1 populations in a draft recovery plan submitted by the NMFS (2012), including the Pismo Creek watershed. Core 1 populations are ranked as the highest priority for recovery action based on a variety of factors, including: the intrinsic potential of the population in an unimpaired condition; the role of the population in meeting the spatial and/or redundancy viability criteria; the current condition of the populations; the severity of the threats facing the populations; the potential ecological or genetic diversity the watershed and population could provide to the species; and the capacity of the watershed and population to respond to the critical recovery actions needed to abate those threats.

4.1.2.1 <u>Loss of Individuals Due to Injury or Mortality</u>

This species is known to occur within Pismo Creek and may be present during construction. Construction activities could result in the loss of individuals due to injury or mortality by contact with construction equipment, dewatering, or noise associated with pile driving. However, construction activities occurring within the Pismo Creek channel will be limited to May 1 to October 15 which coincides with the summer low-precipitation period (April 15 to October 15), reducing potential impacts on steelhead. Additionally, Pismo Creek will be de-watered during bridge construction further reducing potential injury or mortality due to construction equipment. These precautions, along with implementation of Mitigation Measures BIO-1: General Measures for Biological Resources Minimization and Avoidance and BIO-4: Pre-construction Steelhead Surveys and Relocation (see Section 4.6), would reduce the likelihood of injury or mortality of steelhead due to proposed construction.

4.1.2.2 Loss or Modification of Suitable Habitat

The proposed Project will affect steelhead habitat within the Project Area. During construction activities a portion of suitable habitat for steelhead will be removed temporarily through dewatering of Pismo Creek within the vicinity of the construction activities. Dewatering the construction area will help avoid impacts to individual steelhead greatly reducing the chance of loss due to injury or mortality that would be caused by construction equipment or materials if the area was not dewatered. After construction is complete, streambed restoration activities will take place as detailed in Appendix A, Sheet 3 and Appendix C (Conceptual Design for Channel Restoration within Pismo Creek at the Hyla Crossing). These activities will restore and enhance the stretch of Pismo Creek within the Project Area to ensure that steelhead movement is not hindered during normal flow conditions within this stretch of Pismo Creek and to improve habitat. Considering this information, the Project is not likely to result in a permanent loss of habitat for the SCCC steelhead. Further, implementation of Mitigation Measure BIO-1: General Measures for Biological Resources Minimization and Avoidance and BIO-4: Pre-construction Steelhead Surveys and Relocation, would further reduce the probability of this impact.

4.2 IMPACTS TO VEGETATION COMMUNITIES AND LAND COVERS

The Project Area is located within an active oil field, and is subjected to routine industrial activity and human encroachment. The natural oak woodland and willow thicket vegetation communities in the vicinity have been fragmented somewhat by the installation of graded oil well pads and access roads, which are kept clear of vegetation. Nevertheless, as described in Section 3.2, three natural communities, along with three anthropogenic or un-vegetated land cover types, can be found within the Project Area. Implementation of the proposed Project would result in permanent losses of habitat within the footprint of the new span bridge structure and would also result in temporary impacts due to construction-related disturbance within the Project Area. Impacts of the proposed Project on existing vegetation are discussed in this Section.

To quantify and describe the project's effects on existing vegetation, a geospatial analysis was performed overlaying the proposed site plan onto the vegetation map described in Section 3.2 (Figure 7). By calculating the intersections between these data layers, the analysis yielded acreages of each vegetation type that would be permanently and temporarily impacted by grading activities associated with the construction of the new span bridge structure.

4.2.1 Impacts to the Sensitive Vegetation Communities

Implementation of the proposed Project would require the removal of existing vegetation in areas where Project activities are proposed. In most cases the impacts would be temporary, meaning that while the existing vegetation would be cleared or trimmed to accommodate the construction process, the area would not be developed under finished conditions and would be revegetated as described in the Conceptual Mitigation Plan for the Project (Appendix C). In limited areas, however, such as the proposed locations of the new permanent bridge and approaches, existing

vegetation would be removed permanently. In total, the proposed Project would result in the permanent removal of 0.08 acres of existing natural vegetation, 0.06 acres of area that have been previously developed, and 0.01 acres of ruderal vegetation. Two of the vegetation communities that would be affected by the Project, including red/arroyo willow thickets and coast live oak woodlands are considered by the CDFW (2010) to be sensitive natural communities. Impacts of the proposed Project on existing vegetation communities and land covers are quantified in Table 3 and impacts to sensitive natural communities are described below.

TABLE 3
IMPACTS TO VEGETATION COMMUNITIES AND LAND COVERS WITHIN PROJECT AREA

Vegetation Community Type	Acreage to be Permanently Removed	Acreage to be Temporarily Removed or Trimmed	Total Acreage within Project Area
Coast Live Oak Woodland	0.03	0.29	0.32
Red/Arroyo Willow Thickets	0.05	0.39	0.44
Coyote Brush Scrub	0	0.01	0.01
Ruderal Vegetation	0.01	0.03	0.04
Developed	0.06	1.62	1.68
Open Water	0	0.02	0.02
Total	0.15	2.36	2.51

4.2.1.1 Impacts to Red/Arroyo Willow Thickets (CDFW Sensitive Natural Community)

Red/arroyo willow thickets represent the largest proportion of natural vegetation community present within the Project Area, encompassing 0.44 acre. As presented in Table 3, the proposed Project would impact this vegetation type within the Project Area by permanently removing 0.05 acre and temporarily impacting 0.39 acre. Of these 0.39 acres of temporary impacts, approximately 0.06 acres will likely only require trimming or other minor impacts such as installation of exclusionary fencing or foot traffic from construction crew. Mitigation Measures BIO-1: General Measures for Biological Resources Minimization and Avoidance (see Section 4.6), would reduce impacts to adjacent habitat that could be impacted by construction activities.

4.2.1.2 Impacts to Coast Live Oak Woodland (CDFW Sensitive Natural Community)

Coast live oak woodland is present within the Project Area, but is not as extensive as red/arroyo willow thickets. As presented in Table 3, the proposed Project would impact this vegetation type within the Project Area by permanently removing 0.03 acre and temporarily impacting 0.29 acre.

Mitigation Measures BIO-1: General Measures for Biological Resources Minimization and Avoidance(see Section 4.6), would reduce impacts to adjacent habitat that could be impacted by construction activities.

4.3 IMPACTS TO JURISDICTIONAL WATERS AND STREAMS

Streams and water bodies are protected by several federal and state statutes, and are generally considered to be valuable habitat features. As described in Section 3.6 and illustrated on Figure 7, the Project Area contains one jurisdictional drainage, Pismo Creek, which is a non-navigable but relatively permanent tributary to the Pacific Ocean, which is navigable-in-fact. Pismo Creek is a water of the United States due to its hydrologic, chemical, and ecological nexus to the ocean. Pismo Creek is subject to the permitting authority of the USACE under Section 404 of the Clean Water Act and CDFW under Section 1600 *et seq*. of the California Fish and Game Code.

4.3.1 Impacts to Pismo Creek

As presented in Table 4, the proposed Project would impact waters of the U.S. within the Project Area by permanently removing 0.01 acres of non-wetland waters of the U.S. and temporarily impacting 0.18 acres. Additionally, the proposed Project would impact CDFW-jurisdictional streambeds within the Project Area by permanently removing 0.09 acres and temporarily impacting 0.66 acres. Of these 0.66 acres of CDFW-jurisdictional streambeds, 0.48 acres occurs above the OHWM of Pismo Creek.

Loss of waters of the U.S. (calculated above as 0.01 acre) for the entire Hyla Crossing Replacement Project would consist of the portion of the bridge deck that will be suspended over the Pismo Creek channel. Therefore, this area is expected to experience substantial shade and would exclude riparian vegetation from areas immediately beneath the bridge. These areas are not expected to maintain habitat value, except for being passable by aquatic and terrestrial species. Construction activities, including streambed restoration activities, are expected to temporarily impact 0.18 acre of Pismo Creek. Loss of CDFW-jurisdictional streambeds for the Hyla Crossing Replacement Project would include the bridge footings, bridge deck, bridge abutments, and new approaches.

Permanent fill would be discharged into Pismo Creek for restoration purposes; however, this discharge would not result in a loss of waters of the U.S. Rather, the proposed fill would restore Pismo Creek to a functional, geomorphically stable system in which aquatic organisms, including the federally listed steelhead, will be able to successfully utilize as freshwater rearing and migration habitat. Streambed restoration activities will involve the removal of the existing Hyla Crossing and the restoration of 260 linear feet of waters of the U.S. Waters of the U.S. currently comprising 0.14 acre within the streambed restoration boundary. This is due to the current condition of the Hyla Crossing being clogged and causing the pooling of water upstream and immediately downstream of the existing Hyla Crossing. It is anticipated that the proposed streambed restoration activities will return Pismo Creek, within the boundaries of the restoration

activities, to a more natural hydrologic condition. After completion of the streambed restoration activities it is estimated, based on the engineering designs (Appendix A, Sheet 5), that Pismo Creek will encompass 0.06 acres within the streambed restoration boundary. Since the proposed restoration activities will be restoring the area to a more natural hydrologic regime, the reduction of waters of the U.S. from 0.14 acres to an anticipated 0.06 acres within this area should not constitute loss of waters of the U.S. The remaining 0.08 acres will be included in restoration activities for the riparian area. Additionally, 0.04 acres of Pismo Creek is located within the area of temporary disturbance but outside of the area of streambed restoration activities. This 0.04 acre area will be temporarily impacted by the placement of the cofferdam and subsequent dewatering/diversion activities. This area will be returned to current or better conditions at the conclusion of dewatering activities.

Temporary impacts, meaning that while the existing vegetation would be cleared or trimmed to accommodate the construction process the area would not be developed under finished conditions and would be revegetated, to riparian vegetation would occur during all phases of the proposed construction activities. In areas where the existing vegetation is mature temporary impacts would be expected to have a duration exceeding the construction period. Although the proposed restoration activities would result in a net gain in stream and wetland function in the long run, a temporal loss of riparian habitat values would occur in areas where mature riparian vegetation is temporarily removed during the period while replacement vegetation is becoming established and growing to maturity. Of the 0.66 acres of CDFW-jurisdictional streambeds that will be temporarily impacted, 0.18 acres overlaps with Pismo Creek.

Impacts to the bed and banks of Pismo Creek will include grading to construct the new span bridge structure and conduct streambed restoration activities. Additionally, Pismo Creek within the Project Area (see Appendix A, Sheet 3) will be temporarily dewatered. This will ensure that construction equipment does not operate within the wetted portion of Pismo Creek during the construction period. Dewatering will occur between May 1 and October 15 which coincides with the low-flow season (April 15 – October 15) and reduces impact to California red-legged frog by occurring outside of their breeding season (December – April), although California red-legged frog egg masses have potential to be present during May. The biologist will confirm California red-legged frog egg masses are not in the construction area prior to the start of work in the creek. Removal of waters of the U.S. and CDFW-jurisdictional would constitute an impact and warrants mitigation. Project-related temporary impacts to jurisdictional waters and streams would be mitigated by recommended Mitigation Measures BIO-1: General Measures for Biological Resources Minimization and Avoidance. Project-related removal of jurisdictional waters and streams would be dictated by applicable USACE Nationwide Permit, CDFW Streambed Alteration Agreement, and RWQCB CWA Section 401 Water Quality Certification.

All jurisdictional areas are displayed on Figure 9, and impact and mitigation acreages are summarized in Table 4.

TABLE 4
IMPACTS AND COMPENSATORY MITIGATION TABLE FOR CONSTRUCTION IMPACTS

	Permanently Impacted		Temporarily Impacted		Restored Area		Enhanced Area		
Water Body Type	Acres	Linear Feet	Acres	Linear Feet	Acres	Linear Feet	Acres	Linear Feet	Mitigation Type
Perennial creek	0.01	16	0.18	350	0.06[1]	260[1]	0.04[2]	90[2]	Permittee-responsible on-site
Riparian (above OHWM of Pismo Creek)	0.09	16	0.48	350	0.63[3]	365[3]	0	0	Permittee-responsible on-site
Total	0.10	32	0.66	700	0.69[1,3]	625[1,3]	0.04	90	

[1] Includes assumed new Ordinary High Water Mark (OHWM) of Pismo Creek after completion of streambed restoration activities.
[2] Area of Pismo Creek within the temporary construction area upstream and downstream of the streambed restoration activities.
[3] Includes restoration of existing Hyla Crossing approaches to riparian habitat (0.07 ac and 15 linear feet), restoration of riparian habitat temporarily removed or trimmed (0.48 acres and 350 linear feet) due to construction activities, and approximate acreage of streambed restoration above the assumed new OHWM of Pismo Creek (0.08 acres and 260 linear feet).

4.4 CONSISTENCY WITH BIOLOGICAL RESOURCES POLICIES AND REGULATIONS

Biological resources are protected by statutes, regulations, and policies at the federal, state, and local levels. The Project's impacts with regard to some of the most salient requirements are described below.

4.4.1 Impacts to Oak Trees

Oak trees can provide valuable wildlife habitat and due to the County's concern with the loss of oaks in the region from development or other factors, oak trees are treated as special-status species in this report. However, absent a policy or regulation protecting individual oak trees in the Project Area from removal, Project-related impacts to on-site oaks would not conflict with policies or regulations to protect sensitive species. For a discussion of project-related impacts on oak woodlands, refer to Section 4.2.1.2.

The proposed Project entails the construction of a new span bridge structure and associated approaches, removal of the existing culvert and associated approaches, and streambed restoration activities. The necessary construction would be accomplished by grading which would remove woodland habitats within the Project Area that are inhabited by coast live oak trees. During development of the proposed project, it is foreseeable that construction activities and vegetation clearing could remove portions of oak woodland habitat or individual coast live oak trees. Of the total 38 coast live oak trees present within the Project Area, approximately 18 will need to be removed due to project activities and 20 trees will be avoided during the construction period. Trees that will be avoided include those located along upland terraces of Pismo Creek and near or within upland staging/laydown areas. Though these 20 trees will not require trimming and will be avoided, they could sustain impacts from root compaction due to activities associated with streambed restoration since some disturbance could occur within the canopy of some of these trees.

Table 5 presents the tree species and the associated number which will require removal, potential trimming, or will be avoided during the construction period.

TABLE 5
TREES WITHIN PROJECT AREA REQUIRING REMOVAL OR TRIMMING

Tree Species	Trees to be Removed	Trees to be Potentially Trimmed	Trees to be Avoided
Quercus agrifolia	18	0	20
Plantus racemosa	2 indv. & 0.02[2]	0.01[2]	0
Salix laevigata/lasiolepis[2]	0.30[2]	0.06[2]	0.01[2]

[1] Presented in acreage rather than individuals due to density of vegetation and difficulty quantifying individual trees in the field.

In general, trees of a lower size class are comprised of multiple trunks, whereas more mature trees are comprised of either fewer trunks or a single trunk. Oak trees proposed for removal are primarily comprised of mature trees with an average dbh of 8-10 dbh. Two individuals that are required to be removed are of significant size. One individual has three trunks of 35, 29, and 11 inch dbh and the other has one trunk of 30 inch dbh. The Project's effects on oak trees would be lessened by recommended Mitigation Measures BIO-1: General Measures for Biological Resources Minimization and Avoidance and BIO-5: Oak Protection which would reduce potential construction related impacts and require compensation for losses of habitat through long-term preservation and enhancement. These recommended measures are set forth in full in Section 4.6.

4.4.2 Impacts to Nesting Birds

As described previously, the Project Area contains primarily woodland and developed habitats. Woodland habitat is suitable for use by a variety of nesting birds. The nests of native non-game birds are protected by federal and state laws and regulations (the Migratory Bird Treaty Act and Section 3503 of the California Fish and Game Code, for example). All of the natural vegetation communities present within the Project Area have the potential to support nesting native birds, and the existing industrial structures in areas mapped as developed may support certain nesting species as well. During development of the proposed project, it is foreseeable that construction activities and vegetation clearing could remove bird nests that may be present in vegetation, structures, or on the ground within the development footprint. Further, fugitive noise and dust from construction operations could cause behavioral changes, potentially including nest abandonment, in areas immediately adjacent to construction zones. Absent requirements to the contrary, the proposed Project could therefore result in inconsistencies with these laws if construction activities were to destroy an active nest or disrupt nesting birds to the point of causing nest abandonment. These impacts must be avoided to ensure consistency with applicable laws and regulations.

Incidental take of active bird nests during construction is prohibited by federal and state law, and would be avoided through the pre-construction surveys required by recommended

Mitigation Measure BIO-1: General Measures for Biological Resources Minimization and Avoidance and BIO-2: Pre-construction Nesting Bird Surveys and Avoidance(see Section 4.6) would further reduce impacts by protecting adjacent habitat and possible nest trees from damage.

4.4.3 Impacts to Common Plants and Wildlife

Common plant species will be impacted during construction activities. Areas that will result in temporary impacts to vegetation will be revegetated. Impacts to common plant species would be mitigated for during restoration activities described in Mitigation Measure BIO-1: General Measures for Biological Resources Minimization and Avoidance (see Section 4.6).

Impacts to common wildlife would be avoided through the pre-construction surveys required by recommended Mitigation Measure BIO-1: General Measures for Biological Resources Minimization and Avoidance (see Section 4.6) during which common wildlife species would be moved out of the construction zone along with special-status species. Individuals would be relocated to an area outside of the Project Area.

4.5 IMPACTS TO WILDLIFE MOVEMENT

Intact movement linkages are an integral component of functional wildlife habitat, and preventing habitat fragmentation and isolation has long been a tenet of conservation biology. On a large scale, functional habitat linkages are instrumental in allowing gene flow between regional populations, and in allowing species to recolonize habitats following local extirpations. On a local scale, habitat connectivity allows species to accomplish essential behaviors including foraging, dispersing, and searching for mates. As habitats become increasingly fragmented, accomplishing these behaviors becomes more difficult, and wildlife must expend additional effort to survive. Because the Project Area is bordered by intact grassland, woodland, and chaparral habitats, it is likely that small and medium-sized wildlife species traverse the Project Area periodically to satisfy biological requirements such as foraging, seeking mates, and dispersal. However, due to small size of the area to be impacted by the proposed Project (approximately 2.51 acres) and the quantity of natural habitat in and around the Project Area that would not be impacted, the proposed action is not likely to impact wildlife movement or habitat connectivity. In fact, the proposed project is likely to have a beneficial effect on wildlife movement as the removal of the existing Hyla Crossing structure and proposed streambed restoration activities will reestablish migratory habitat for the SCCC steelhead and improve breeding habitat for California red-legged frog.

4.6 RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES

Project-related impacts to Pismo Creek, wildlife, and vegetation would be avoided and/or minimized by implementing the Recommended Avoidance and Minimization Measures, BIO-1 through BIO-5, described below.

BIO-1: General Measures for Biological Resources Minimization and Avoidance. An approved biological monitor will conduct a worker orientation for all construction contractors (site supervisors, equipment operators, and laborers) which will emphasize the presence of special-status species within the project site, identification, their habitat requirements, and applicable regulatory policies and provisions regarding their protection, and measures being implemented to avoid and/or minimize impacts. All equipment staging areas, construction-crew parking areas, and construction access routes will be established in areas that have been previously disturbed or developed, and will be designated on the grading plans for the project. In addition, construction fencing will be installed around oak trees in equipment staging and material storage areas to ensure that construction activities will occur outside of the drip lines of oak trees. Vehicles and heavy machinery shall not enter wetted portions of Pismo Creek and will be inspected for leaks. If vehicles are found to have leaks they will be contained in upland staging areas, as feasible, with leaking fluid contained (i.e., using drip pans) until leak can be fixed. All vehicles and other applicable construction equipment will be staged in designated equipment staging areas overnight with drip pans. Equipment staging areas will be located in such a manner as to avoid accidental spills into the creek. All work will be conducted during daylight hours. All anthropogenic debris will be cleaned up at the end of each work day. To minimize sediment movement downstream of the project area, gravel bag or geoweb gravel check dams will be placed in such a manner as to enable sediment to settle in this area and not be carried downstream. Check dams will be monitored and maintained regularly and sedimentation will be removed from behind the dams and disposed of in an upland site away from Pismo Creek. After completion of bridge construction, the Pismo Creek channel will be restored to enhance the habitat for aquatic animals, specifically steelhead. These activities will also create a geomorphologically stable system to hold the stream dimension post Hyla Crossing removal. Bankfull benches and riparian planting specifics for areas impacted by construction activities will be developed during subsequent plan refinement.

BIO-2: Pre-construction Nesting Bird Surveys and Avoidance. Where feasible, construction and activities will be conducted outside the nesting season (February 15 through August 15, unless determined otherwise by a qualified biologist based on observations in the field), or after the completion of nesting to avoid any potential impact to migratory birds. If these activities must be conducted during the nesting season, pre-construction surveys will be conducted between February 15 and August 15 to identify potential bird and raptor nesting sites. If active nest sites of common bird species protected under the Migratory Bird Treaty Act (e.g., northern mockingbird, house finch, etc.) are observed within the vicinity of the project site, then the Project will be modified and/or delayed as necessary to avoid direct take of the identified nests, eggs, and/or young. If active nest sites of raptors and/or special-status species (e.g., oak titmouse, Nuttall's woodpecker, etc.) are observed within the vicinity of the Project site, then the California Department of Fish and Wildlife (CDFW) will be contacted to establish the appropriate buffer around the nest site. Construction activities in the buffer zone will be prohibited until the young have fledged the nest. Woody vegetation requiring

removal due to construction activities will be removed between September and December, to the extent possible, outside of the nesting bird season and the California red-legged frog breeding season (BIO-3). This complies with the Migratory Bird Treaty Act and will help minimize suitable nesting habitat within the active construction zone.

BIO-3: Pre-construction California Red-legged Frog Surveys and Relocation. In order to avoid and minimize impacts to the federally-listed threatened California red-legged frog, before and during dewatering activities the entire site would be searched by a USFWS approved biologist for California red-legged frogs, tadpoles, or egg masses. If found, they would be relocated or otherwise addressed based on the terms and conditions of the USFWS Biological Opinion for the project. A ¼-inch seine, of appropriate height to span from the channel bed to the water surface and sufficient width to span from bank to bank, will be installed on the upstream side of the bypass intake to prevent California red-legged frogs from entering the site within the Pismo Creek channel. Work within Pismo Creek will not occur during the California red-legged frog breeding season, December through April, and no work will be conducted at night. Additionally, during construction activities both upland and riparian areas within the construction zone will be surveyed by a qualified biologist and any California red-legged frogs detected would be relocated or otherwise addressed based on the terms and conditions of the USFWS Biological Opinion before commencement of activities each morning. Any trenches or excavations left open overnight will include an escape route for California red-legged frogs and other wildlife, or would be covered at the end of each workday. Following a rain event any areas of standing water would be inspected by the biologist before work begins. If the biological monitor finds that California red-legged frogs are entering the site despite the upstream block net, lateral blocking structures comprising silt fencing or plywood may be constructed to help prevent California red-legged frogs from entering the site.

BIO-4: Pre-construction Steelhead Surveys and Relocation. In order to avoid and minimize impacts to the federally-listed threatened South-Central California Coast steelhead, before and during dewatering activities, the entire site would be searched by a NMFS-approved biologist for steelhead, rainbow trout, or their eggs. If found, they would be relocated or otherwise addressed based on the terms and conditions of the NMFS Biological Opinion before commencement of activities each morning. Additionally, a ¼-inch seine, of appropriate height to span from the channel bed to the water surface and sufficient width to span from bank to bank, will be installed as a blocking net to prevent steelhead or other fishes from entering the work area or getting into the water diversion system. The net should be monitored regularly for integrity and repaired immediately if breaches are detected or debris removed from net promptly once detected.

BIO-5: Oak Protection. In order to avoid, minimize, and compensate for impacts to coast live oak trees prior to any construction or vegetation removal, each mature coast live oak tree (≥5 inch dbh) within the vicinity of the impact area will be clearly marked for removal or

protection. To further protect oak trees remaining in place, a certified arborist will be retained by the applicant to perform any necessary trimming of oak tree limbs overhanging into the active construction zone or along access routes between the construction zone and equipment staging areas. This will be conducted prior to allowing construction equipment within the construction zone or applicable staging areas to avoid and/or minimize the potential for inadvertent damage to oak tree limbs. Prior to completion of construction of the project, payment to the State Wildlife Conservation Board will be made at $970 per oak tree that is removed and $485 per oak tree that is encroached upon or trimmed (but not removed) pursuant to the San Luis Obispo County's oak tree mitigation fee program. Receipt of payment will be provided to the San Luis Obispo County Department of Planning and Building.

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SECTION 6.0
LIST OF PREPARERS

Tiffany Whitsitt, Biologist

Johanna Kisner, Senior Biologist/Restoration Ecologist

Christopher Julian, Principal Environmental Scientist

FIGURES

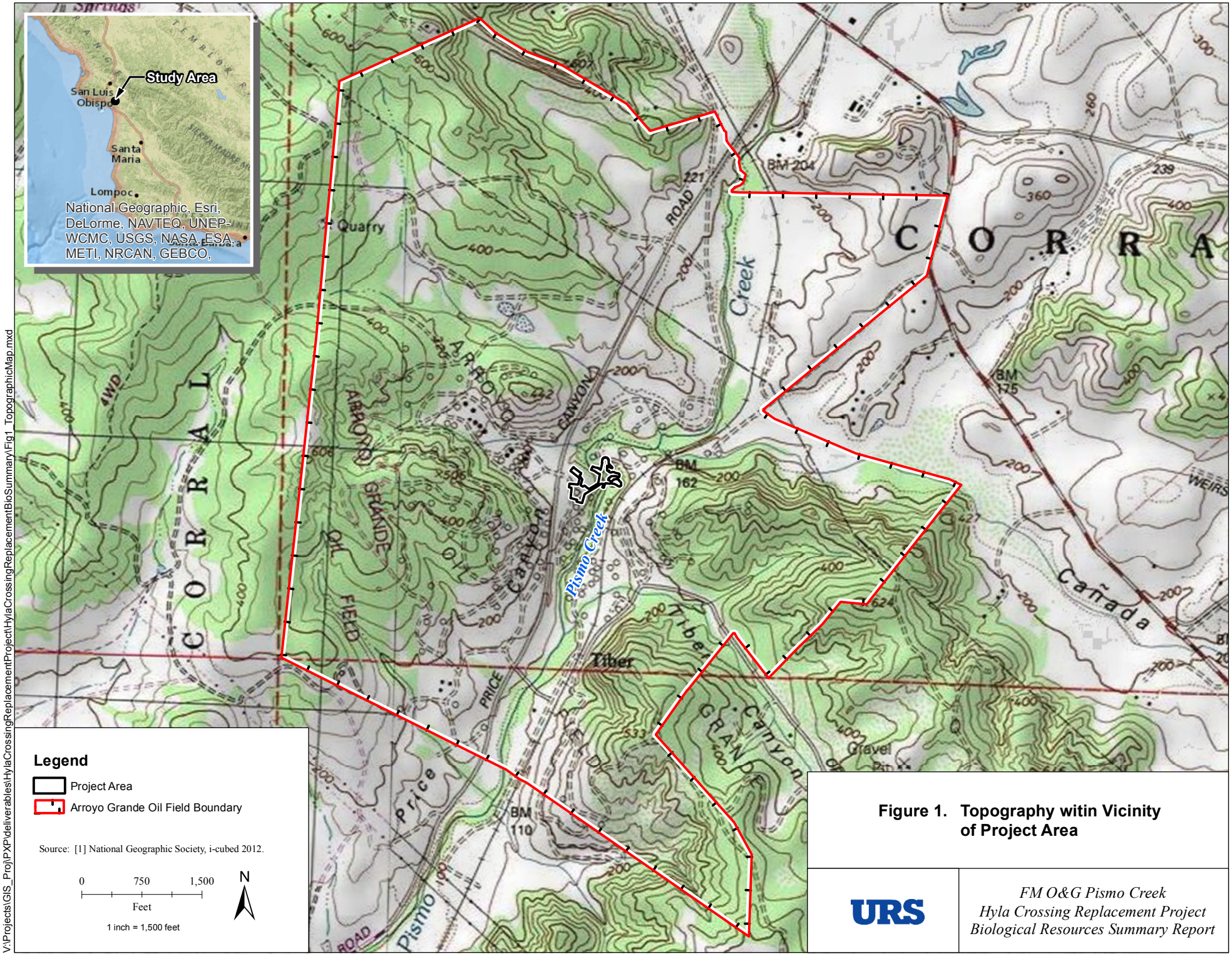

Figure 1. Topography witin Vicinity of Project Area

URS

FM O&G Pismo Creek
Hyla Crossing Replacement Project
Biological Resources Summary Report

Figure 2. Project Area Location

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FM O&G Pismo Creek
Hyla Crossing Replacement Project
Biological Resources Summary Report

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Figure 3. Soils within Project Area

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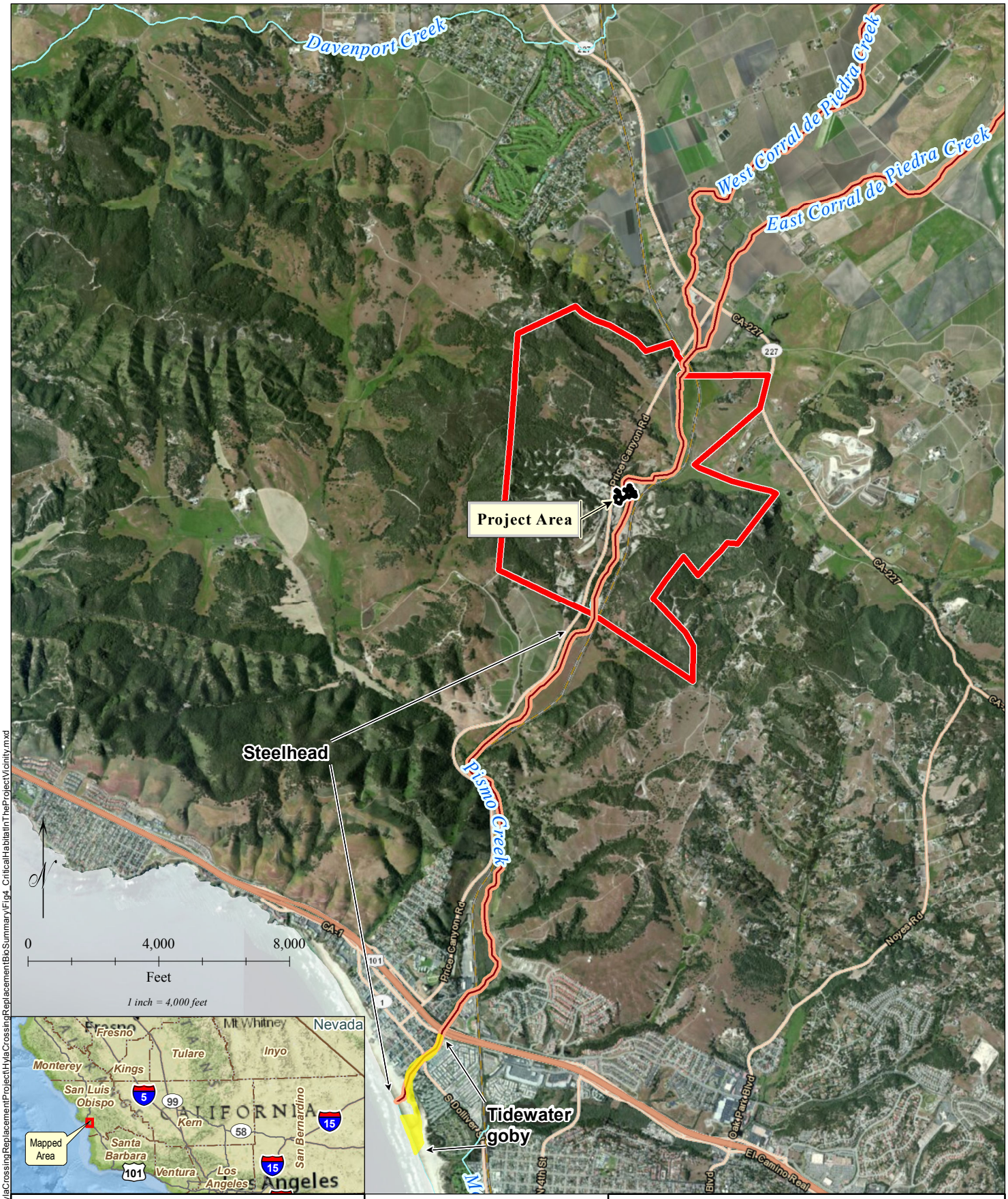
Hyla Crossing Replacement Project
Biological Resources Summary Report



Legend

- Project Area
- FM O&G Arroyo Grande Oil Field Boundary

Critical Habitat

- Steelhead
- Tidewater goby

Source: [1] United States Fish & Wildlife Service (1/2014); [2] USGS NHD Flowlines & Waterbodies -- high res. sub region accessed 5/23/2013 from ftp://nhdftp.usgs.gov/DataSets/Staged/ [3] Aerial Photo provided by ESRI World Map Imagery, May 8th, 2010.

Figure 4. Critical Habitat in the Project Vicinity

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Hyla Crossing Replacement Project
Biological Resources Summary Report

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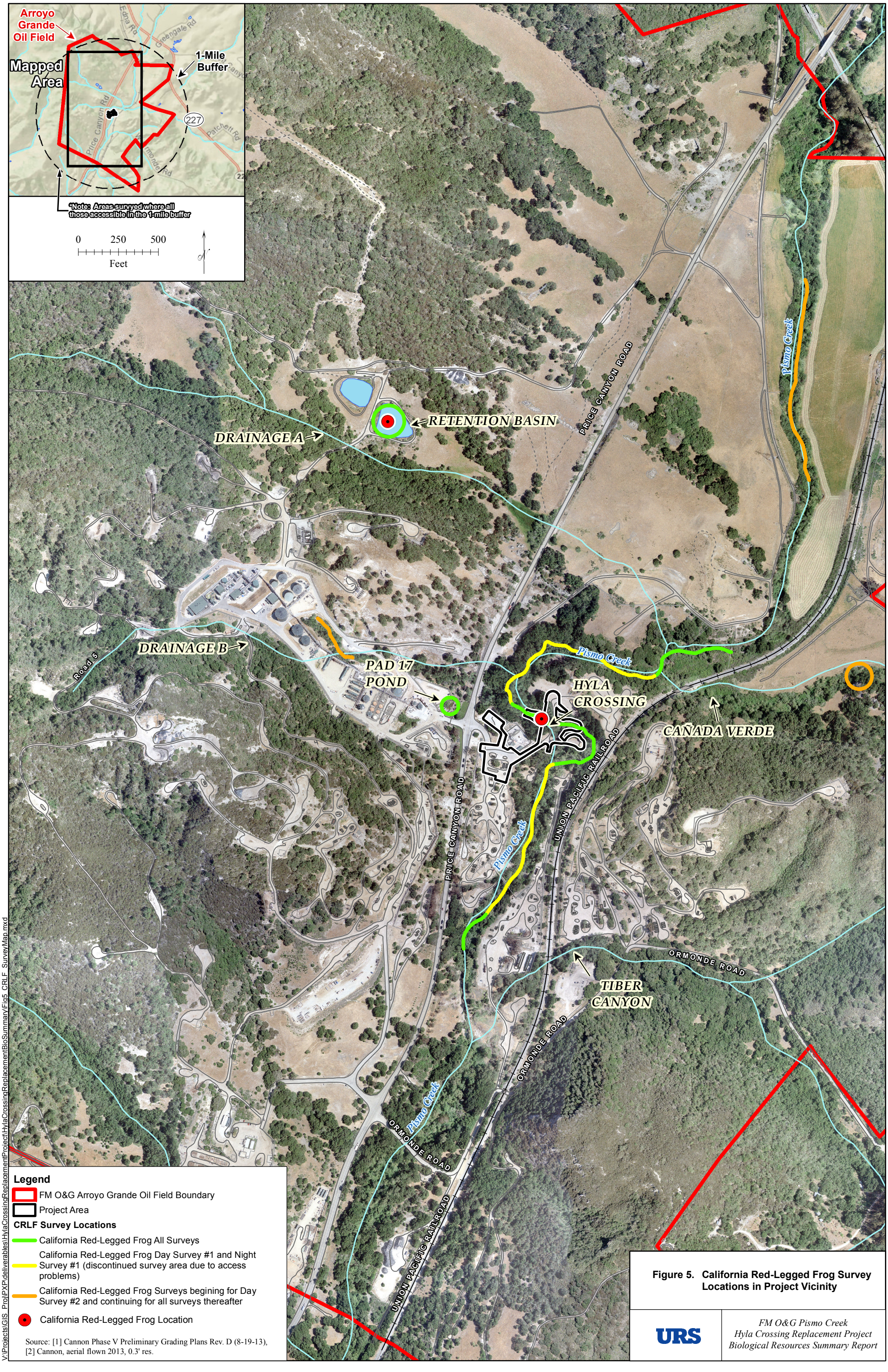

Figure 5. California Red-Legged Frog Survey Locations in Project Vicinity

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FM O&G Pismo Creek
Hyla Crossing Replacement Project
Biological Resources Summary Report

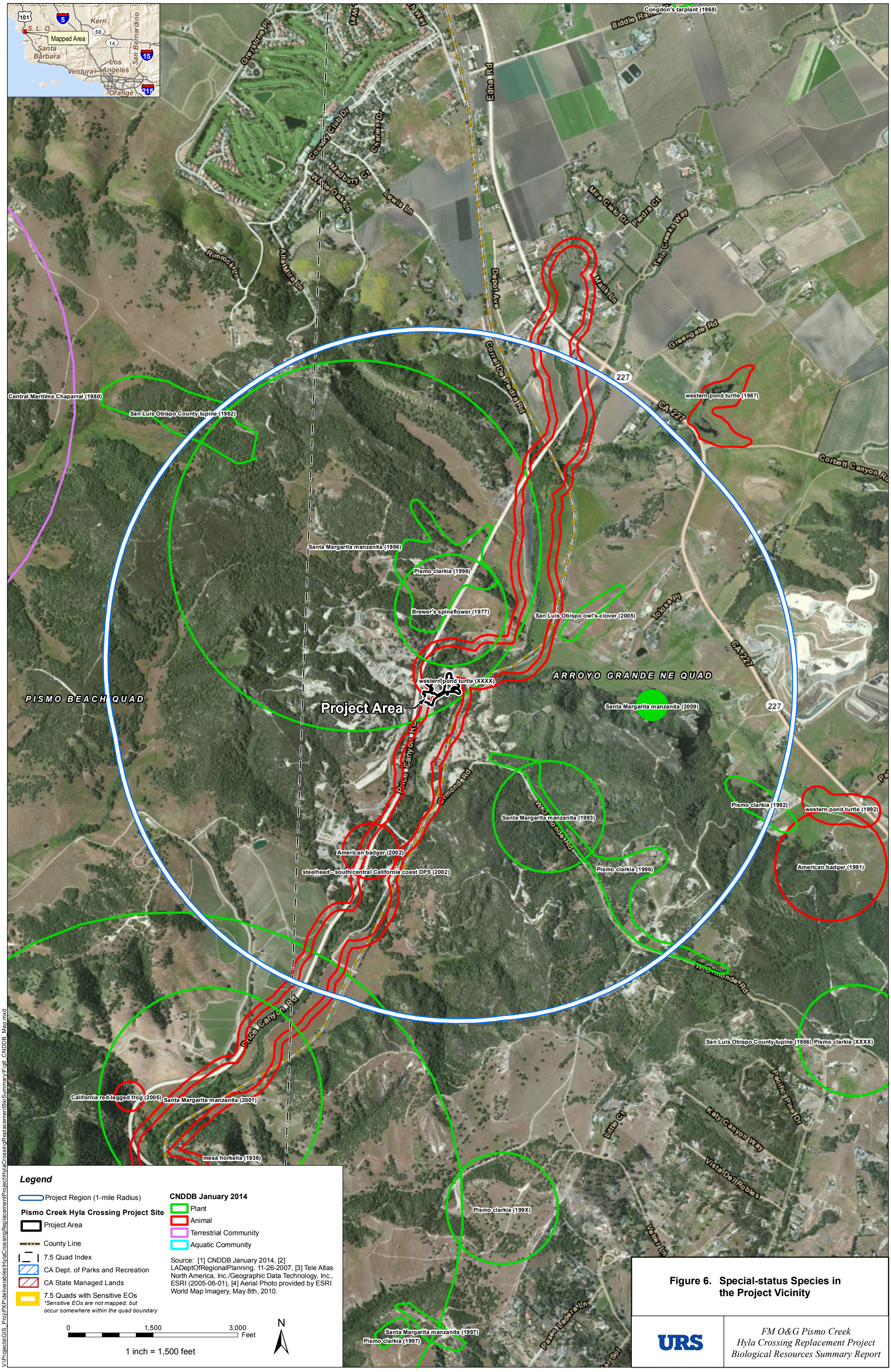

Figure 6. Special-status Species in the Project Vicinity

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Hyla Crossing Replacement Project
Biological Resources Summary Report

Figure 7. Vegetation Communities

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Hyla Crossing Replacement Project
Biological Resources Summary Report

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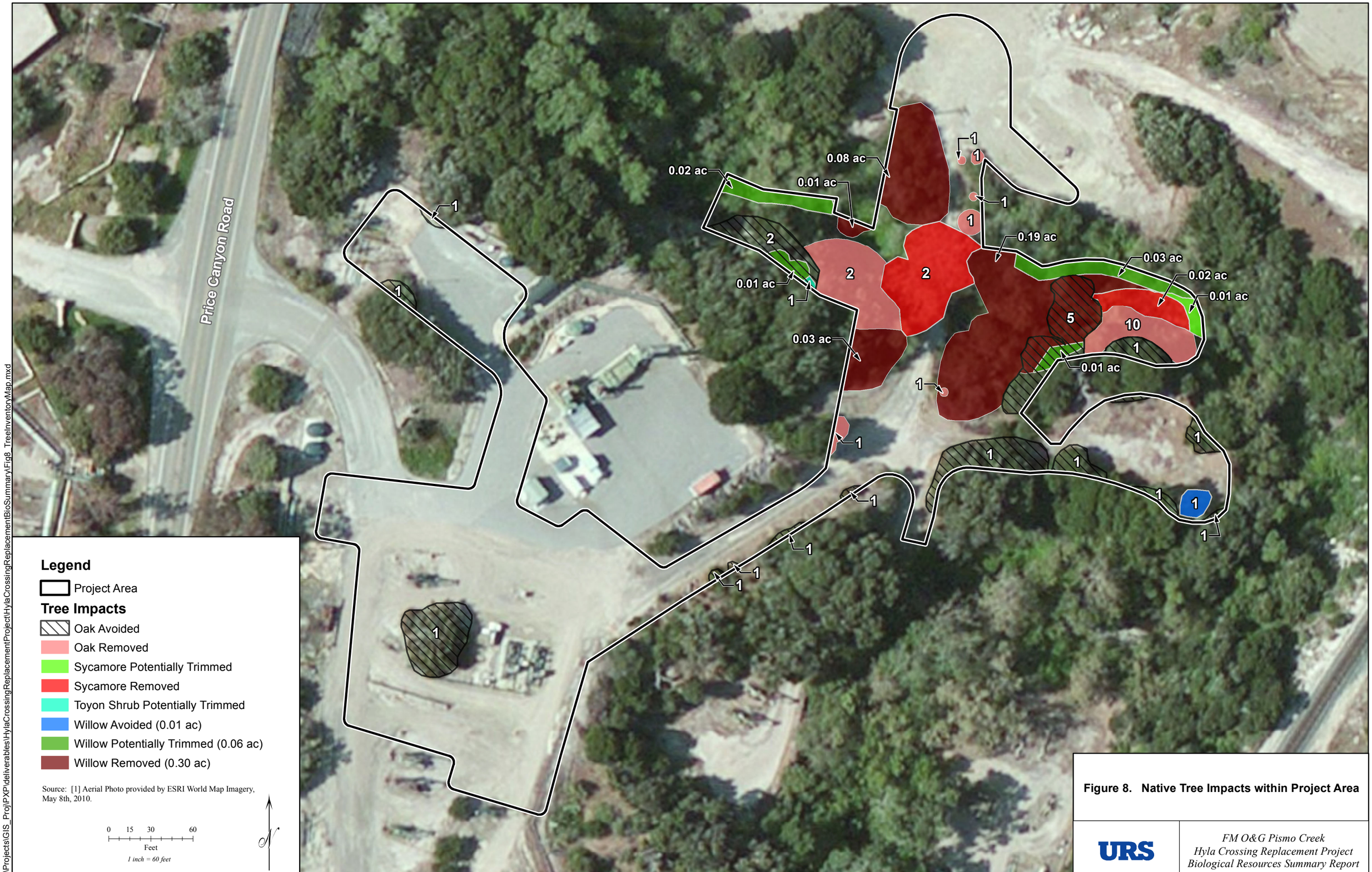

Figure 8. Native Tree Impacts within Project Area

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Hyla Crossing Replacement Project
Biological Resources Summary Report

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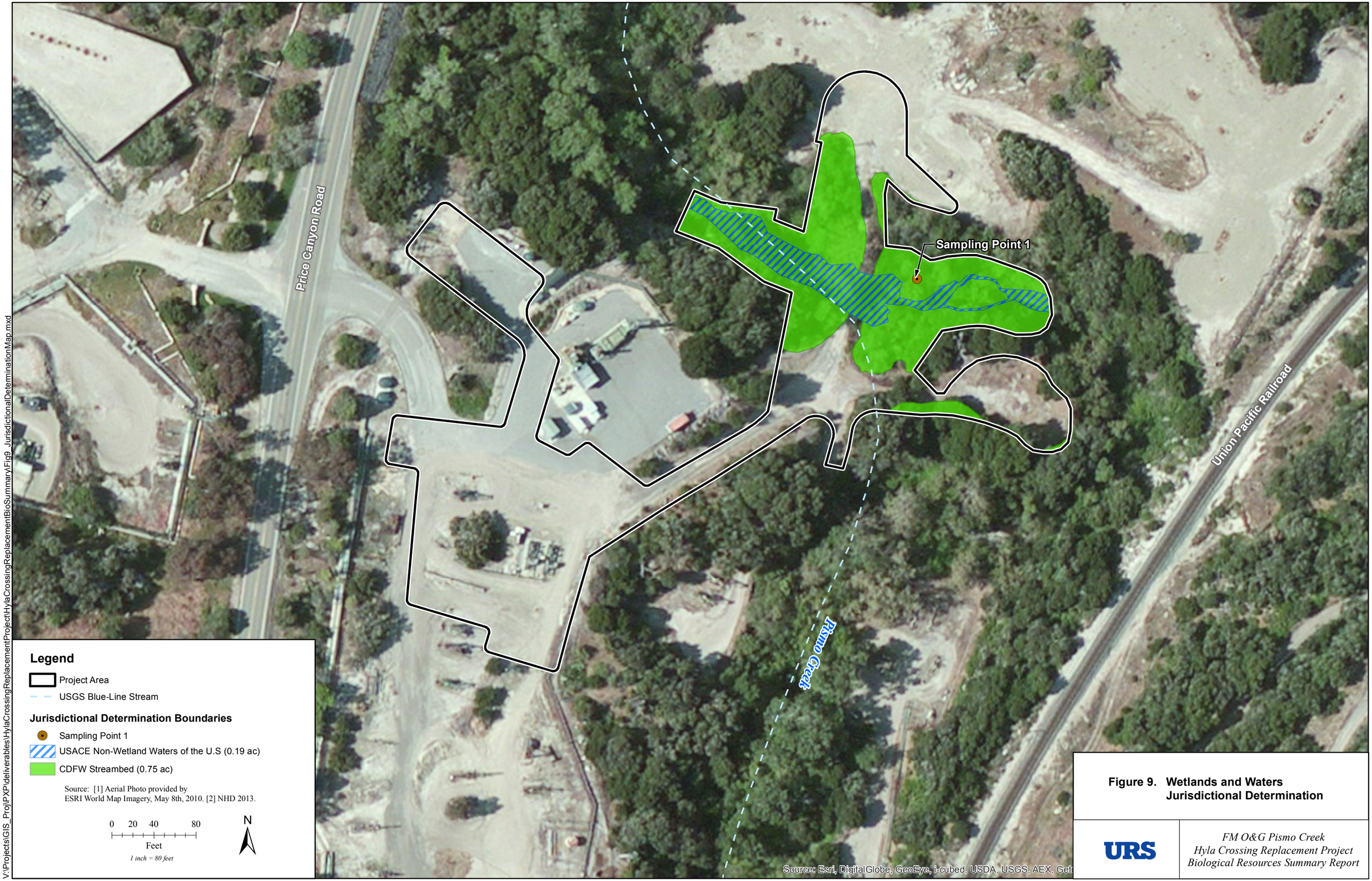

Figure 9. Wetlands and Waters Jurisdictional Determination

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Hyla Crossing Replacement Project
Biological Resources Summary Report

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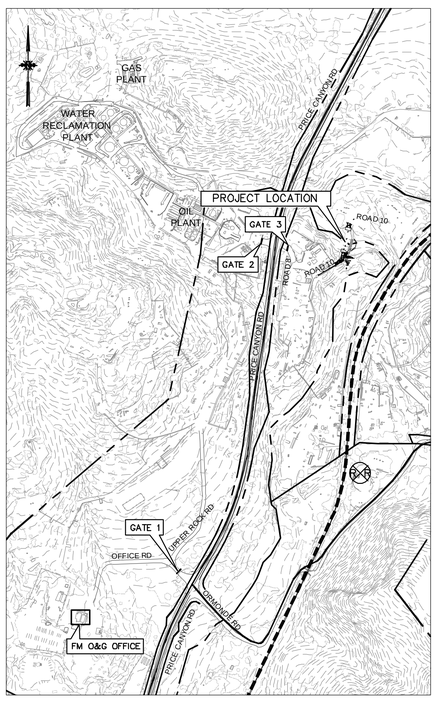
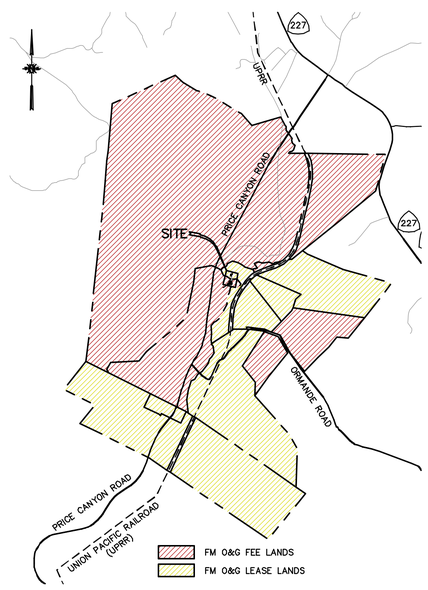
APPENDIX A
GRADING PLANS

PHASE IV DEVELOPMENT
HYLA CROSSING REPLACEMENT PROJECT
ENVIRONMENTAL PERMITTING PLANS

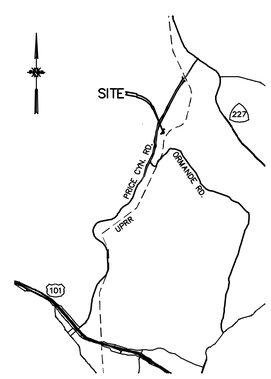
FREEPORT-MCMORAN OIL & GAS
1821 PRICE CANYON ROAD
SAN LUIS OBISPO COUNTY, CA 93401
PMT 2013-_____



SITE MAP
SCALE 1"=500'



UNIT FEE/LEASE MAP
SCALE 1"=2000'



VICINITY MAP
SCALE 1"=5000'

PROJECT DESCRIPTION

THE WORK FOR THIS PROJECT IN THESE PLANS INCLUDES:

- TREE REMOVAL AND PRUNING IN VICINITY OF NEW CROSSING
- DEWATERING OF PISMO CREEK IN THE CONSTRUCTION AREA VIA A TEMPORARY DAM AND DIVERSION PIPE
- REPLACEMENT OF THE EXISTING CROSSING WITH A 4-SPAN COMPOSITE BRIDGE ABOVE THE 100-YEAR FLOOD ELEVATION AND A PILE FOUNDATION
- INSTALLATION OF ROAD AND DRAINAGE IMPROVEMENTS TO THE NEW BRIDGE ABUTMENTS
- REMOVAL OF THE EXISTING ARIZONA CROSSING OF PISMO CREEK
- RESTORATION OF PISMO CREEK IN THE CONSTRUCTION AREA WITH (4) STEP-POOL CROSS-VANES

SHEET INDEX

SHEET NO.	REV. NO.	TITLE
1	B	TITLE SHEET
2	B	SITE PLAN
3.1	B	STREAM BYPASS NOTES AND DETAILS
3.2	B	STREAM BYPASS PLAN AND PROFILE
4	B	BRIDGE PLAN & ELEVATIONS
5	B	STREAM RESTORATION PLAN
6	B	NOTES SHEET

SITE PROTOCOL

ACCESS OUTSIDE THE IMMEDIATE OFFICE AREA IS CONTROLLED THROUGH THE OWNER'S REPRESENTATIVE. MINIMUM PERSONAL PROTECTIVE EQUIPMENT FOR ACCESS TO THE SITE IS FIRE RETARDANT CLOTHING, FIRE RETARDANT SAFETY VEST, HARD HAT, SAFETY GLASSES, AND STEEL-TOE BOOTS. INDIVIDUALS MUST CARRY OR BE ESCORTED BY AN INDIVIDUAL WITH A PERSONAL HYDROGEN SULFIDE MONITOR WHENEVER ON SITE. FURTHER SITE ACCESS CONTROLS WILL BE IMPLEMENTED AS CONSTRUCTION CONDITIONS WARRANT. SAFETY AND ENVIRONMENTAL CONDITIONS AWARENESS TRAINING CONDUCTED BY THE OWNER'S REPRESENTATIVE FOR THIS SITE IS REQUIRED PRIOR TO ACCESS TO THE PROJECT AREA.

CODE COMPLIANCE

- 2010 CALIFORNIA BUILDING CODE VOLS. 1 & 2 (2009 IBC).
- SECTIONS 4 TO 22 OF THE CALTRANS STANDARDS SPECIFICATIONS.
- SAN LUIS OBISPO COUNTY ORDINANCE(S) TITLE 19, 22, 23

CONTACT INFORMATION

OWNER: FREEPORT-MCMORAN OIL & GAS
1821 PRICE CANYON RD.
SAN LUIS OBISPO, CA 93401
(805) 547-8969 X 4911

OWNER'S REPRESENTATIVE: PAUL DELORENZO
FREEPORT-MCMORAN OIL & GAS
1821 PRICE CANYON RD.
SAN LUIS OBISPO, CA 93401
(805) 547-8969 X4911

OWNER'S PROJECT MGR: MICHELLE GIBBS
FREEPORT-MCMORAN OIL & GAS
201 S. BROADWAY
ORCUTT, CA 93455
(805) 934-8210

CIVIL ENGINEER: JOHN W. EVANS, SR., PE
CANNON
1050 SOUTHWOOD DR.
SAN LUIS OBISPO, CA 93401
(805) 544-7407

STRUCTURAL ENGINEER: MARSHALL PIHL, PE
CANNON
1050 SOUTHWOOD DR.
SAN LUIS OBISPO, CA 93401
(805) 544-7407

GEOTECHNICAL ENGINEER: JUDD KING, GE
EARTH SYSTEMS PACIFIC
4378 OLD SANTA FE ROAD
SAN LUIS OBISPO CA 93401
(805) 544-3276

PROJECT SURVEYOR: STUART SOLES, PLS
SOLES SURVEYING
442 ORCAS ST.
MORRO BAY, CA. 93442
(805) 771-8915

REGISTERED DESIGN PROFESSIONAL: CLAY S. BRADFIELD, PE
URS CORPORATION
2625 SOUTH MILLER STREET, SUITE 104
SANTA MARIA, CA 93455
(805) 361-1120

PLANNING CONSULTANT: ROBERT RAY
URS CORPORATION
130 ROBIN HILL RD. SUITE 100
SANTA BARBARA, CA 93117

SITE INFORMATION

BENCHMARK:
TOPOGRAPHIC SURVEY BY EDA ON 06-25-2007
CP-111, N 624016.346, E 1216627.42, EL 264.97,
SCRIBED X

BASIS OF BEARING:
CONTROL POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
112,	624463.18,	1216714.56,	308.24,	PK/TIN
113,	624056.46,	1216233.42,	287.86,	3/8 RB

SITE DESCRIPTION

THE SITE, 1821 PRICE CANYON ROAD, IS THE 'PISMO CANYON UNIT' OF THE ARROYO GRANDE OILFIELD OPERATED IN WHOLE BY FREEPORT-MCMORAN OIL & GAS UNDER A 'UNIT AGREEMENT' DATED JULY 23, 1986, (SLO CO. OR VOL 2861 PGS 382-442).

NUMBER	REFERENCE DRAWINGS/DOCUMENT

REV. NO.	DATE	REVISION	REV. BY	CKD. BY	APP'D	REV. NO.	DATE	REVISION	REV. BY	CKD. BY	APP'D
B	2/4/14	ISSUED FOR ENVIRONMENTAL PERMITTING	WT	PM							
A	1/9/14	ISSUED FOR REVIEW	KM	PM							

REGISTERED PROFESSIONAL ENGINEER JOHN W. EVANS JR. NO. 54105 EXP. 12/31/15 CIVIL STATE OF CALIFORNIA 2/4/14

Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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APPROVED:		DATE:	

HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
TITLE SHEET
ENVIRONMENTAL PERMITTING PLANS

Freeport-McMoRan OIL & GAS
CALIFORNIA ONSHORE

DWG NO:	SHT:	REV. NO.	SCALE:
CE130129AA0401	1	B	VARIES

ARCH D (36"x24")

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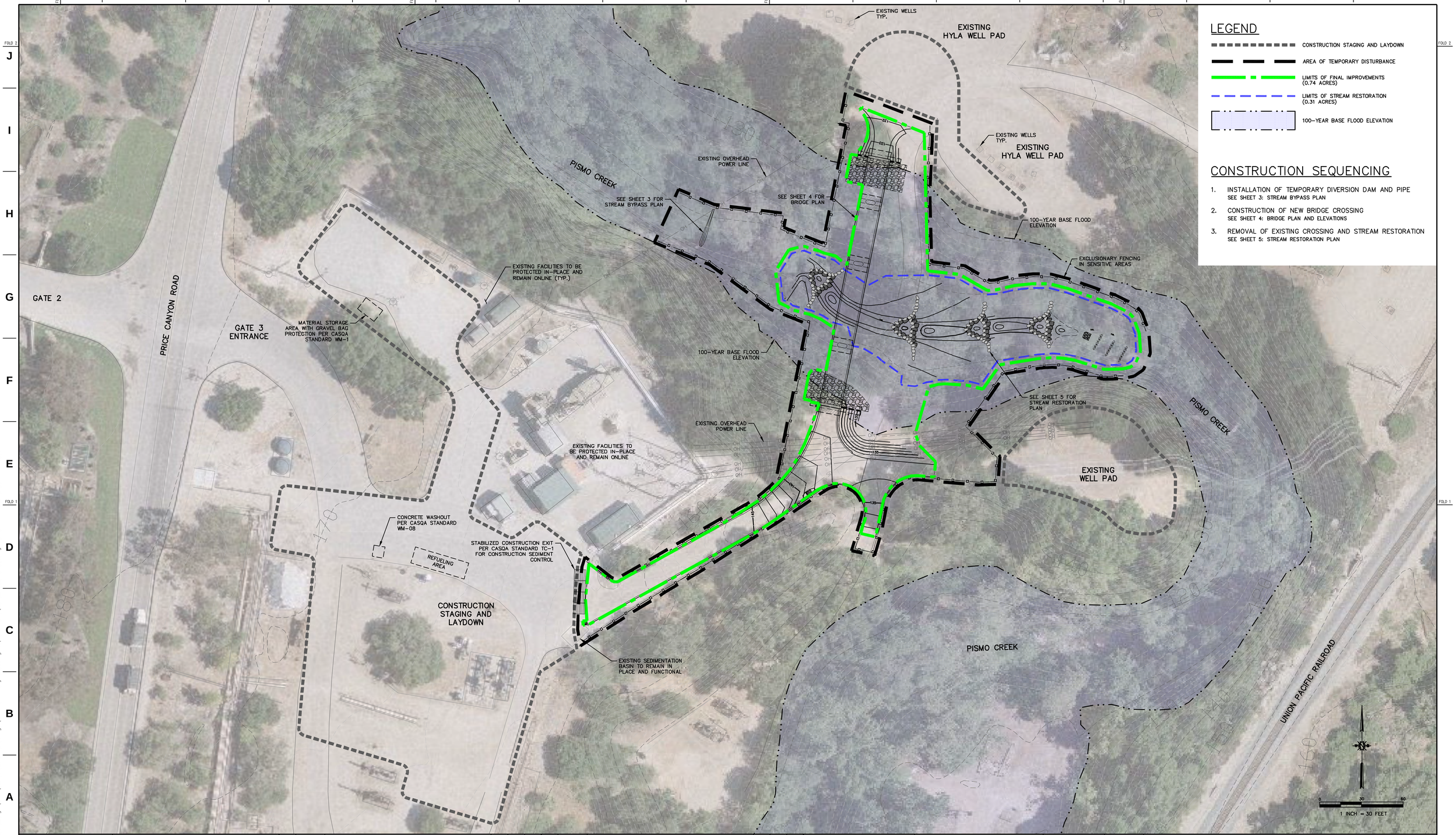

LEGEND

- CONSTRUCTION STAGING AND LAYDOWN
- AREA OF TEMPORARY DISTURBANCE
- LIMITS OF FINAL IMPROVEMENTS (0.74 ACRES)
- LIMITS OF STREAM RESTORATION (0.31 ACRES)
- 100-YEAR BASE FLOOD ELEVATION

CONSTRUCTION SEQUENCING

1. INSTALLATION OF TEMPORARY DIVERSION DAM AND PIPE
   SEE SHEET 3: STREAM BYPASS PLAN
2. CONSTRUCTION OF NEW BRIDGE CROSSING
   SEE SHEET 4: BRIDGE PLAN AND ELEVATIONS
3. REMOVAL OF EXISTING CROSSING AND STREAM RESTORATION
   SEE SHEET 5: STREAM RESTORATION PLAN

NUMBER	REFERENCE DRAWINGS/DOCUMENT	REV. NO.	DATE	REVISION	REV. BY	CKD. BY	APP'D
		B	2/4/14	ISSUED FOR ENVIRONMENTAL PERMITTING	WT	PM	
		A	1/9/14	ISSUED FOR REVIEW	KM	PM	

REV. NO.	DATE	REVISION	REV. BY	CKD. BY	APP'D

REGISTERED PROFESSIONAL ENGINEER — ANDREW EVANS — NO. 55105 — EXP. 12/31/15 — CIVIL — STATE OF CALIFORNIA — 2/4/14

Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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APPROVED:	DATE:		

HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
SITE PLAN
ENVIRONMENTAL PERMITTING PLANS

Freeport-McMoRan OIL & GAS
CALIFORNIA ONSHORE

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ARCH D (36"x24")

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STREAM DIVERSION NOTES

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE EROSION AND SEDIMENTATION PLAN PREPARED IN THE DETAILED DESIGN PHASE OF THIS PROJECT AND WITH THE SITE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND ALL AMENDMENTS THERETO.

2. ALL PROJECTS INVOLVING SITE DISTURBANCE OF ONE ACRE OR GREATER SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF CALIFORNIA'S GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES (GENERAL PERMIT) ORDER NO. 2009_0009_DWQ AS AMENDED BY ORDER NO. 2010_0014_DWQ (NPDES NO. CAS000002) ISSUED BY THE STATE WATER RESOURCES CONTROL BOARD.

3. ALL WORK SHALL COMPLY WITH APPLICABLE THE U.S. ARMY CORP OF ENGINEERS, U.S. FISH AND WILDLIFE SERVICE, NATIONAL MARINE FISHERIES SERVICE, STATE WATER QUALITY CONTROL BOARD, AND/OR CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE PERMITS.

TEMPORARY DIVERSION DAM AND BYPASS PIPE

1. PRIOR TO INSTALLATION OF DEWATERING DAM, DEWATERING OF CONSTRUCTION AREA, OR CONSTRUCTION WORK IN THE CREEK, THE BIOLOGICAL MONITOR SHALL REMOVE AND RELOCATE ALL WILDLIFE IN THE WORK AREA. PRIOR TO COMMENCEMENT OF WORK EACH DAY, THE BIOLOGICAL MONITOR SHALL CHECK FOR WILDLIFE AND REMOVE AND RELOCATE AS NECESSARY.

2. THE STREAM SHALL BE TEMPORARILY DEWATERED IN THE CONSTRUCTION AREA WITH A TEMPORARY DEWATERING DAM AND AN HDPE PLASTIC DIVERSION PIPE AS SHOWN ON THE PLANS. THE DIVERSION PIPE SHALL HAVE PERIODIC BOLTED, FLANGED, WATERTIGHT JOINTS AS SHOWN IN THE STREAM BYPASS PLAN.

3. THE DIVERSION PIPE MAY BE MOVED LATERALLY WITHIN THE STREAM CHANNEL DURING CONSTRUCTION FOR ADJUSTMENTS TO CONSTRUCTION ACTIVITIES AND PHASING.

4. THE BYPASS PIPE SHALL BE ANCHORED PER THE DETAIL SHOWN ON THIS SHEET. ANCHORS SHALL BE INSTALLED AS FREQUENTLY AS REQUIRED TO STABILIZE THE PIPE AND AVOID DISRUPTION OF FLOW DURING CONSTRUCTION.

5. THE DIVERSION PIPE MAY BE DISCONNECTED DURING THE STREAM RESTORATION PHASE AS NECESSARY TO SHAPE AND FORM THE STREAM CHANNEL AND STEP POOLS. CHECK DAMS SHALL BE EMPLOYED AT ALL TIMES DOWNSTREAM TO PREVENT TURBIDITY AND SEDIMENTATION.

6. GRAVEL BAG CHECK DAMS SHALL BE PLACED PERIODICALLY IN THE WORK ZONE AND AT THE DOWNSTREAM END OF THE RESTORATION AREA TO REDUCE AND PREVENT TURBIDITY AND SEDIMENTATION OF THE STREAM. THE CHECK DAMS SHALL BE CHECKED AND MAINTAINED REGULARLY AND SEDIMENTATION REMOVED FROM BEHIND THE DAMS SUCH THAT THEY FILTER STREAM FLOW RATHER THAN CAUSE OVERTOPPING.

7. GRAVEL BAG CHECK DAMS SHALL COMPLY WITH CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA) STANDARD SE-6. GRAVEL USED FOR GRAVEL BAGS SHALL BE EITHER 3/4-IN OR 3/8-IN CLEAN, CRUSHED ROCK AND FREE FROM CONTAMINATES.

8. LOOSE GRAVEL BERMS MAY BE USED USED IN LIEU OF GRAVEL BAG CHECK DAMS AND SHALL COMPLY WITH CASQA STANDARD SE-4. GRAVEL SHALL BE 1.5-IN NOMINAL DIAMETER, CLEAN, CRUSHED ROCK.

9. THE DEWATERING DAM SHALL BE INSTALLED AND THE CONSTRUCTION AREA DEWATERED BEFORE THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES WITHIN PISMO CREEK.

10. THE DEWATERING DAM SHALL BE DESIGNED AND INSTALLED TO ENSURE THAT THE FLOW OF PISMO CREEK DURING THE CONSTRUCTION PERIOD WILL NOT OVERTOP OR CIRCUMVENT THE DAM. IN THE EVENT THAT THE DAM FAILS, ALL CONSTRUCTION ACTIVITIES WITHIN PISMO CREEK WILL CEASE UNTIL ISSUE IS RESOLVED AND APPROPRIATE REGULATORY AGENCIES ARE CONTACTED.

11. A ROCK RIP-RAP ENERGY DISSIPATOR OR EQUIVALENT FEATURE SHALL BE INSTALLED AT THE OUTLET OF THE BYPASS PIPE AS SHOWN IN THE DETAIL ON THIS PLAN TO PREVENT EROSION AND SCOUR AT THE OUTLET. IF THE OUTLET AREA EXHIBITS EROSION AND/OR SCOUR, CONSTRUCTION ACTIVITIES WILL CEASE AND IMMEDIATE ACTION WILL BE TAKEN TO PREVENT FURTHER EROSION OR SCOUR.

12. AFTER INSTALLATION OF THE DEWATERING DAM AND LOWERING OF WATER USING THE BYPASS PIPE, REMAINING WATER WILL BE REMOVED VIA VACUUM TRUCK. NO WATER REMOVED BY VACUUM TRUCK SHALL BE RELEASED BACK INTO THE CREEK OR RIPARIAN AREA. ALL SUCH WATER SHALL BE DISPOSED OF INTO THE PMO&G WATER TREATMENT FACILITY.

13. VACUUM HOSES SHALL DRAW CREEK WATER FROM A SCREENED, PERFORATED SUMP. THE SUMP DIAMETER SHALL BE AT LEAST 12 INCHES. NOMINAL SCREEN SIZE SHALL BE 1/4-INCH.

14. WATER MAY NOT BE TRANSFERRED DOWNSTREAM BY PUMP.

DEWATERING/DIVERSION MONITORING

1. THROUGHOUT THE PERIOD OF ACTIVE DEWATERING/DIVERSION, THE PERMITTEE SHALL SUBMIT TO THE WATER BOARD WEEKLY MONITORING AND MAINTENANCE REPORTS. THE FIRST REPORT IS DUE THE FIRST WEDNESDAY* AFTER THE DEWATERING/DIVERSION PLAN COMMENCES. THE LAST REPORT IS DUE AFTER THE DEWATERING/DIVERSION PLANS ARE COMPLETED AND THE AREAS IMPACTED BY THE DEWATERING/DIVERSION ARE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER. DUE EACH WEDNESDAY, THE REPORTS MUST INCLUDE:

   A. TIME, DATE AND LOCATION OF DEWATERING/DIVERSION AND LOCATION OF DISCHARGE(S).
   B. SUMMARY OF DAILY VISUAL MONITORING AND SETTLEABLE SOLIDS OR TURBIDITY MONITORING DATA;
   C. ESTIMATED VOLUME OF DEWATERING/DIVERSION DISCHARGES;
   D. PHOTOGRAPHS;
   E. MAPS;
   F. IF MONITORING RESULTS INDICATE NONCOMPLIANCE WITH CRITERIA DESCRIBED BELOW, THEN FOLLOW-UP SAMPLING OF RECEIVING WATER MUST BE IMPLEMENTED AND REPORTS SHALL INCLUDE CORRECTIVE ACTIONS TO PREVENT EROSION AND SEDIMENT RUNOFF AND A CORRESPONDING SCHEDULE FOR IMPLEMENTATION.

2. THE PERMITTEE SHALL CONDUCT DAILY MONITORING AND RECORD KEEPING DOCUMENTING OF THE DEWATERING/DIVERSION ACTIVITIES AND CONTROL MEASURES USED IN THE PROCESS.

   A. THE MONITORING MUST DOCUMENT ESTIMATED VOLUME OF DIVERSION/DEWATERING DISCHARGES AND VISIBLE WATER CHARACTERISTICS (E.G., VISIBLE TURBIDITY, SEDIMENTATION, AND/OR EROSION) DURING DEWATERING/DIVERSION IMPLEMENTATION.
   B. IF MONITORING RESULTS INDICATE FURTHER RUN-OFF OR EROSION OF SEDIMENTS, SITE PERSONNEL MUST TAKE IMMEDIATE ACTION TO PREVENT ADVERSE IMPACTS TO THE WATER BODY AND NOTIFY THE WATER BOARD BY TELEPHONE/FAX AS SOON AS PRACTICABLE, BUT NO LATER THAN WITHIN 24 HOURS.

3. PRIOR TO IMPLEMENTATION OF THE DEWATERING/DIVERSION PLAN, THE PERMITTEE MUST CONDUCT BASELINE MONITORING TO DETERMINE NATURAL SETTLEABLE SOLIDS OR TURBIDITY LEVELS AT THE PROPOSED PROJECT SITE. THE PERMITTEE MUST THEN DETERMINE IF HE/SHE WILL BE MONITORING AND REPORTING ON SETTLEABLE SOLIDS OR TURBIDITY DURING THE PERIOD ACTIVE DIVERSION/DEWATERING.

4. REPRESENTATIVE SAMPLES OF CONSTRUCTION DEWATERING DISCHARGES SHALL BE COLLECTED AND ANALYZED FOR SETTLEABLE SOLIDS OR TURBIDITY DAILY WHILE DEWATERING DISCHARGES CONTINUE. SAMPLE RESULTS SHOULD BE COMPARED WITH A WATER QUALITY GOALS OF 3 ML/L FOR SETTLEABLE SOLIDS OR < 110 NTUs TURBIDITY UNITS**. THE WATER QUALITY OBJECTIVES DESCRIBED ARE FOR RECEIVING WATERS. THIS MEANS THAT COMPLIANCE WITH THE OBJECTIVES ARE MEASURED IN THE RECEIVING WATER RATHER THAN THE DISCHARGE.

NOTES:

* THE FIRST REPORT IS DUE THE FIRST WEDNESDAY AFTER THE DEWATERING/DIVERSION PLAN COMMENCES. THE LAST REPORT IS DUE AFTER THE DEWATERING/DIVERSION PLANS ARE COMPLETED AND THE AREAS IMPACTED BY THE DEWATERING/DIVERSION ARE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER.

** WHERE NATURAL TURBIDITY IS BETWEEN 0 AND 50 NEPHELOMETRIC TURBIDITY UNITS (NTU), INCREASES SHALL NOT EXCEED 20 PERCENT. WHERE NATURAL TURBIDITY IS BETWEEN 50 AND 100 NTU, INCREASES SHALL NOT EXCEED 10 NTU. WHERE NATURAL TURBIDITY IS GREATER THAN 100 NTU, INCREASES SHALL NOT EXCEED 10 PERCENT.

DESIGN CAPACITY AND CONTINGENCY PLAN

1. DIVERSION DAM LOW-FLOW CREEK DESIGN FLOW: 0.1 CFS*
   BYPASS PIPE CAPACITY WITH 1-FT, OF FREEBOARD AT DAM: 4.4 CFS
   BYPASS PIPE CAPACITY AT OVERTOPPING OF DAM: 4.6 CFS

   *THIS VALUE IS BASED ON AN UPSTREAM FLOW GAUGE

2. THE RISK OF RECEIVING HIGHER THAN ANTICIPATED FLOWS FOR THIS PROJECT SCHEDULE ARE LOW. CONSTRUCTION WILL OCCUR DURING THE DRY SEASON WHEN HISTORICAL CREEK FLOW LEVELS ARE AT A MINIMUM.

3. IF THE FLOW OF THE CREEK INCREASES BEYOND THE NORMAL LOW-FLOW, THE DAM SHALL BE ALLOWED TO OVERFLOW. CHECK DAMS SHALL REMAIN IN-PLACE AND THE DIVERSION PIPE BRACED AGAINST MOVEMENT AND FLOATING. THE CONSTRUCTION SITE SHALL BE PREPARED FOR THE OVERFLOW SUCH AS REMOVAL OF TOOLS, EQUIPMENT, AND MATERIALS FROM THE CREEK CHANNEL AND CLEANUP OF CONSTRUCTION DEBRIS.

4. IF A LARGE STORM OR FLOW EVENT IS ANTICIPATED, ADDITIONAL SANDBAGS SHALL BE KEPT ON-HAND TO BUTTRESS THE DEWATERING DAM. ADDITIONAL GRAVEL BAGS SHALL BE KEPT ON-HAND TO INCREASE EITHER WIDTH OR HEIGHT OF OR MAKE REPAIRS TO THE CHECK DAMS.

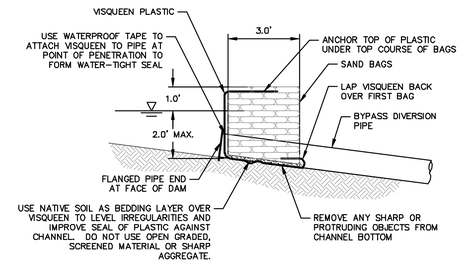
DIVERSION INTAKE REMOVAL PLAN

1. THE DIVERSION DAM SHALL BE REMOVED FOLLOWING CONSTRUCTION. THE CONTRACTOR SHALL EMPLOY MEANS AND METHODS SUITABLE FOR REDUCING SEDIMENTATION OF WATER.

3. CONTRACTOR SHALL REMOVE ANY BUILDUP OF BEDLOAD IN FRONT OF THE DIVERSION DAM AND CHECK DAMS PRIOR TO THEIR REMOVAL.

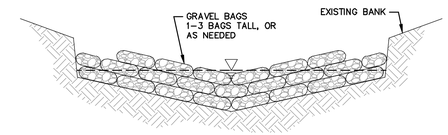
4. ONE OR MORE CHECK DAMS SHALL BE IN-PLACE DOWNSTREAM OF THE BYPASS PIPE OUTLET UPON REMOVAL OF ANY BEDLOAD FROM BEHIND THE DAM.

5. IF TURBIDITY OR SEDIMENTATION NEEDS TO BE FURTHER REDUCED, ADDITIONAL CHECK DAMS SHALL BE INSTALLED OR A FILTER TEMPORARILY INSTALLED OVER THE INLET OF THE BYPASS PIPE.

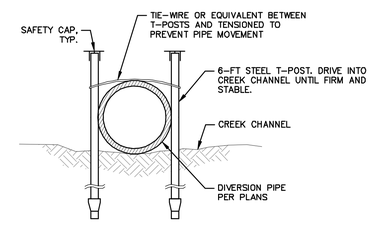


NOTE:
CONTRACTOR SHALL INSPECT DAM DAILY TO VERIFY WATER IS NOT SEEPING UNDER THE DAM AND DAYLIGHTING THE SURFACE. IF WATER IS DAYLIGHTING OR DAM IS LEAKING, THE CONTRACTOR SHALL MAKE THE APPROPRIATE REPAIRS OR IMPROVEMENTS.

DIVERSION DAM DETAIL (A)
N.T.S.



GRAVEL CHECK DAM DETAIL (B)
N.T.S.



NOTE:
POSTS SHALL BE COMPLETELY REMOVED FOLLOWING CONSTRUCTION.

TYP. BYPASS PIPE ANCHOR (C)
N.T.S.

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REGISTERED PROFESSIONAL ENGINEER — PATRICK M. EVANS — NO. 54105 — EXP. 12/31/15 — CIVIL — STATE OF CALIFORNIA — 2/4/14

Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
STREAM BYPASS NOTES AND DETAILS
ENVIRONMENTAL PERMITTING PLANS

Freeport-McMoRan OIL & GAS
CALIFORNIA ONSHORE

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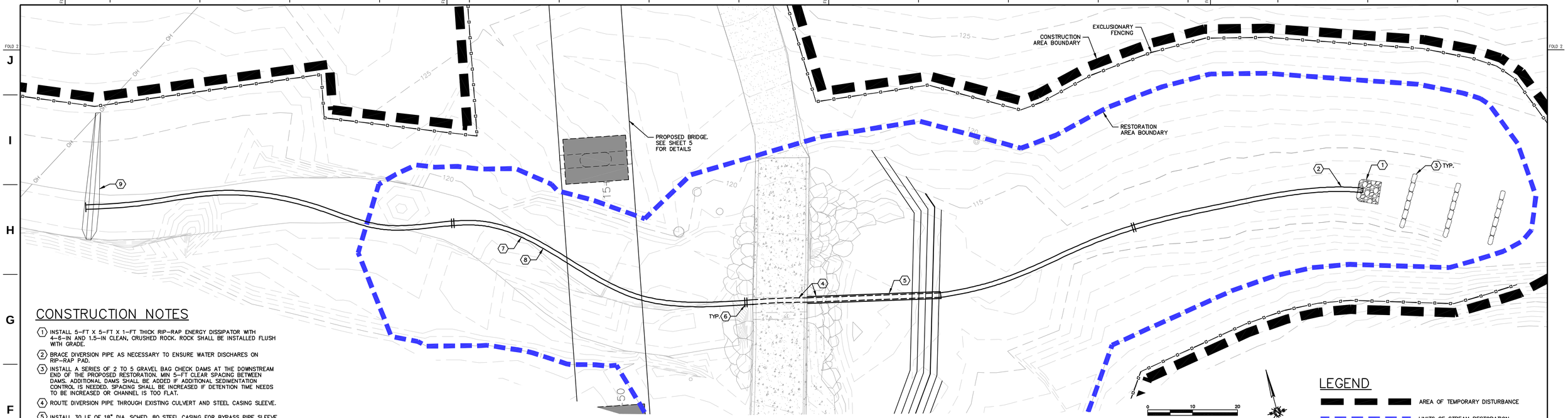


PLAN

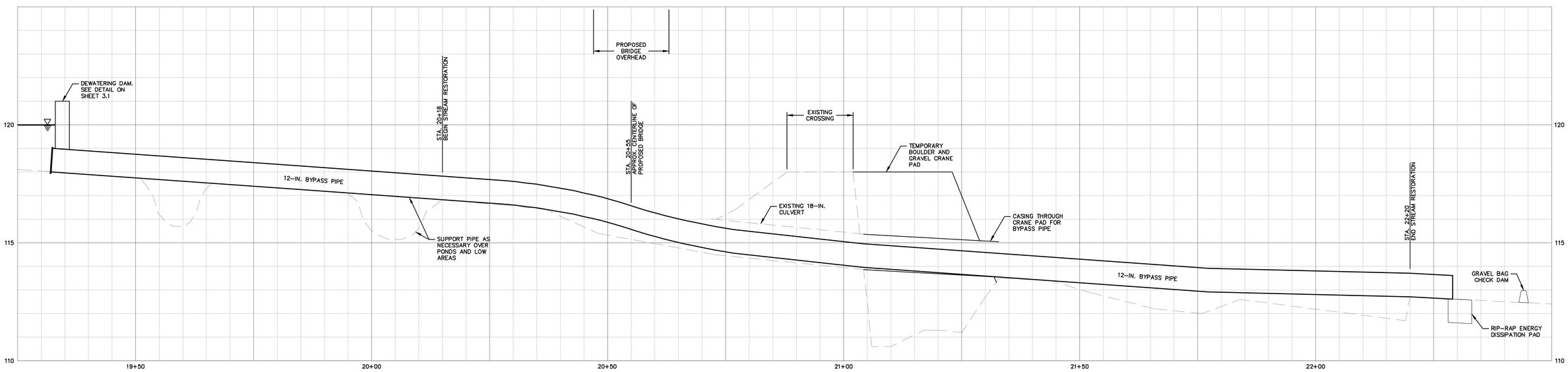
SCALE: 1"=10'

CONSTRUCTION NOTES

1. INSTALL 5-FT X 5-FT X 1-FT THICK RIP-RAP ENERGY DISSIPATOR WITH 4-6-IN AND 1.5-IN CLEAN, CRUSHED ROCK. ROCK SHALL BE INSTALLED FLUSH WITH GRADE.
2. BRACE DIVERSION PIPE AS NECESSARY TO ENSURE WATER DISCHARES ON RIP-RAP PAD.
3. INSTALL A SERIES OF 2 TO 5 GRAVEL BAG CHECK DAMS AT THE DOWNSTREAM END OF THE PROPOSED RESTORATION. MIN 5-FT CLEAR SPACING BETWEEN DAMS. ADDITIONAL DAMS SHALL BE ADDED IF ADDITIONAL SEDIMENTATION CONTROL IS NEEDED. SPACING SHALL BE INCREASED IF DETENTION TIME NEEDS TO BE INCREASED OR CHANNEL IS TOO FLAT.
4. ROUTE DIVERSION PIPE THROUGH EXISTING CULVERT AND STEEL CASING SLEEVE.
5. INSTALL 30 LF OF 18" DIA. SCHED. 80 STEEL CASING FOR BYPASS PIPE SLEEVE THROUGH CRANE PAD.
6. BOLTED, FLANGED, WATERTIGHT CONNECTION FOR HANDLING OF PIPE AND FLEXIBILITY OF CONFIGURATION DURING EACH CONSTRUCTION PHASE, TYP. USE BROWN RUBBER GASKET FOR WATERTIGHT JOINT.
7. TEMPORARY 12" FUSED HDPE, DR 17, DIVERSION PIPE.
8. LOCATION AND ELEVATION OF PIPE TO BE DETERMINED BASED ON ACTUAL TERRAIN AND CONSTRUCTION PHASING.
9. TEMPORARY DEWATERING DIVERSION DAM, SEE DETAIL A, SHEET 3.1.

LEGEND

- AREA OF TEMPORARY DISTURBANCE
- LIMITS OF STREAM RESTORATION
- EXCLUSIONARY FENCING



PROFILE

SCALE – HORIZ: 1"=10' VERT: 1"=2'

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Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
STREAM BYPASS PLAN AND PROFILE
ENVIRONMENTAL PERMITTING PLANS

Freeport-McMoRan OIL & GAS
CALIFORNIA ONSHORE

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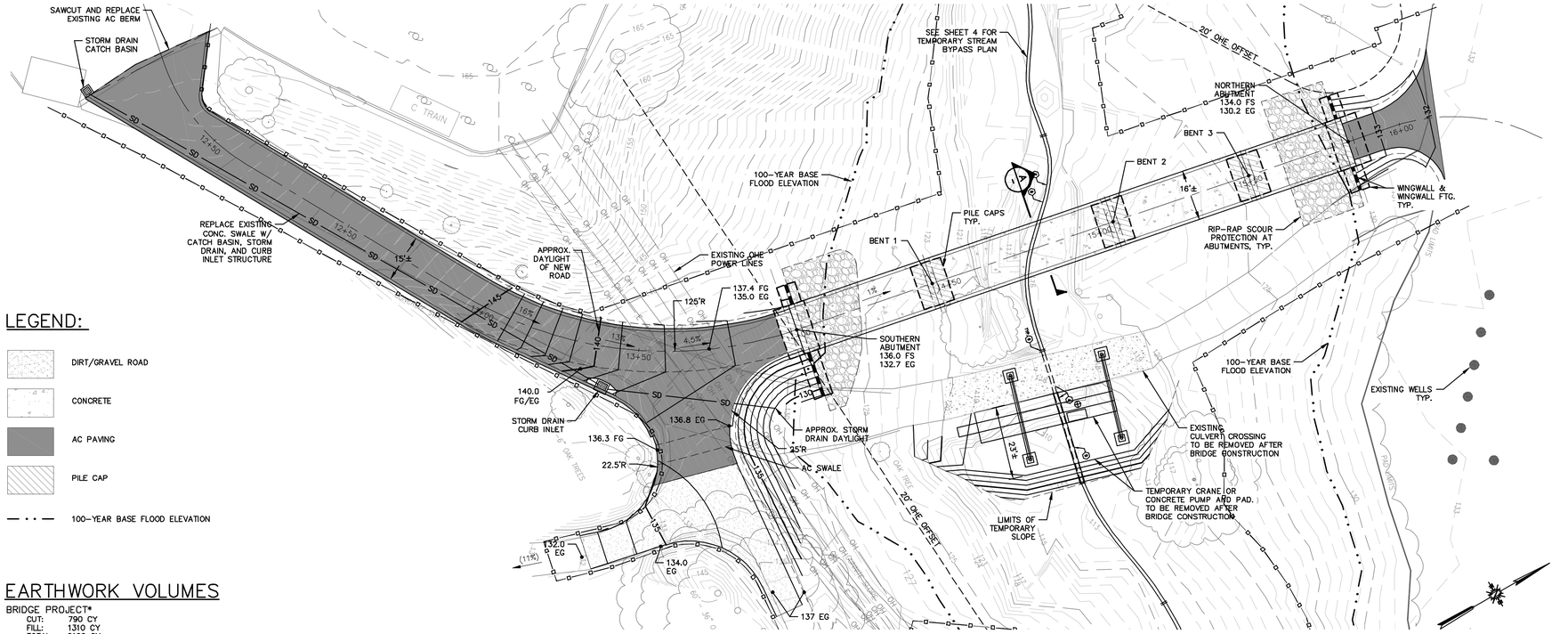


HYLA BRIDGE – PLAN VIEW

LEGEND:

- DIRT/GRAVEL ROAD
- CONCRETE
- AC PAVING
- PILE CAP
- 100-YEAR BASE FLOOD ELEVATION

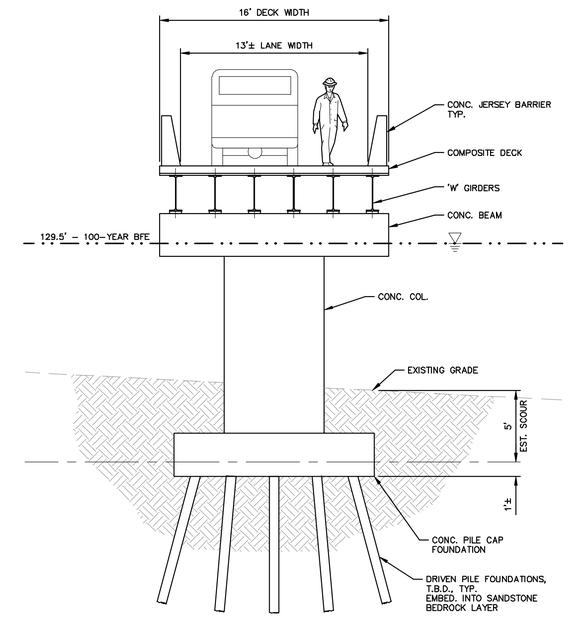
EARTHWORK VOLUMES

BRIDGE PROJECT*
CUT: 790 CY
FILL: 1310 CY
TOTAL: 2100 CY

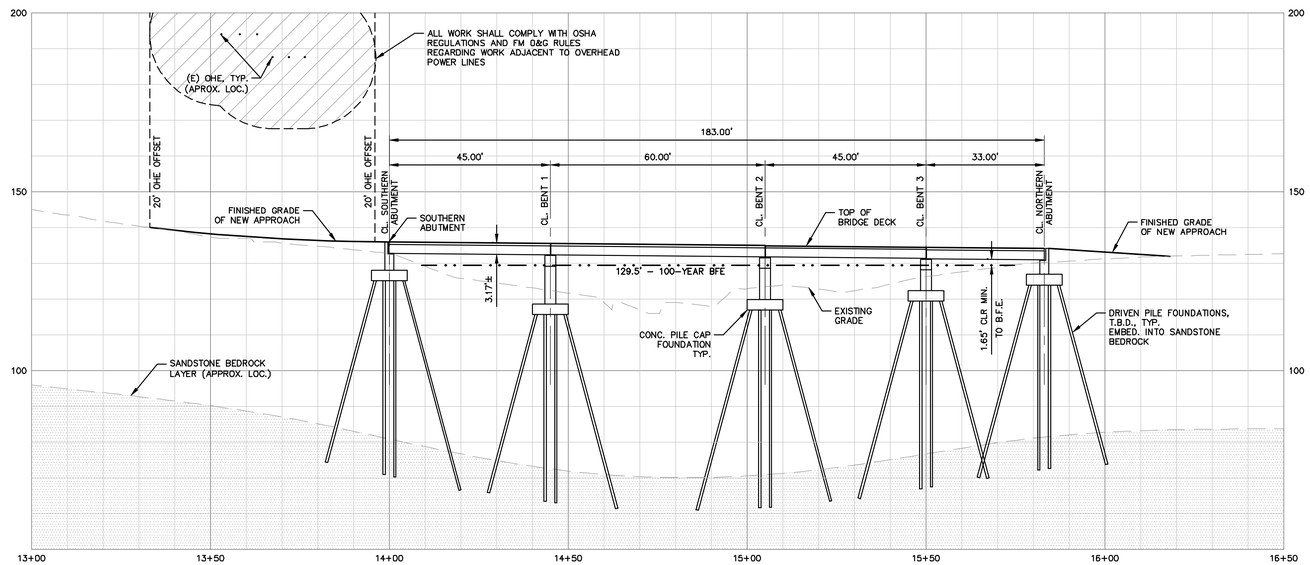
STREAM RESTORATION*
CUT: 280 CY
FILL: 370 CY
TOTAL: 650 CY

TOTALS*
CUT: 1070 CY
FILL: 1680 CY
TOTAL: 2750 CY

*NOTE: THE QUANTITIES SHOWN ARE FOR PERMITTING USE ONLY. THE VOLUMES ARE THE DIFFERENCE BETWEEN EXISTING GRADE AND PROPOSED FINISHED GRADE. THESE QUANTITIES DO NOT INCLUDE ALLOWANCES FOR SHRINKAGE, CONSOLIDATION, LOSSES DUE TO CLEARING OPERATIONS, FINISHED SURFACE/GRADE HOLD DOWNS, OVER-EXCAVATION, OR FACTORS FOR GRADING MEANS AND METHODS. A SEPARATE GRADING PERMIT IS REQUIRED FOR ANY EXPORT RECEIVING SITE.



TYPICAL BRIDGE SECTION (A)
N.T.S.



HYLA BRIDGE – PROFILE VIEW

SCALE HORIZ 1"=20'; VERT 1"=20'

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Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

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HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
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CALIFORNIA ONSHORE

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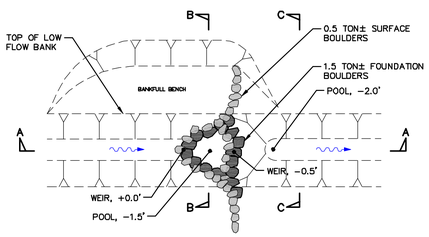
CONSTRUCTION NOTES

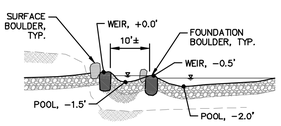
1. SEE DETAIL A, THIS SHEET, FOR TYPICAL CROSS-VANE STEP-POOL STRUCTURE (TYP. 4).
2. REMOVE EXISTING PAVING AND DISPOSE OFF-SITE.
3. STUMPS TO REMAIN AS DETERMINED BY BIOLOGIST AT TIME OF RESTORATION WORK (TYP. 3).
4. INSTALL BANKFULL BENCH PER DETAIL A, THIS SHEET.
5. APPROXIMATE LIMITS OF STREAM RESTORATION.
6. REMOVE EXISTING CREEK CROSSING CONCRETE AND CULVERTS.
7. REMOVE EXISTING RIP-RAP, TYP. REUSE ROCK AS DIRECTED BY BIOLOGIST.
8. STOCKPILE EXCAVATED STREAMBED AND STREAMBANK SOIL SEPARATELY FOR REUSE AS SUBGRADE FILL MATERIAL.
9. REUSE EXISTING BOULDERS FROM EXISTING CROSSING AND BOULDERS FROM TEMPORARY CRANE PAD FOR CROSS-VANE STEP POOLS.
10. SEE SHEET 4 FOR BRIDGE PLAN.
11. LIMITS OF TEMPORARY DISTURBANCE. SEE SITE PLAN ON SHEET 2 FOR FULL EXTENTS. EXCLUSIONARY CONSTRUCTION FENCE TO BE INSTALLED ALONG THIS BOUNDARY.
12. PILE CAP TO BE BURIED BELOW GRADE FOR SCOUR PROTECTION. MATCH EXISTING GRADE.
13. PLANTINGS WITHIN STREAM RESTORATION AREA PER OTHERS.
14. INSTALL A SERIES OF GRAVEL BAG CHECK DAMS PER CASQA STANDARD SE-4 TO PREVENT SEDIMENTATION OF DOWNSTREAM WATERS. HEIGHT AND SPACING TO BE DETERMINED IN FIELD BASED ON TERRAIN AND FLOW LEVEL OF STREAM.

GENERAL NOTES

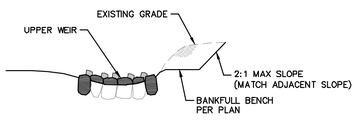
THIS STREAM RESTORATION PLAN IS BASED ON THE TECHNICAL MEMORANDUM BY URS CORPORATION ENTITLED, "CONCEPTUAL DESIGN FOR CHANNEL RESTORATION WITHIN PISMO CREEK AT THE HYLA CROSSING, SAN LUIS OBISPO COUNTY, CALIFORNIA," DATED JUNE 24, 2013.



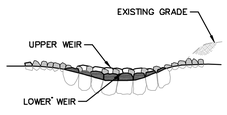
PLAN VIEW



SECTION A – PROFILE VIEW



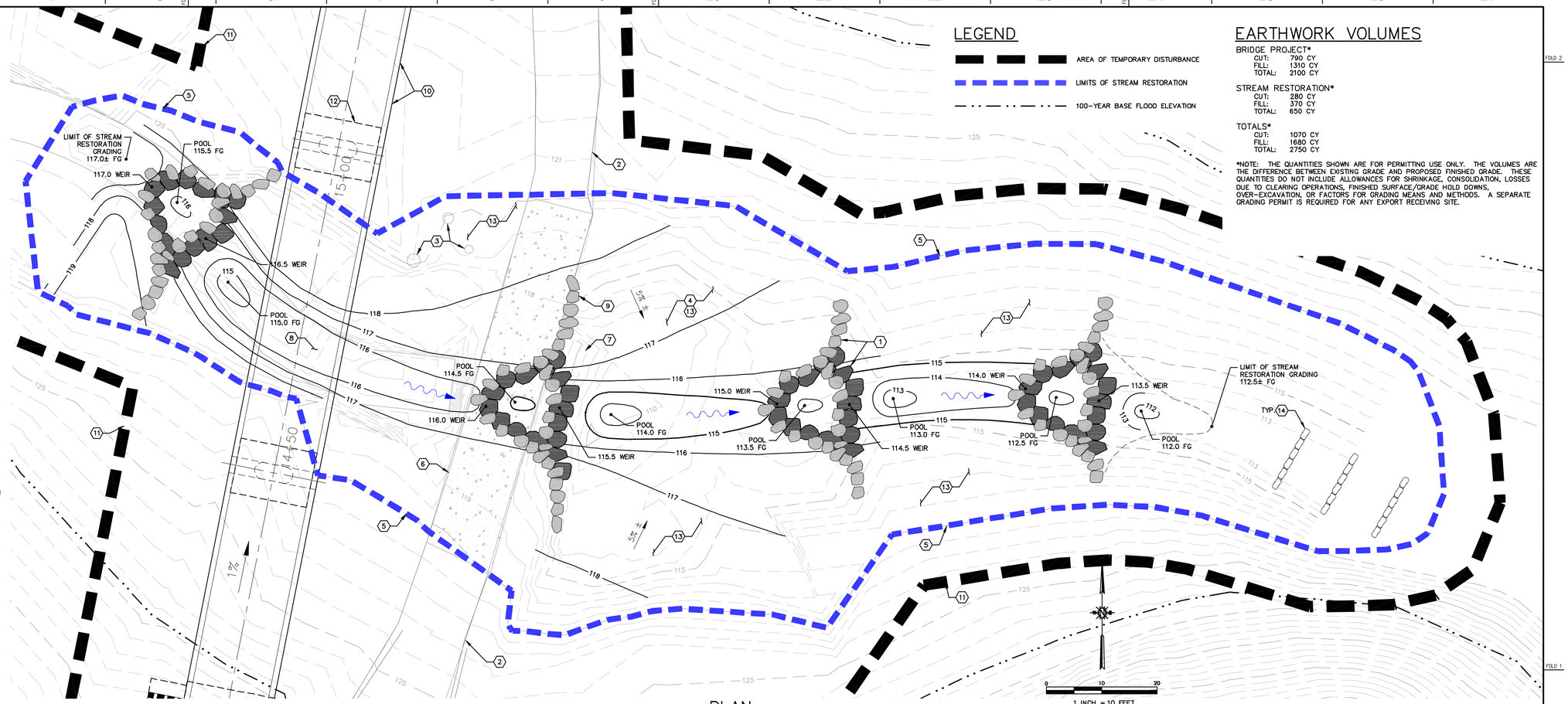
SECTION B – UPPER POOL



SECTION C – LOWER POOL

CROSS VANE STEP-POOL DETAIL (A)

N.T.S.



PLAN

LEGEND

- AREA OF TEMPORARY DISTURBANCE
- LIMITS OF STREAM RESTORATION
- 100-YEAR BASE FLOOD ELEVATION

EARTHWORK VOLUMES

BRIDGE PROJECT*

CUT:	790 CY
FILL:	1310 CY
TOTAL:	2100 CY

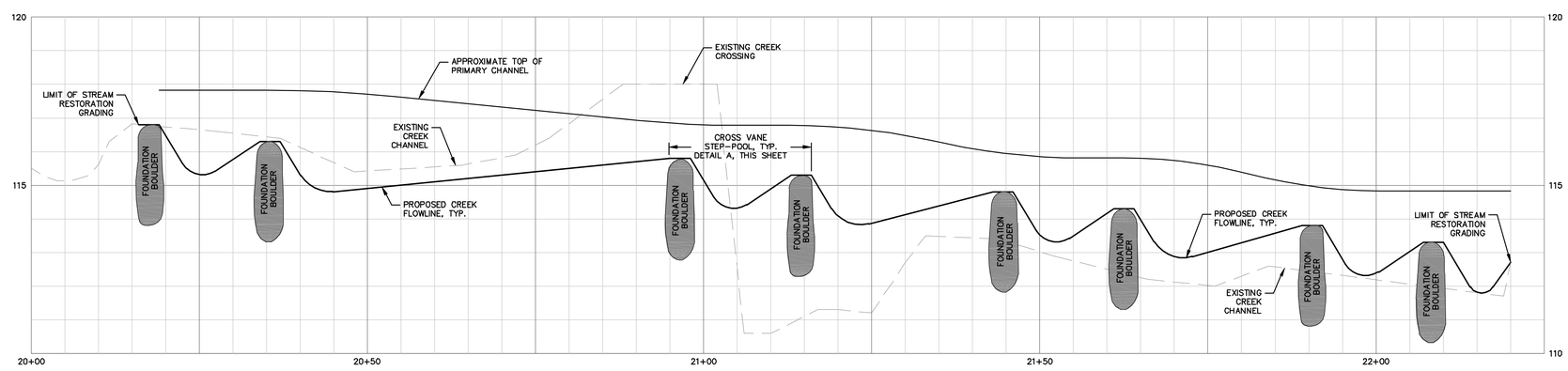
STREAM RESTORATION*

CUT:	280 CY
FILL:	370 CY
TOTAL:	650 CY

TOTALS*

CUT:	1070 CY
FILL:	1680 CY
TOTAL:	2750 CY

*NOTE: THE QUANTITIES SHOWN ARE FOR PERMITTING USE ONLY. THE VOLUMES ARE THE DIFFERENCE BETWEEN EXISTING GRADE AND PROPOSED FINISHED GRADE. THESE QUANTITIES DO NOT INCLUDE ALLOWANCES FOR SHRINKAGE, CONSOLIDATION, LOSSES DUE TO CLEARING OPERATIONS, FINISHED SURFACE/GRADE HOLD DOWNS, OVER-EXCAVATION, OR FACTORS FOR GRADING MEANS AND METHODS. A SEPARATE GRADING PERMIT IS REQUIRED FOR ANY EXPORT RECEIVING SITE.



PROFILE VIEW

SCALE HORIZ 1"=10'; VERT 1"=5'

NUMBER	REFERENCE DRAWINGS/DOCUMENT

REV. NO.	DATE	REVISION	REV. BY	CKD. BY	APP'D
B	2/4/14	ISSUED FOR ENVIRONMENTAL PERMITTING	WT	PM	
A	1/9/14	ISSUED FOR REVIEW	KM	PM	

REGISTERED PROFESSIONAL ENGINEER — JOHN EVANS — NO. 54105 — EXP. 12/31/15 — CIVIL — STATE OF CALIFORNIA — 2/4/14

Cannon
1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

DRAWN BY: LM	DATE: 11/6/13	
DESIGN: PM	DATE: 11/6/13	
CHECK:	DATE:	
ENGINEER:	DATE:	
APPROVED:	DATE:	
APPROVED:	DATE:	
APPROVED:	DATE:	

HYLA CROSSING REPLACEMENT PROJECT
ARROYO GRANDE FIELD
STREAM RESTORATION PLAN & PROFILE
ENVIRONMENTAL PERMITTING PLANS

Freeport-McMoRan OIL & GAS
CALIFORNIA ONSHORE

DWG NO:	SHT:	REV. NO.	SCALE:
CE130129SR0405	5	B	VARIES

ARCH D (36"x24")

F:\pro\2013\130129\3 Project Design\Civil\Construction Drawings\04 Preliminary Crossing Replacement\CE130129SR0405.dwg 2-06-14 11:39:33 AM PeteM

GRADING SPECIFICATIONS

1. A SOILS INVESTIGATION HAS BEEN PERFORMED FOR THIS SITE, AND A FEASIBILITY REPORT AS BEEN WRITTEN ENTITLED, "GEOTECHNICAL ENGINEERING FEASIBILITY REPORT, FREEPORT-MCMORAN OIL & GAS, HYLA VEHICULAR BRIDGE OVER PISMO CREEK, 1821 PRICE CANYON ROAD, SAN LUIS OBISPO COUNTY, CA," DATED OCTOBER 31, 2013 BY EARTH SYSTEMS PACIFIC. A SOILS REPORT IS NOT YET AVAILABLE. ALL GRADING SHALL CONFORM TO THE 2013 CALIFORNIA BUILDING CODE AND THE SAN LUIS OBISPO COUNTY LAND USE ORDINANCE. FINAL PLANS SHALL BE BASED ON THE RECOMMENDATIONS OF AND BE REVIEWED BY THE GEOTECHNICAL ENGINEER. THE PROJECT SOILS REPORT SHALL BE SUBMITTED FOR REVIEW AND ACCEPTANCE WITH THE CONSTRUCTION PERMIT PLANS.

2. THIS PROJECT IS LOCATED IN AN AREA KNOWN FOR SHALLOW GROUNDWATER AND SOFT, YIELDING SOIL CONDITIONS REQUIRING SUBSURFACE STABILIZATION. IF THESE CONDITIONS ARE ENCOUNTERED DURING GRADING, THE CONTRACTOR SHALL CONTACT THE GEOTECHNICAL ENGINEER.

3. AREAS TO BE GRADED SHALL BE CLEARED OF ALL VEGETATION, INCLUDING ROOTS, OVERSIZED ROCKS, PAVEMENT, AND OTHER OBJECTIONABLE MATERIAL UNSUITABLE FOR STRUCTURAL FILL.

4. ALL UNSUITABLE SOIL MATERIAL, RUBBISH, AND DEBRIS RESULTING FROM GRADING OPERATIONS SHALL BE REMOVED FROM THE JOB SITE AND DISPOSED.

5. PRIOR TO PLACEMENT OF FILL MATERIAL, THE PREPARED AREA SHALL BE INSPECTED AND APPROVED BY THE ENGINEER OF RECORD AND THE GEOTECHNICAL ENGINEER.

6. OVEREXCAVATION AND RECOMPACTION SHALL BE PERFORMED UNDER THE OBSERVATION OF THE GEOTECHNICAL ENGINEER.

7. SURFACE DRAINAGE SHALL NOT BE LESS THAN 2% FOR NON-PAVED SURFACES UNLESS OTHERWISE NOTED ON THE PLANS. POSITIVE DRAINAGE SHALL BE MAINTAINED AWAY FROM ALL STRUCTURES AND SLOPES.

8. FOR FILL MATERIAL PLACED ON SLOPES STEEPER THAN 5H:1V, THE FILL SHALL BE KEYED AND BENCHED INTO THE SLOPE. THE BENCH KEY SHALL BE CENTERED ON THE TOE OF SLOPE AND EXTEND A MINIMUM OF 2 FEET BELOW EXISTING GROUND SURFACE OR FINISHED GRADE, WHICHEVER IS DEEPER, OR INTO RELATIVELY FIRM MATERIAL AS APPROVED BY THE GEOTECHNICAL ENGINEER. THE BENCH KEY SHALL BE AT LEAST 10 FEET WIDE AND SLOPED AT 2 PERCENT INTO THE HILLSIDE. THE KEYING AND BENCHING SHALL REMOVE THE UPPER 2 FEET OF THE EXISTING SOILS OR EXTEND INTO FIRM BEDROCK. THE SLOPES BETWEEN BENCHES SHALL NOT EXCEED 1.5(H):1(V). FILL SHALL NOT BE PLACED ON EXISTING SLOPES STEEPER THAN 2H:1V.

9. OVER-EXCAVATION AND RECOMPACTION SHALL BE PERFORMED UNDER THE OBSERVATION OF THE GEOTECHNICAL ENGINEER.

10. THE GEOTECHNICAL ENGINEER SHALL REVIEW THE BOTTOM OF EXCAVATIONS PRIOR TO PLACING FILL MATERIALS TO EVALUATE WHETHER OR NOT UNSUITABLE MATERIAL, EXISTING FILL, AND LOOSE DEPOSITS HAVE BEEN REMOVED AND THAT THE BASE OF THE EXCAVATION IS SUITABLE FOR PLACING COMPACTED FILL. THE GEOTECHNICAL ENGINEER MAY REQUIRE THE EXCAVATION TO BE DEEPENED IF LOOSE OR UNSUITABLE MATERIALS ARE ENCOUNTERED.

11. COMPACTION OF FILLS SHALL BE TESTED ACCORDING TO THE LATEST APPROVED EDITION OF ASTM TEST METHOD D 1557. ALL TESTS MUST BE MADE WITHIN 15 DAYS OF THE PLACING OF MATERIAL. THE TESTS SHALL CLEARLY INDICATE THE LOCATION AND SOURCE OF THE MATERIAL.

12. COMPACTION TESTS SHALL BE MADE ON SUBGRADE MATERIAL AND MATERIAL AS SPECIFIED BY THE ENGINEER. TESTS SHALL BE MADE AND PASSED PRIOR TO THE PLACING OF THE NEXT LIFT.

13. FILL SHALL BE PLACED WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT OF THE SOIL. EACH LIFT SHALL BE SPREAD EVENLY AND BLADE-MIXED TO PROVIDE UNIFORMITY OF THE FILL MATERIAL. MATERIAL PLACED OUTSIDE OF THIS RANGE SHALL BE RE-MOISTENED AND BLADED AND MIXED OR AERATED UNTIL THE MOISTURE CONTENT IS WITHIN THE SPECIFIED RANGE. SOFT OR YIELDING MATERIALS SHALL BE REMOVED AND REPLACED WITH PROPERLY COMPACTED FILL MATERIAL PRIOR TO PLACING THE NEXT LIFT. PONDING OR JETTING IS NOT PERMITTED. FILL MATERIALS SHALL BE MECHANICALLY COMPACTED.

14. ANY ROCKS OR DEBRIS LARGER THAN 3 INCHES IN DIAMETER SHALL BE REMOVED FROM THE FILL MATERIAL.

15. FILL SHALL BE PLACED IN LIFTS NO GREATER THAN APPROXIMATELY 8 INCHES IN UNCOMPACTED THICKNESS. MATERIAL SHALL BE PLACED IN THINNER LIFTS AS NECESSARY TO ACHIEVE THE SPECIFIED RELATIVE COMPACTION WITH THE EQUIPMENT BEING USED.

16. FINISHED CUT AND FILL SLOPES SHALL BE GRADED AT INCLINATIONS NO GREATER THAN 2H:1V UNLESS NOTED OTHERWISE.

17. IF AREAS OF WET OR YIELDING SOIL ARE ENCOUNTERED THAT PREVENT COMPACTION OF THE SUBGRADE, THE AREA SHALL BE STABILIZED WITH GRAVEL PRIOR TO PLACING COMPACTED FILL. PRIOR TO PLACING FILL OVER A WET SUBGRADE, THE BASE OF THE EXCAVATION SHALL BE COVERED WITH A LAYER OF FILTER FABRIC AND AT LEAST 1 FOOT OF GRAVEL. THE GRAVEL FOR SUBGRADE STABILIZATION SHALL CONSIST OF OPEN-GRADED MATERIAL CONFORMING TO THE SPECIFICATIONS HEREIN AND BE FULLY ENCASED IN A FILTER FABRIC. THE ENGINEER MAY REQUIRE THAT THE GRAVEL BE TIED INTO A DRAIN SYSTEM. COMPACTED FILL CAN THEN BE PLACED TO FINISHED GRADE ACCORDING TO THE SPECIFICATIONS. APPLICATION OF THIS REQUIREMENT IS SUBJECT TO REVIEW AND APPROVAL OF THE GEOTECHNICAL ENGINEER.

18. ANY AREA THAT WILL RECEIVE FILL SHALL BE REMOVED TO A DEPTH OF 1 FOOT, SCARIFIED TO A DEPTH OF 9 INCHES, MOISTURE CONDITIONED AS NECESSARY, AND COMPACTED IN-PLACE TO AT LEAST 90% RELATIVE COMPACTION. COMPACTED FILL MAY THEN BE PLACED TO FINISHED GRADE ACCORDING TO THE SPECIFICATIONS.

19. SLOPE CONSTRUCTION REQUIREMENTS, INCLUDING BENCHING, SHALL BE REVIEWED BY THE GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION OF GRADED SLOPES.

20. ALL CUT AND FILL SLOPES SHALL BE HYDROSEEDED UPON COMPLETION OF GRADING. SLOPES WITHIN THE STREAM RESTORATION AREA SHALL BE PLANTED PER PLANS BY OTHERS. IRRIGATION MAY BE NECESSARY TO ACHIEVE DENSE AND GROWING VEGETATION PRIOR TO FINAL INSPECTION. A BOND MAY BE REQUIRED IF THE WEATHER IS INAPPROPRIATE FOR HYDROSEEDING. ALL SLOPES OVER 3 FEET TALL SHALL BE PLANTED WITH PERENNIAL VEGETATION APPROVED BY THE COUNTY AND SHALL BE DENSE AND GROWING PRIOR TO FINAL INSPECTION.

21. THE CONTRACTOR SHALL EMPLOY ALL LABOR, EQUIPMENT, AND METHODS REQUIRED TO PREVENT HIS OPERATIONS FROM PRODUCING DUST DAMAGING TO PROPERTY, CULTIVATED VEGETATION, DOMESTIC ANIMALS, OR CAUSING A NUISANCE TO PERSONS IN THE VICINITY OF THE JOB SITE. THE GRADING PERMIT HOLDER AND THE OWNER SHALL COMPLY WITH THE DUST CONTROL MEASURES REQUIRED BY THE AIR POLLUTION CONTROL DISTRICT (APCD) AND THE BUILDING OFFICIAL. DUST ABATEMENT MEASURES SHALL BE CONTINUED UNTIL PERMISSION TO CEASE SUCH MEASURES IS GRANTED BY THE GRADING INSPECTOR.

22. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR PROTECTION OF PUBLIC AND PRIVATE PROPERTY ADJACENT TO THE SITE FROM HIS OPERATIONS AND SHALL, AT HIS EXPENSE, REPAIR OR REPLACE, TO ORIGINAL CONDITION, ALL PROPERTY WITHIN OR NEAR THE JOB SITE WHICH IS NOT DESIGNATED FOR REMOVAL, BUT WHICH IS DAMAGED OR REMOVED AS A RESULT OF HIS OPERATIONS.

23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MARKERS DURING CONSTRUCTION. ALL SUCH MONUMENTS OR MARKERS DISTURBED SHALL BE RESET AT THE CONTRACTOR'S EXPENSE.

24. ANY TEMPORARY STOCKPILES OF EARTH SHALL BE APPROVED BY THE COUNTY, SHALL BE COVERED AND BERMED, SHALL NOT OBSTRUCT DRAINAGE OR CREATE BLOWING DUST, AND SHALL BE INCLUDED IN THE PROJECT SWPPP.

25. NO OFFSITE GRADING OR OTHER CONSTRUCTION WORK IS INCLUDED WITH THESE PLANS.

EARTHWORK VOLUMES

BRIDGE PROJECT*
CUT: 790 CY
FILL: 1310 CY
TOTAL: 2100 CY

STREAM RESTORATION*
CUT: 280 CY
FILL: 370 CY
TOTAL: 650 CY

TOTALS*
CUT: 1070 CY
FILL: 1680 CY
TOTAL: 2750 CY

*NOTE: THE QUANTITIES SHOWN ARE FOR PERMITTING USE ONLY. THE VOLUMES ARE THE DIFFERENCE BETWEEN EXISTING GRADE AND PROPOSED FINISHED GRADE. THESE QUANTITIES DO NOT INCLUDE ALLOWANCES FOR SHRINKAGE, CONSOLIDATION, LOSSES DUE TO CLEARING OPERATIONS, FINISHED SURFACE/GRADE HOLD DOWNS, OVER-EXCAVATION, OR FACTORS FOR GRADING MEANS AND METHODS. A SEPARATE GRADING PERMIT IS REQUIRED FOR ANY EXPORT RECEIVING SITE.

IMPROVEMENT NOTES

1. NO CONSTRUCTION SHALL BE STARTED WITHOUT PLANS APPROVED BY THE COUNTY. THE COUNTY SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO STARTING OF CONSTRUCTION AND OF THE TIME AND LOCATION OF THE PRE-CONSTRUCTION MEETING. ANY CONSTRUCTION DONE WITHOUT APPROVED PLANS OR PRIOR TO NOTIFICATION TO THE COUNTY WILL BE REJECTED AND WILL BE AT THE CONTRACTOR'S AND/OR OWNER'S RISK.

2. A LICENSED CIVIL ENGINEER MUST CERTIFY THAT THE IMPROVEMENTS, WHEN COMPLETED, ARE IN ACCORDANCE WITH THE PLANS PRIOR TO THE REQUEST FOR A FINAL INSPECTION. AS-BUILT PLANS ARE TO BE PREPARED AFTER CONSTRUCTION IS COMPLETED. THE CIVIL ENGINEER CERTIFYING THE IMPROVEMENTS AND PREPARING AS-BUILT PLANS WILL BE PRESENT WHEN THE FINAL INSPECTION IS MADE.

3. AN INSPECTION AGREEMENT IS REQUIRED PRIOR TO THE START OF CONSTRUCTION.

4. ALL UTILITY COMPANIES MUST BE NOTIFIED PRIOR TO THE START OF CONSTRUCTION.

5. A COUNTY ENCROACHMENT PERMIT IS REQUIRED FOR ANY WORK DONE WITHIN THE COUNTY ROAD EASEMENT. THE ENCROACHMENT PERMIT MAY ESTABLISH ADDITIONAL TRAFFIC CONTROL REQUIREMENTS.

6. THE COUNTY INSPECTOR MAY REQUIRE REVISIONS IN THE PLANS TO SOLVE UNFORESEEN PROBLEMS THAT MAY ARISE IN THE FIELD. ALL REVISIONS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

7. IF ENVIRONMENTAL PERMITS FROM THE U.S. ARMY CORPS OF ENGINEERS, THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, STATE WATER RESOURCES CONTROL BOARD, OR THE CALIFORNIA DEPARTMENT OF FISH & WILDLIFE ARE REQUIRED, THE OWNER SHALL:
   A. SUBMIT A COPY OF ALL SUCH COMPLETED PERMITS TO THE DEPARTMENT OF PLANNING AND BUILDING OR
   B. DOCUMENT THAT THE REGULATORY AGENCIES DETERMINED THAT THE SUCH PERMITS ARE NOT REQUIRED;
ANY MITIGATION MONITORING REQUIRED BY SUCH PERMITS WILL REMAIN THE RESPONSIBILITY OF THE OWNER.

8. APPROXIMATE AREA OF DISTURBANCE = 2.5 ACRES

9. ALL PROJECTS INVOLVING SITE DISTURBANCE OF ONE ACRE OR GREATER SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES). THE OWNER SHALL SUBMIT A NOTICE OF INTENT (NOI) TO COMPLY WITH THE GENERAL PERMIT FOR CONSTRUCTION ACTIVITY WITH THE REGIONAL WATER QUALITY CONTROL BOARD (RWQCB). THE OWNER SHALL PROVIDE THE COUNTY WITH THE WASTE DISCHARGE IDENTIFICATION NUMBER (WDID #) OR WITH VERIFICATION THAT AN EXEMPTION HAS BEEN GRANTED BY THE RWQCB.

WDID#: TBD

10. PERSON TO CONTACT 24 HOURS A DAY IN THE EVENT THERE IS AN EROSION CONTROL/SEDIMENTATION PROBLEM (STORM WATER COMPLIANCE OFFICER)
NAME: RUTH JURIS
PHONE NUMBER: (805) 934-8215

UTILITY NOTES

1. MATERIAL REQUIREMENTS FOR BEDDING MATERIAL, PIPE ZONE MATERIAL AND TRENCH BACKFILL SHALL BE ACCORDING THE SPECIFICATIONS IN THESE PLANS.

2. BEDDING, PIPE ZONE, AND TRENCH BACKFILL SHALL BE COMPACTED TO 90% RELATIVE COMPACTION UNLESS A HIGHER DEGREE OF COMPACTION IS REQUIRED FOR THE AREA WHERE THE MATERIAL IS BEING PLACED. WHERE THE PIPES OR UTILITIES ARE TO BE CONSTRUCTED BELOW STRUCTURES OR WITHIN BUILDING AREAS, THE BEDDING, PIPE ZONE, AND TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO AT LEAST 95% RELATIVE COMPACTION.

3. UTILITY PIPES SHALL BE PLACED ON PROPERLY PREPARED BEDDING. BEDDING IS SELECT FILL MATERIAL PLACED BETWEEN THE TRENCH SUBGRADE AND THE BOTTOM OF THE PIPE. WHERE SOILS EXPOSED AT THE BOTTOM OF THE UTILITY TRENCHES ARE SOFT AND YIELDING, THE FOUNDATION SHALL BE STABILIZED OR BE REMOVED AND REPLACED WITH PROPERLY COMPACTED SOIL PRIOR TO PLACING THE PIPE. GRAVEL BEDDING CAN BE USED IN LIEU OF SAND BEDDING TO ASSIST IN STABILIZING THE SUBGRADE, IF NEEDED. AT LEAST 4 INCHES OF BEDDING MATERIAL SHALL BE PROVIDED BELOW THE PIPE. OPEN GRADED MATERIALS, SUCH AS PEA GRAVEL, SHALL BE ENCASED IN FILTER FABRIC.

4. UNDERGROUND UTILITIES ON THESE PLANS SHOULD NOT ENCOUNTER WET OR YIELDING CONDITIONS. IF THE CONTRACTOR ENCOUNTERS THESE CONDITIONS, THE BOTTOM OF TRENCH SHALL BE STABILIZED WITH AT LEAST 12 INCHES OF GRAVEL ENCASED IN FILTER FABRIC BELOW THE PIPE. THE ACTUAL LIMITS AND NEED FOR SUBGRADE STABILIZATION SHALL BE EVALUATED BASED ON THE CONDITIONS ENCOUNTERED DURING CONSTRUCTION. THE THICKNESS AND EXTENTS OF GRAVEL STABILIZATION MAY BE VARIED OR OMITTED AT THE CONSULTATION OF THE GEOTECHNICAL ENGINEER.

5. PIPE ZONE MATERIAL IS SELECT FILL MATERIAL PLACED BETWEEN THE TOP OF THE BEDDING AND AT LEAST 6 INCHES ABOVE THE TOP OF THE PIPE AND TO AT LEAST 9 INCHES BEYOND THE SPRINGLINE OF THE PIPE. COMPACTION WITHIN THE PIPE ZONE SHALL BE PERFORMED SUCH THAT THE PIPE IS FULLY SUPPORTED DURING COMPACTION, AND SUCH THAT EXCESSIVE DEFORMATION TO THE PIPE OR PIPE JOINT OR DAMAGE TO THE PIPE DOES NOT OCCUR. COMPACTION ABOVE THE SPRINGLINE OR TOP OF PIPE SHALL NOT BE PERFORMED UNTIL THE FILL PLACED BELOW THAT ELEVATION HAS BEEN PROPERLY COMPACTED.

6. TRENCH BACKFILL IS SELECT FILL MATERIAL PLACED ABOVE THE PIPE ZONE AND FINISHED GRADE OR THE BASE OF OTHER SPECIFIED BACKFILL MATERIALS (SUCH AS PAVEMENT STRUCTURAL SECTIONS). TRENCH BACKFILL CAN CONSIST OF EITHER ON-SITE OR IMPORTED FILL MATERIAL THAT COMPLIES WITH THE SPECIFICATIONS OF THESE PLANS.

7. EXISTING UTILITIES ARE PRESENT WITHIN THE PLANNED IMPROVEMENT AREAS. EXISTING UTILITIES IN BUILDING OR STRUCTURE AREAS SHOULD BE REMOVED, RELOCATED, AND/OR ABANDONED AS PART OF OR PRIOR TO SITE CLEARING AND GRUBBING. UTILITIES PRESENT BELOW THE EXCAVATION FOR BUILDINGS OR STRUCTURES SHOULD BE REMOVED AND REPLACED WITH COMPACTED FILL. IF A UTILITY IS NOT ENTIRELY REMOVED, IT SHALL BE FILLED WITH EITHER SAND-CEMENT SLURRY OR CONCRETE AND BACKFILLED AS ABOVE.

8. IF ANY PROVISION OF PIPE MANUFACTURER'S INSTALLATION INSTRUCTIONS VARY FROM THESE SPECIFICATIONS, THE MOST RESTRICTIVE REQUIREMENT SHALL APPLY.

MATERIAL SPECIFICATIONS

ALL MATERIAL CUT FROM THE STREAM CHANNEL SHALL BE STOCKPILED SEPARATELY FOR USE IN BACKFILL WITHIN THE STREAM CHANNEL, STREAM RESTORATION FILL, AND CHANNEL LINING.

2.1 AGGREGATE BASE SHALL CONSIST OF IMPORTED MATERIAL CONFORMING TO CALTRANS STANDARD SPECIFICATIONS FOR CLASS 2 AGGREGATE BASE, SECTION 26-1.02A. CLASS 3 MATERIAL THAT INCORPORATES RECLAIMED OR RECYCLED MATERIALS CAN ALSO BE USED AS AGGREGATE BASE PROVIDED THE CLASS 3 MATERIAL COMPLIES WITH THE GRADATION AND QUALITY REQUIREMENTS FOR CLASS 2 MATERIAL. AGGREGATE BASE MAY NOT BE PLACED IN THE STREAM CHANNEL WITHOUT APPROVAL OF THE PROJECT BIOLOGIST.

2.2 COMPACTED FILL MATERIAL SHALL CONSIST OF ON-SITE OR IMPORTED MATERIALS THAT ARE FREE OF ORGANICS, ROCKS GREATER THAN 3 INCHES, TRASH, DEBRIS, CORROSIVE AND OTHER DELETERIOUS MATERIAL. IMPORTED FILL SHALL BE REVIEWED BY THE GEOTECHNICAL ENGINEER PRIOR TO BEING BROUGHT TO THE SITE. HOWEVER, IMPORTED FILL MATERIALS SHALL COMPLY WITH ALL SPECIFICATIONS FOR MATERIAL PLACED AT THE SITE. ON-SITE SOIL OR IMPORTED MATERIALS TO BE USED AS THE COMPACTED FILL SHALL HAVE AT LEAST 75 PERCENT MATERIAL PASSING THE U.S. STANDARD NO. 4 SIEVE AND AN EXPANSION INDEX OF NO MORE THAN 20 AS DETERMINED BY ASTM D2428. COMPACTED FILL TO BE PLACED WITHIN 3 FEET OF THE GRADING PLANE (BOTTOM OF THE PAVEMENT STRUCTURAL SECTION) SHALL HAVE AN R-VALUE OF AT LEAST 50 AS DETERMINED BY ASTM D2844.

2.3 FILTER FABRIC SHALL CONSIST OF NON-WOVEN GEOTEXTILE THAT CONFORMS TO THE REQUIREMENTS OUTLINED IN THE CALTRANS STANDARD SPECIFICATIONS FOR FILTER FABRIC-UNDERDRAINS, SECTION 88-1.03. FILTER FABRIC SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS.

2.4 PIPE BEDDING MATERIAL SHALL CONSIST OF SAND OR GRAVEL BEDDING AND SHALL BE CONSTRUCTED WHERE SHOWN OR SPECIFIED, IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS AND THESE SPECIFICATIONS.

SAND BEDDING SHALL BE IMPORTED MATERIAL FREE FROM CLAY OR ORGANIC MATERIAL, SUITABLE FOR THE PURPOSE INTENDED, AND SHALL HAVE A SAND EQUIVALENT OF AT LEAST 30 AND BE OF SUCH SIZE THAT 90 TO 100 PERCENT WILL PASS A NO. 4 SIEVE AND NOT MORE THAN 5 PERCENT WILL PASS A NO. 200 SIEVE.

2.5 PIPE ZONE MATERIAL SHALL CONSIST OF IMPORTED FREE DRAINING GRANULAR MATERIAL HAVING A SAND EQUIVALENT OF AT LEAST 30, AT LEAST 90 TO 100 PERCENT OF THE MATERIAL PASSING THE U.S. STANDARD NO. 4 SIEVE, AND NOT MORE THAN 5 PERCENT OF THE MATERIAL PASSING THE NO. 200 SIEVE.

2.6 SUBGRADE STABILIZATION MATERIAL (GRAVEL) FOR SUB-GRADE STABILIZATION SHALL CONSIST OF HARD, DURABLE, CRUSHED STONE, AND SHALL BE FREE FROM ORGANIC MATERIAL, CLAY BALLS OR OTHER DELETERIOUS SUBSTANCES. AGGREGATE SHALL HAVE 100 PERCENT FRACTURED FACES, CONFORM TO THE GRADATION REQUIREMENTS FOR CALTRANS SECTION 90-3.02, 1-1/2 INCH BY 3/4 INCH COARSE AGGREGATE GRADING, AND HAVE A DURABILITY INDEX OF NOT LESS THAN 40. SUBGRADE STABILIZATION MATERIAL SHALL BE FULLY ENCASED IN A GEOTEXTILE FOR STABILIZATION TO SEPARATE THE MATERIAL FROM THE NATIVE MATERIALS AND ANY SUBSEQUENT FILL MATERIAL.

2.7 TRENCH BACKFILL SHALL CONSIST OF IMPORTED OR ON-SITE MATERIAL THAT IS FREE OF ORGANICS, DEBRIS, ROCKS GREATER THAN 3 INCHES, AND OTHER DELETERIOUS MATERIAL. TRENCH BACKFILL MATERIAL SHALL HAVE AT LEAST 85 PERCENT OF THE MATERIAL PASSING THE U.S. STANDARD NO. 4 SIEVE, AND/OR COMPLY WITH THE APPLICABLE REQUIREMENTS FOR THE AREA WHERE THE TRENCH BACKFILL IS BEING PLACED (SUCH AS THE PAVEMENT STRUCTURAL SECTION, OR SAND PLACED BELOW FLOOR SLABS.

2.8 STREAM CHANNEL FLOODPLAIN ALLUVIAL MATERIAL SHALL CONSIST OF SAND, GRAVEL, AND COBBLE MATERIAL. WHEN POSSIBLE, THIS MATERIAL SHALL COME FROM STREAM CHANNEL CUT AND EXISTING STREAM CHANNEL MATERIAL STOCKPILED PRIOR TO EACH PHASE OF STREAM RESTORATION. ALL IMPORT MATERIAL SHALL BE APPROVED BY THE PROJECT BIOLOGIST PRIOR TO PLACEMENT.

2.9 STREAM CHANNEL SUBGRADE MATERIAL SHALL CONSIST OF SOIL CUT FROM EXISTING ADJACENT TERRACE DEPOSITS EXCAVATED FOR BANKFULL BENCHES, OR SOURCED FROM SIMILAR MATERIAL CONSISTENT WITH SUBGRADE OF THE STREAM CHANNEL. IMPORT MATERIAL SHALL NOT BE USED UNLESS APPROVED BY THE PROJECT BIOLOGIST.

ENVIRONMENTALLY SENSITIVE AREAS (ESAs)

MUCH OF THE WORK SHOWN IN THESE PLANS OCCURS WITHIN ENVIRONMENTALLY SENSITIVE AREAS (ESA) WHICH ARE MARKED ON THESE PLANS, IN THE FIELD, AND PROJECT BIOLOGICAL REPORTS. NO WORK SHALL OCCUR IN THESE AREAS UNLESS A MITIGATION PLAN HAS BEEN CREATED, SUBMITTED, APPROVED AND SUBSTANTIALLY IMPLEMENTED. THE OWNER'S ENVIRONMENTAL REPRESENTATIVE SHALL VERIFY THAT THE MITIGATION FOR ANY GIVEN AREA HAS BEEN SUFFICIENTLY PERFORMED PRIOR TO COMMENCEMENT OF WORK IN THAT AREA. WORK IN THESE AREAS SHALL BE MONITORED BY AN APPROVED BIOLOGIST AS REQUIRED BY THE PERMITS.

PERMITS TO PERFORM THIS WORK SHALL BE OBTAINED FROM THE AGENCIES WHICH HAVE JURISDICTION, SUCH AS BUT NOT LIMITED TO:

- UNITED STATES ARMY CORPS OF ENGINEERS
- UNITED STATES FISH AND WILDLIFE SERVICE
- NATIONAL MARINE FISHERIES SERVICE
- CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
- REGIONAL WATER QUALITY CONTROL BOARD

CONSTRUCTION WATER SUPPLY

THERE IS SUFFICIENT WATER FOR COMPLETION OF THIS WORK AVAILABLE FROM ON-SITE SOURCES CONTROLLED BY THE OWNER. THE ON-SITE WATER SYSTEM IS NON-POTABLE AND USED FOR NON-CONTACT PURPOSES ONLY. ALL POTABLE SUPPLIES TO BE PROVIDED BY OFF-SITE BOTTLE WATER.

WATER USED FOR CONSTRUCTION SHALL NOT BE ALLOWED TO RUN INTO THE STREAM CHANNEL OR CREATE RUNOFF, EROSION, OR TURBIDITY.

EMERGENCY AND FIRE RESPONSE ACTION PLAN

THE "ARROYO GRANDE PRODUCTION FACILITIES EMERGENCY RESPONSE ACTION PLAN" IS MAINTAINED IN THE OPERATIONS OFFICE AT THE PROJECT SITE. THIS PLAN IS TO BE CONSIDERED A PART OF THESE PLANS AS THE MINIMUM RESPONSE CRITERIA FOR COORDINATION BY THE CONTRACTOR WITH THE SITE OPERATIONS MANAGER FOR JOB SPECIFIC SAFETY PLANNING. COORDINATION OF CONTRACTOR'S SAFETY PLAN WITH THE SITE OPERATIONS AND SAFETY REQUIREMENTS SHALL BE COMPLETED PRIOR TO AND REPORTED AT THE PRE-CONSTRUCTION MEETING. PARTICIPATION OF THE CONTRACTOR AND KEY SUB-CONTRACTOR REPRESENTATIVES AT A DAILY SIMULTANEOUS OPERATIONS MEETING IS REQUIRED. CONSTRUCTION OPERATIONS SHALL BE COORDINATED WITH SITE OPERATIONS TO MINIMIZE CONFLICTING USES TO THE MAXIMUM EXTTENT POSSIBLE.

CONTAMINATED SOIL

IF ANY CONTAMINATED SOIL IS ENCOUNTERED DURING CONSTRUCTION, IT SHALL BE HANDLED, TESTED, REMOVED, STORED, REUSED, AND/OR DISPOSED OF IN ACCORDANCE WITH THE CONTAMINATED SOIL CONTINGENCY PLAN (CSCP) ENTITLED, "CONTAMINATED SOIL CONTINGENCY PLAN, PXP PRODUCED WATER TREATMENT FACILITY, CONDITIONAL USE PERMIT DRC2005-00252, CONDITIONS OF APPROVAL 26A AND B, (EIR CONDITION HAZ-2A AND 2B) DATED FEB. 26, 2009." THIS PLAN HAS BEEN WRITTEN TO COMPLY WITH THE PROJECT ENVIRONMENTAL IMPACT REPORT AND IS ON FILE AND AVAILABLE AT THE COUNTY OF SAN LUIS OBISPO PLANNING DEPARTMENT.

REGISTERED DESIGN PROFESSIONAL

AS THE OWNER OF RECORD, I DESIGNATE TO THE FOLLOWING PERSON AS MY REGISTERED DESIGN PROFESSIONAL (RDP) FOR THE PROJECT NOTED. I UNDERSTAND THAT THE ARCHITECT/ENGINEER DESIGNATED SHALL BE RESPONSIBLE FOR REVIEWING AND COORDINATING ALL SUBMITTAL DOCUMENTS PREPARED BY OTHERS FOR THE DURATION OF THE PROJECT. I ALSO UNDERSTAND THAT I MUST PROVIDE WRITTEN NOTIFICATIONS TO THE COUNTY OF SAN LUIS OBISPO BUILDING DIVISION IF MY DESIGNEE IS CHANGED

PMT NO.: TBD

PROJECT ADDRESS: 1821 PRICE CANYON RD.

PROJECT/ TENANT NAME: HYLA CROSSING REPLACEMENT PROJECT
FREEPORT-MCMORAN OIL & GAS

REGISTERED DESIGN PROFESSIONAL NAME: CLAY S. BRADFIELD, PE

ARCHITECTURAL/ENGINEERING FIRM NAME: URS CORP.

TELEPHONE NUMBER: (805) 361-1120

FAX NUMBER: (805) 739-1135

E-MAIL ADDRESS: CLAY.BRADFIELD@URS.COM

ARCHITECT/ENGINEER'S SIGNATURE: _____ DATE: _____

OWNER'S NAME: PAUL DELORENZO

TELEPHONE NUMBER: (805) 547-8969 X4911

E-MAIL ADDRESS: PAUL.DELORENZO@FMI.COM

FAX NUMBER: (805) 547-8979

OWNER'S SIGNATURE: _____ DATE: _____

REPORTING

1. ONGOING SOILS TESTING AND SPECIAL INSPECTION REPORTS SHALL BE PREPARED BY THE GEOTECHNICAL ENGINEER AND SUBMITTED THROUGH THE PROJECT ENGINEER AS RECORD DOCUMENTS.

2. THE ENGINEER OF RECORD SHALL COMPILE IN-PROGRESS REPORTS AND COMPLETE RECORD DOCUMENTS AND SUBMIT TO THE BUILDING OFFICIAL.

3. THE GEOTECHNICAL ENGINEER SHALL CONDUCT AN OBSERVATION AND TESTING PROGRAM TO EVALUATE MASS GRADING PERFORMANCE AND CERTIFY, IN ACCORDANCE WITH THE CALIFORNIA BUSINESS AND PROFESSIONS CODE (BPC) SEC. 6735.5, THAT SAID WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE SPECIFICATIONS PRIOR TO CONCRETE POUR FOR ALL FOUNDATION ELEMENTS. NON-CONFORMING WORK SHALL BE CORRECTED BY AND AT THE EXPENSE OF THE CONTRACTOR.

TEMPORARY SLOPES & SHORING

DURING CONSTRUCTION, WHEN SHORING, TEMPORARY SLOPES AND/OR UNDERPINNING BECOME NECESSARY, THE CONTRACTOR SHALL DESIGN THE SHORING SYSTEM FOR THE DESIGN SURCHARGE LOAD OR PROVIDE SUPPLEMENTAL FOUNDATION SUPPORT OR UNDERPINNING OF THE ADJACENT STRUCTURES. DESIGN AND INSTALLATION OF TRENCH SHORING MAY BE SUBJECT TO SEPARATE PERMITTING AND INSTALLATION REVIEWS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR. AN UNDERPINNING AND MONITORING PLAN SHALL BE SUBMITTED FOR REVIEW TO THE GEOTECHNICAL ENGINEER PRIOR TO BEGINNING THE EXCAVATION. A PERMIT SHALL BE OBTAINED PRIOR TO COMMENCING WORK REQUIRING INSTALLATION OF SHORING OR UNDERPINNING.

LOOSE SAND IS ANTICIPATED IN EXCAVATIONS. THESE SOILS MAY NOT BE ABLE TO SUPPORT HEAVY EQUIPMENT SUCH AS EXCAVATORS OR TRUCKS. WE ALSO EXPECT THAT SHALLOW OR NEAR SURFACE GROUNDWATER WILL BE ENCOUNTERED. EXCAVATING FOR STRUCTURES MAY REQUIRE THE USE OF BACKHOE-TYPE EQUIPMENT POSITIONED OUTSIDE THE EXCAVATION. GRAVEL MATS AND GEOTEXTILE FABRICS MAY BE NEEDED TO HELP STABILIZE WET SUBGRADE CONDITIONS IN STRUCTURE, PAVEMENT, OR TRENCH SUBGRADE AREAS AND TO ALLOW FOR COMPACTION OF SUBSEQUENT FILL MATERIALS.

TEMPORARY SLOPES SHALL BE BRACED OR SLOPED ACCORDING TO THE REQUIREMENTS OF CAL OSHA. SLOPES ENCOUNTERED IN GRADING OPERATIONS WILL BE LOOSE TO MEDIUM DENSE SAND AND SHOULD NOT BE CONSIDERED CAPABLE OF MAINTAINING A VERTICAL SLOPE. THE ALLUVIUM AND ARTIFICIAL MATERIAL CONSISTS OF LOOSE GRANULAR SOIL, MOSTLY SAND (SP, SM, SP-SM) TYPE C SOIL. THE SANDY SOILS WILL BE PRONE TO CAVING. TEMPORARY CONSTRUCTION SLOPES WILL NEED TO BE EITHER FLATTENED TO A STABLE SLOPE OR SHORED TO ALLOW FOR CONSTRUCTION.

FOR TYPE C SOIL CONDITIONS, CONSTRUCTION SLOPES SHALL BE CONSTRUCTED AT INCLINATIONS OF 1.5H:1V OR FLATTER FOR DEPTHS UP TO 20 FEET. VERTICAL SHORING CONSISTING OF SHEET PILES OR SIMILAR CONSTRUCTION SYSTEMS CAN BE PROVIDED IN LIEU OF FLATTENING SLOPES.

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APPENDIX B
SITE PHOTOGRAPHS (FEBRUARY 11, 2013)

APPENDIX B - SITE PHOTOGRAPHS (FEBRUARY 11, 2013)

Photograph 1. Looking west-northwest (upstream) from center of existing Hyla Crossing structure. New span bridge structure and stream restoration activities will occur in this portion of the Project Area.

Photograph 2. Looking east-southeast (downstream) from center of existing Hyla Crossing structure. Equipment staging and stream restoration activities will occur in this portion of the Project Area.

Photograph 3. Looking northwest from center of existing Hyla Crossing structure. View of riparian vegetation.

Photograph 4. Looking southwest from center of existing Hyla Crossing structure. View of riparian vegetation.

Photograph 5. Looking northeast from center of exisiting Hyla Crossing structure. View of riparian vegetation.

Photograph 6. Looking southeast from center of existing Hyla Crossing structure. View of riparian vegetation.

Photograph 7. Looking south from Pismo Creek bank northeast of Hyla crossing structure. View of downstream side of existing Hyla crossing structure.

Photograph 8. Looking southeast from Pismo Creek bank northwest of Hyla crossing structure. View of upstream side of existing Hyla crossing structure with pooled area comprised of turbid water.

Photograph 9. Looking northeast from southern edge of Pismo Creek riparian area. View of existing Hyla crossing structure, road approaches, and surrounding riparian vegetation.

Photograph 10. Looking west-northwest from southern edge of Pismo Creek riparian area. View of concrete embankment and surrounding vegetation. Approximate location of southern approach to new span bridge structure.

Photograph 11. Looking east-southeast from southern edge of Pismo Creek riparian area. View of paved access road, riparian vegetation on the lower slope, and adjacent upland vegetation.

Photograph 12. Looking south-southwest from northern edge of Pismo Creek riparian area. View of existing Hyla Crossing structure, paved access road, and surrounding riparian vegetation.

Photograph 13. Looking west from northern edge of Pismo Creek riparian area. View of intersection of riparian vegetation and disturbed upland area. Approximate location of northern approach to new span bridge structure.

Photograph 14. Looking east-southeast from northern edge of Pismo Creek riparian area. View of intersection of riparian vegetation and Hyla Extension lease area.

APPENDIX C
TECHNICAL MEMORADUM, CONCEPTUAL DESIGN FOR CHANNEL RESTORATION WITHIN PISMO CREEK AT THE HYLA CROSSING, SAN LUIS OBISPO COUNTY, CALIFORNIA

URS

TECHNICAL MEMORANDUM

To: Michelle Gibbs
Freeport – McMoRan Oil & Gas, LLC
201 South Broadway
Orcutt, CA 93455

From: Matthew H. O'Brien
URS Corporation

Date: June 24, 2013

Re: Conceptual Design for Channel Restoration within Pismo Creek at the Hyla Crossing, San Luis Obispo County, California

INTRODUCTION

URS Corporation (URS) appreciates the opportunity to provide this conceptual stream design for Pismo Creek to allow for removal of the Hyla Crossing within the Arroyo Grande Field. This letter report provides the defining parameters used in the conceptual layout, rationale for using step pools, data that can be used for the final design preparation, and conceptual design.

The intent of this effort is to provide Freeport-McMoRan Oil & Gas (FM O&G) with: 1) a geomorphologically stable step pool system in the Pismo Creek watershed (Figure 1) that will allow for migration of native steelhead, 2) sufficient information to prepare the necessary permitting strategy, and 3) the information to derive preliminary costing and schedule for its implementation.

DEFINITION AND PURPOSE

Step-pools result from a naturally-occurring channel bed morphology commonly found in relatively steep mountainous streams. The channel bed materials are usually cobbles and boulders and the channels themselves would be classified as threshold channels for the purposes of natural stream design. Step-pools are characterized by an accumulation of cobbles and boulders into organized structures that span the channel. These structures form an alternating series of rough weirs and pools which results in a stepped longitudinal stream profile. Step-pools generally function to control the grade and flow velocity of a steep stream by allowing the flow to step down over a series of drops. (Refer to Figure 2 Typical Modified Step-pool complex) Under low flow conditions, the flow becomes supercritical as it passes over each step and drops into the next pool, dissipating its energy in a roller eddy. This alternating sequence of supercritical flow over the steps and subcritical flow through the pools controls the velocity of

the flow and provides aquatic habitat by introducing complexity into the flow and aerating the water.

DESIGN BASIS

This section summarizes the basis for various design elements used in the stream restoration design. The latest plans for the restoration reach upstream of Hyla Crossing (SH+G 2009) include substantive in-channel restoration. The discussion below is primarily intended for those restoration efforts spanning the reach of Pismo Creek immediately upstream and downstream of the Hyla Crossing, and relies upon original data collection and research by others.

Hydrology

Rainfall in the watershed ranges from 16 inches at the coast to approximately 32 inches in the upper watershed (City of San Luis Obispo and County of San Luis Obispo, 2003). Mean annual rainfall at the San Luis Obispo Edna Valley station is approximately 22.45 inches, according to the long-term record of rainfall collected just west of the watershed at California Polytechnic Institute. Refer to Table 1 for rainfall data. Long-term data from the City of San Luis Obispo records from 1904 to 2007 show an increase in the number of extreme (>50 year) events during the latter half of the last century. Refer to Table 2 for watershed and flow characteristics, and Table 3 for peak flow (100-year storm) data.

Channel Slope

As described above and seen in Figures 3A and 3B, the restored channel profile includes both step-pool and native-riparian segments. Native-riparian segments are proposed to be stable, quasi-equilibrium banks with little need for structural protection to maintain the restored channel slope (other than for extra protection). In other words, these segments are designed to perform as natural channels that would naturally form in the natural setting of upper Pismo Creek. As such, the conceptual design slopes is based upon stable reaches within the watershed. For Pismo Creek, a 0.01 percent slope was used for the design, as this was consistent with the slope of the channel in the stable reach immediately upstream of the Hyla Crossing, as well as within the channel downstream of the crossing.

It is important to note that certain smaller upstream reaches (<500 lineal feet) with higher slopes are partially a factor of the continued influx of gravel/cobble-sized bed material from the upper reaches. The restored channel of Pismo Creek will incorporate this type of material in order to maintain the restored channel slope.

Slopes for the step-pool segments are defined by the step drop height and pool spacing (see below for further discussion). Slopes within step-pool segments of the restored channel are between 5 and 6 percent, which are consistent with slopes in reaches where step-pools naturally form.

Channel Width and Depth

In keeping with the established hydraulic-geometry literature, URS designed the channel using widths, depths, and cross-sectional areas consistent with stable channel reaches throughout the region. The width of the 'bankfull' channel was based on dimensions of the channel as measured in the field (refer to Figure 4); in reaches that were thought to be valid and meta-stable reference reaches. For Pismo Creek, URS measured stable segments with bankfull indicators within the incised channel downstream of the Hyla Crossing ("bankfull" point bars and mid-channel bars), and a well-articulated stable channel in the reach immediately upstream of the Hyla Crossing. In addition, URS used high-water marks from previous peaks to help guide the selection of bankfull parameters and the identification of self-formed inset floodplains. It is important to note that URS expects that the channel will periodically shift with respect to pool to pool spacing, as is typical in this type of high-sediment setting. URS does not anticipate that the designed channel planform will be a static feature, as a functional channel in dynamic equilibrium is expected to shift and adjust within 'stable-sloped' sections.

As such, URS has purposely designed the restored channel with a relatively shallow depth, to mimic the shallow channels that are typical of such a setting, and to encourage this sort of channel migration.

Bankfull indicators were more difficult to distinguish in the downstream reaches of Pismo Creek, though some depositional bars were present that did provide some indication of potential bankfull dimensions.

Observed bankfull widths and depths appear to be consistent with the 'San Francisco Bay region' curve (set for a normative 30 inches annual rainfall). The observed channel width upstream of the Hyla Crossing of Pismo Creek is slightly wider-than-typical, though this is to be expected in this setting, given that: 1) average annual rainfall (~34 inches) is slightly higher than that designated for the regional curve, and 2) channels in stream systems with high bedload transport tend to be wider-than-average perhaps reflecting their proclivity to develop mid-channel bars.

Floodplain Width

In the conceptual design, URS has allowed for a multi-staged floodplain intended to replicate the stable multiple terraces that are seen locally at the project site. The terraces provide important floodwater-, wood-, and sediment-storage functions, and allow the development of riparian vegetation at multiple seral stages. They also assist other floodplain functions, including biogeochemical transformations, which best occur in those limited near-channel bottomlands found in montane San Luis Obispo County.

The terraces will also provide natural-looking variability in the final design. The lowest terrace serves as the "bankfull" floodplain that is intended to be active at flows at or greater than the bankfull flow (~1.5- to 2-year peak flow). While the width of this floodplain will vary due to grading constraints, (typically where avoidance of established trees and planned construction is

necessary) URS has attempted to maintain a floodplain width of at least equal to the bankfull width. Higher floodplain terraces are designed to be active during higher-flow events—at about the 5-year flow and 20-year flow (where a third surface is present).

Sinuosity and Meander Wavelength

In mid-slope segments of the reach, the restoration design uses a sinuosity and meander wavelength that is similar to the sinuosity of the existing channel. The existing meander pattern appears to be a direct reflection of (or similar to) the meander pattern that existed before the construction of the Hyla Crossing, based on field evidence. In fact, the observed and planned channel sinuosity patterns plot near standard meander-stability curves.

Our use of meander-geometry criteria should not imply that the project will build a fixed-in place meandering channel built to theoretical dimensions. As stated previously, URS expects that the channel may continue to shift and migrate in the mid-slope segments of the restoration, and thus are simply providing a template channel form that will change and evolve naturally over time. At the transition to step-pool segments, URS has designed the corridor to funnel flow toward the step-pool structure (regardless of channel migration), such that the channel position will be more stable through the step-pool segments (to avoid the flow cutting around the structures).

Step-pools

<u>Step-pool Spacing</u>

URS recognizes that step-pools are not a natural form presently found within the reviewed reaches of upper Pismo Creek. However, the steep grades in the restored channel profile (to reconnect segments above and below knickpoints) dictate that step-pools should be used in order to provide stability of the restored channel.

The conceptual step-pool design followed the design approach detailed by Chartrand et al. (2011). They provide evidence that the geometric elements of step-pools exhibit characteristic scaling relationships, which are inferred to reflect the three-dimensional hydrodynamics prevalent along step-pool streams during their development by large floods. The scaling relationships underscore the observation that step-pools exhibit variable geometric arrangements across the full range of bed slopes at which they are measured.

The specified scaling relationships of Chartrand et al. (2011) have been applied to identify a range of step-pool design geometries as an analog for Pismo Creek which would likely be observed under similar natural conditions, and are governed by two project-specific key design constraints: 1) average step-pool segment slope, and 2) the step drop height.

The range of step-pool spacing for the step-pool segments of the proposed Pismo Creek restoration was defined through the review of step-pool design tools developed by Balance

Hydrologics, and included rigorous peer-review of the step-pool design and associated design tools.

Step Drop Height

Step drop height (the elevation difference from the top of one step to the top of the next downstream step) for in-stream structures is typically limited to a maximum step drop height of 6 inches (per NOAA design guidelines) in order to appropriately address fish passage considerations[1]. Within the upper Pismo Creek setting, however, URS proposes to use modified step-pool structures (see Figure 2, typical) rather than standard cross vane step-pool. From a geomorphic/hydrologic perspective, the modified structure will allow a consistent step drop height and will provide several notable benefits:

- **Fewer step-pools.** To make the ~5-foot elevation gain between the stable lower reach of Pismo Creek and the bedrock knickpoint (upstream of the Hyla Crossing) with a 6-inch maximum step, only 4 separate step-pool structures would be required. The steep grade transition could be made with shorter segments of step-pools, allowing for longer channel segments designed at a geomorphically stable slope. The reason that modified step-pools are required in this setting is that the channel elevation difference between the immediately upstream reach and drop downstream from the Hyla Crossing is steeper than that which is geomorphically stable with a meandering channel habit or otherwise without the use of modified step pools in this setting. Given regulatory concerns regarding potential stranding in step-pools, a reduction in the number of typical cross vane pools is a significant benefit.
- **Geomorphic stability.** In order to make up the required elevation gain with 6-inch steps, the necessary step-pool spacing is near the lower-limit of that which is considered stable for naturally-formed step-pools.
- **Connection to existing floodplain terraces.** 6-inch step drop heights would allow for stable elevation gain in the channel profile. In addition to providing for longer reaches at a more-natural slope (as described above), this would allow us to make better use of the abandoned floodplain terrace surfaces by reestablishing continuity with those surfaces. Using a 6-inch step drop height leaves the stream bed at or very near these terrace surfaces.
- **Tree protection.** Steeper steps near the downstream reach will reduce the need to lay back banks near the Hyla Crossing. This will allow an increase in the buffer between graded areas and several existing trees, providing added protection for the tree and its root system.
- **More-natural design.** Fewer constructed step-pools, and the ability to vary step drop heights slightly will allow for greater variability in the designed structures to provide a more 'natural' aesthetic.

[1] Step drop height is the standard terminology used in step-pool literature for this elevation difference. 'Step height' is the elevation difference between the top of a step and the bottom of the scour pool below the step.

Boulder Sizing

Boulder sizes were selected using a boulder-stability equation using probable stability under the velocities predicted values for the 100-year flood as the sizing criterion (SH&G, 2009). URS has preliminarily specified two sizes of boulders for each creek reach: larger "foundation" boulders (~1.5 tons) and smaller "surface" boulders (~0.5-ton). The surface boulders will need to be partially buttressed upstream of foundation boulders (standard boulder-weir construction) to be stable at the 100-year peak flow. Refer to the Rock Sizing Calculations appended to this memorandum.

Materials

The proposed restoration will include several different types of materials, as described below.

The materials are intended to mimic conditions in stable, existing reaches (especially immediately upstream of the Hyla Crossing; see Figure 5) and limit hydrogeologic incongruences between the native and emplaced bank and subgrade materials. Our ultimate goal is to recreate a functioning stream/aquifer system similar to that which was present prior to the construction of the Hyla Crossing. Because it was assumed that material will be sourced from the adjacent areas for the bulk of the fill material, we expect to maintain baseflow recession patterns similar to that which exists under current conditions.

Sub-grade Material

Where the channel elevation will be raised, the sub-grade fill will be composed of well-graded, compacted material sourced primarily from the adjacent terrace deposits (from the excavation of terraces that will be laid back). The fill would be emplaced using a series of compacted 'lifts' to provide structural stability and mimic the alluvial and debris flow deposits within the adjacent terraces. Because the sub-grade material will likely be sourced from adjacent terrace deposits, URS expects the fill material to function in a hydrogeologically-similar manner to the material that is present in the sub-grade beneath and adjacent to the current channel.

Floodplain Alluvial Material

The sub-grade material will be capped with a layer of mixed sand/gravel/cobble material, no less than 2 feet thick. This material is intended to mimic bar and floodplain deposits that are present within alluvial portions of the Pismo Creek watershed. The material is intended to represent episodic deposits typical of such a dynamic environment, and would be reworked to varying degrees as the channel continues to shift under such conditions. Surface topography (channel and floodplain features) would be sculpted primarily within this material.

Active Channel Bed Material

We would recommend that FM O&G remove and separately stockpile the existing creek-bed material at the start of each phase of stream restoration. Approximately the top 1.5 to 2 feet of the creek-bed material should be removed, stockpiled, and then reused toward the end of that phase of restoration to line the raised creek bed. URS staff examined bed material at multiple locations along Pismo Creek; in most locations we found a coarsened surface layer that was winnowed of sand but otherwise similar to the deeper material. The existing material currently in transport on the bed of Pismo Creek consists primarily of sub-angular to subrounded gravel and cobbles (based on the bedload samples that we sampled during our field efforts).

Boulders

As described above, we recommend constructing the step-pool structures with boulders of variable sizes. Some boulders may be available from the on-site excavation, but reconnaissance suggests most boulders will need to be brought in from off-site. The bedrock present on-site appears to be too weathered to source boulders that will be solid enough for use in step-pool structures.

SUMMARY

Using the design parameters for natural channel design and NOAA specifications for fish passage, Figure 6 provides a conceptual design for the step-pools proposed for this design. The design allows for 6-inch steps and holding pools for migrating species (e.g., steelhead) and provides for a geomorphologically stable system to hold the stream dimension post Hyla Crossing removal. Bankfull benches and riparian planting specifics will be developed during subsequent plan refinement.

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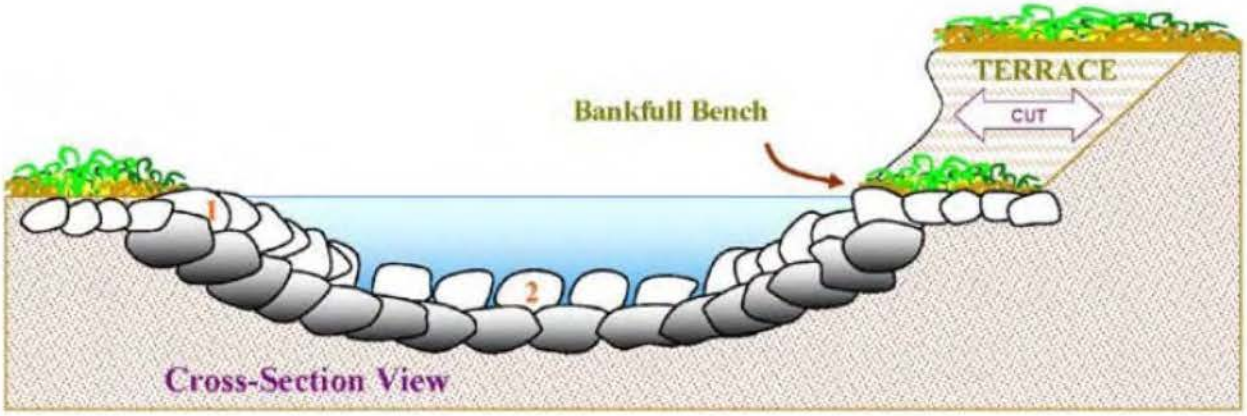
FIGURES

Figure 1
Pismo Creek Watershed Boundary

Figure 2
Typical Modified Step-pool Complex (Source: Wildland Hydrology, 2009)



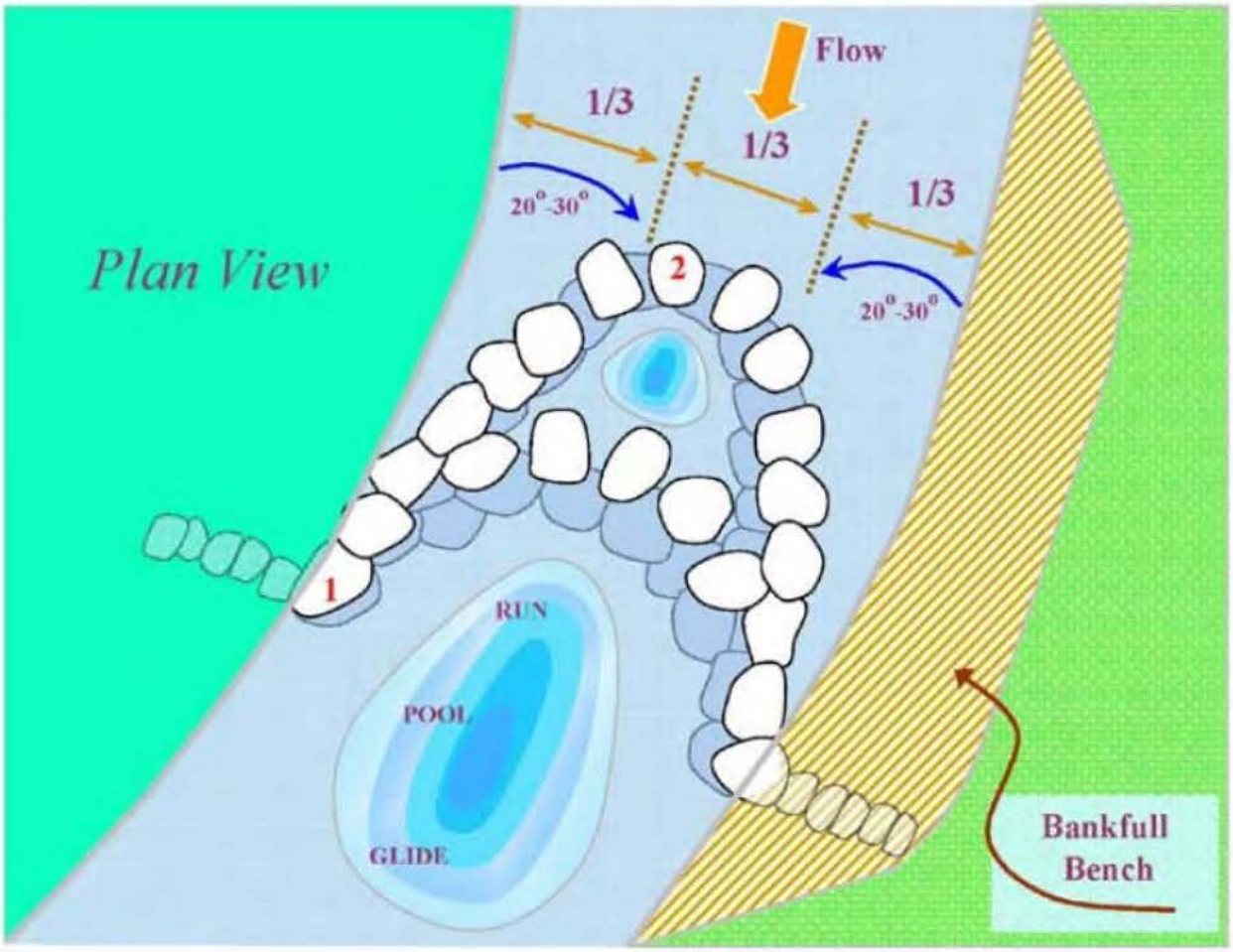
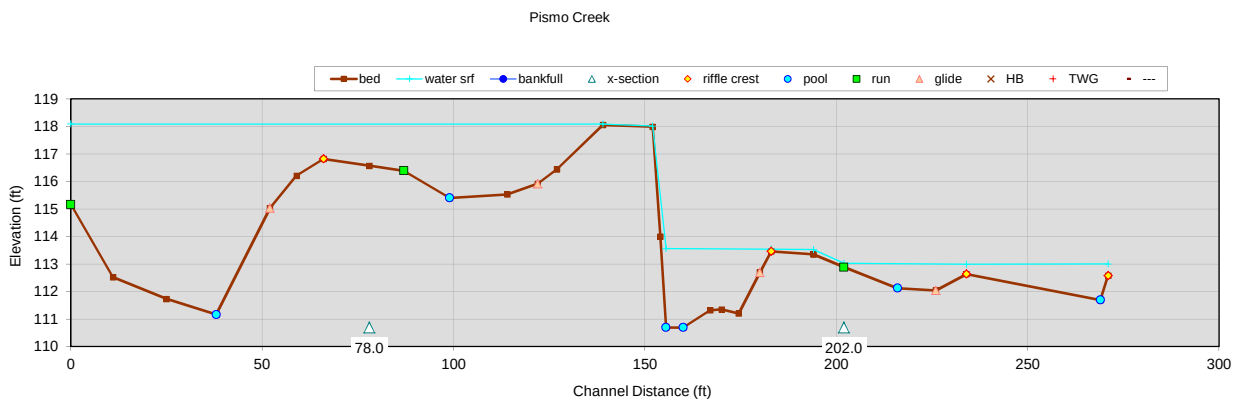


Fig. 3A. Longitudinal Dat at the Hyla Crossing

Longitudinal Slope Profile



	slope (%)		slope ratio		length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	1.9		---		271.0	(10.4 channel widths)	---		---		---	
riffle	2.5	(2 - 2.7)	1.3	(1.1 - 1.4)	25.0	(19 - 35)	1	(0.7 - 1.3)	---		---	
pool	#DIV/0!		---		11.5	(0 - 23)	0.4	(--- - 0.9)	46.2	(4.5 - 61)	1.8	(0.2 - 2.3)
run	8.1	(5.4 - 11)	4.3	(2.8 - 5.8)	21.3	(12 - 38)	0.8	(0.5 - 1.5)	---		---	
glide	0	(0 - 16)	0	(0 - 8.4)	14.6	(3 - 33.5)	0.6	(0.1 - 1.3)	---		---	

notes	cross section ID	bed feature	station	station	Benchmark Elevation 118.1 Turning Points BS	HI	FS	FS bed	water	FS bankfull	user defined FS HB	FS TWG	FS	azimuth AZ	ELEV bed	ELEV water srf	ELEV bankfull	ELEV HB	ELEV TWG	ELEV ---
back sight to benchmark					5.3	123.4														
Start of LP - Upstream		N	0			123.4		8.24	5.31						115.16	118.09				
			11			123.4		10.88							112.52					
			25			123.4		11.67							111.73					
		P	38			123.4		12.24							111.16					
		G	52			123.4		8.37							115.03					
			59			123.4		7.19							116.21					
		R	66			123.4		6.58							116.82					
	US1		78			123.4		6.83							116.57					
		N	87			123.4		7.01							116.39					
		p	99			123.4		8							115.4					
			114			123.4		7.87							115.53					
chk		G	122			123.4		7.48							115.92					
			127			123.4		6.96							116.44					
			139			123.4		5.35	5.31						118.05	118.09				
			152			123.4		5.41	5.39						117.99	118.01				
			154			123.4		9.4							114					
		p	155.5			123.4		12.71	9.84						110.69	113.56				
		p	160			123.4		12.71							110.69					
			167			123.4		12.08							111.32					
			170			123.4		12.05							111.35					
			174.5			123.4		12.2							111.2					
		G	180			123.4		10.71							112.69					
		R	183			123.4		9.94	9.86						113.46	113.54				
			194			123.4		10.05	9.88						113.35	113.52				
	DS1	N	202			123.4		10.52	10.38						112.88	113.02				
		P	216			123.4		11.28							112.12					
		G	226			123.4		11.36							112.04					
		R	234			123.4		10.77	10.41						112.63	112.99				
		P	269			123.4		11.71							111.69					
		R	271			123.4		10.82	10.4						112.58	113				
						123.4														

Figure 3B. Pre- and Post-construction reach profile

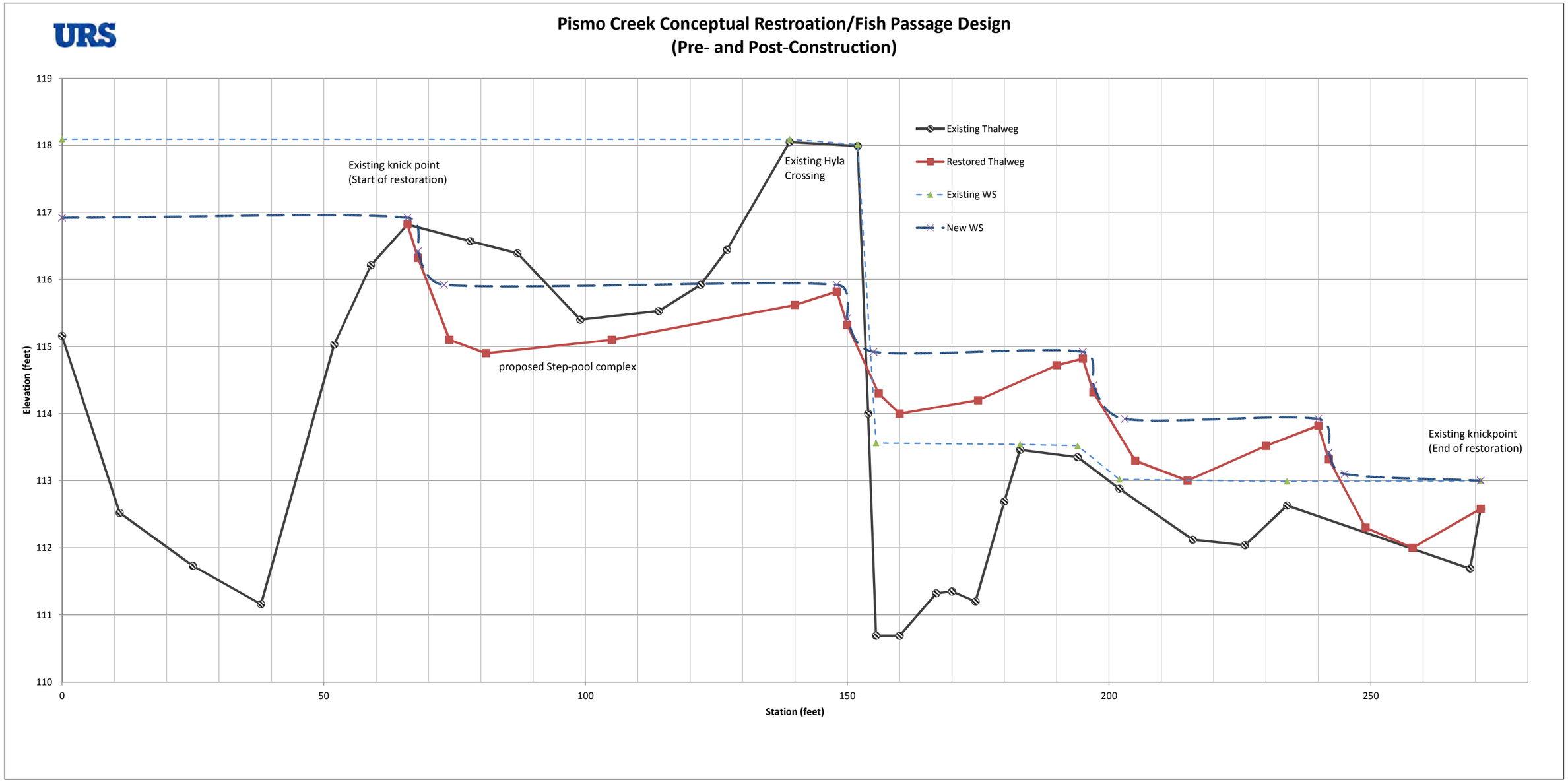


Figure 4
Cross-sectional Analyses

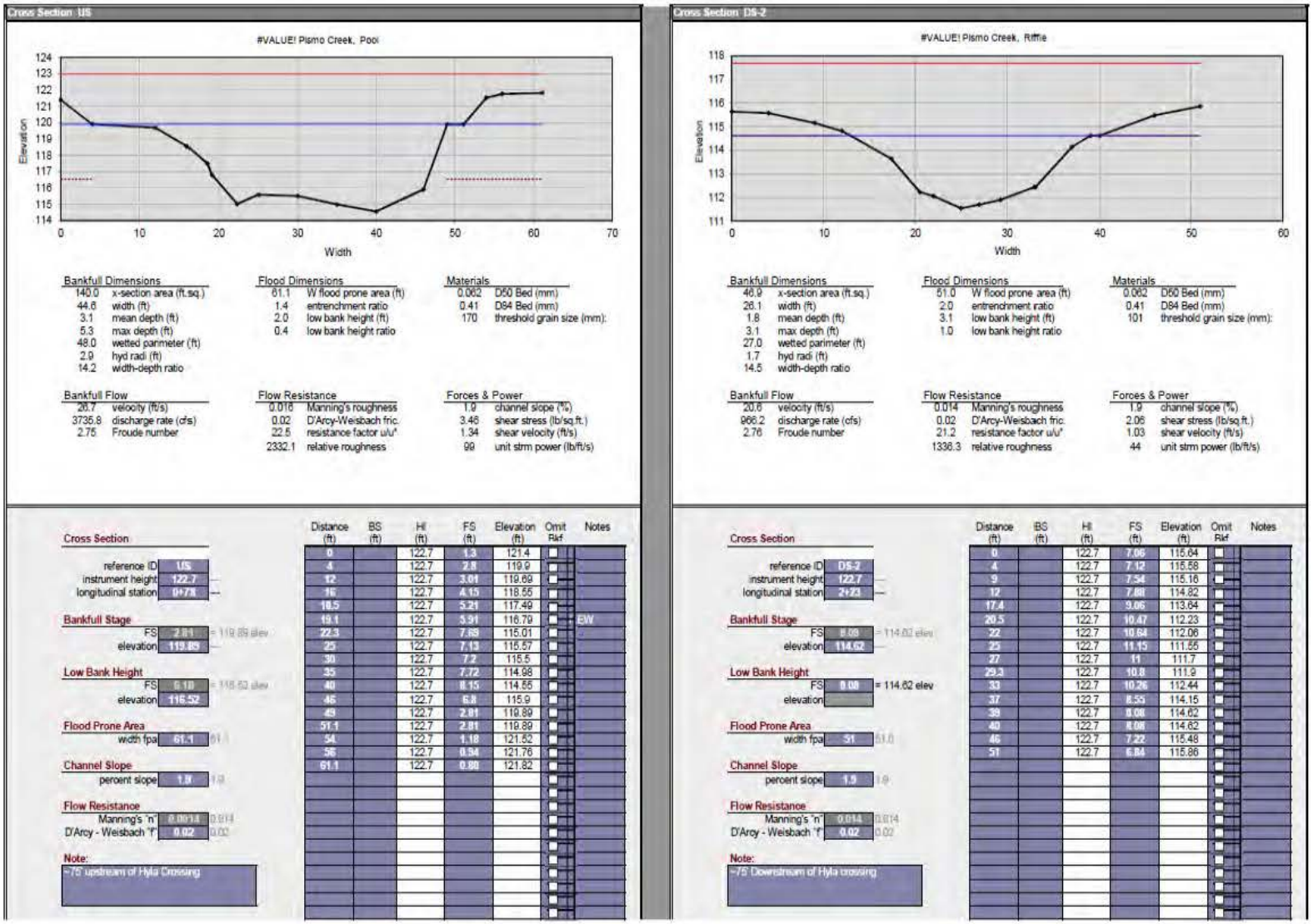
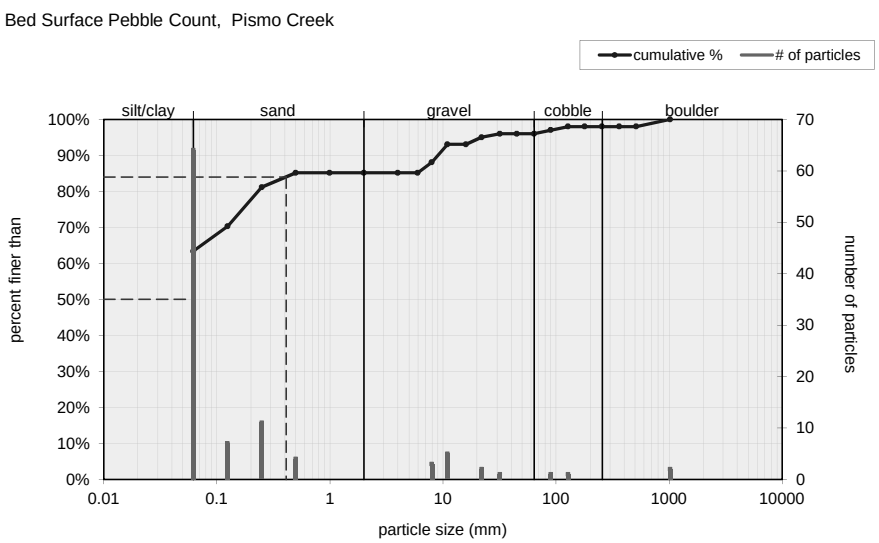


Figure 5. Stream Bed Material Analyses

Bed Surface

Material	Size Range (mm)	Count
silt/clay	0 - 0.062	**64**
very fine sand	0.062 - 0.125	**7**
fine sand	0.125 - 0.25	**11**
medium sand	0.25 - 0.5	**4**
coarse sand	0.5 - 1	
very coarse sand	1 - 2	
very fine gravel	2 - 4	
fine gravel	4 - 6	
fine gravel	6 - 8	**3**
medium gravel	8 - 11	**5**
medium gravel	11 - 16	
coarse gravel	16 - 22	**2**
coarse gravel	22 - 32	**1**
very coarse gravel	32 - 45	
very coarse gravel	45 - 64	
small cobble	64 - 90	**1**
medium cobble	90 - 128	**1**
large cobble	128 - 180	
very large cobble	180 - 256	
small boulder	256 - 362	
small boulder	362 - 512	
medium boulder	512 - 1024	**2**
large boulder	1024 - 2048	
very large boulder	2048 - 4096	
total particle count:		101
bedrock ----------		
clay hardpan ----------		
detritus/wood ----------		**11**
artificial ----------		
total count:		112

Note: Upstream of Hyla Crossing



Size (mm)	
D16	0.062
D35	0.062
D50	0.062
D65	0.073
D84	0.41
D95	22

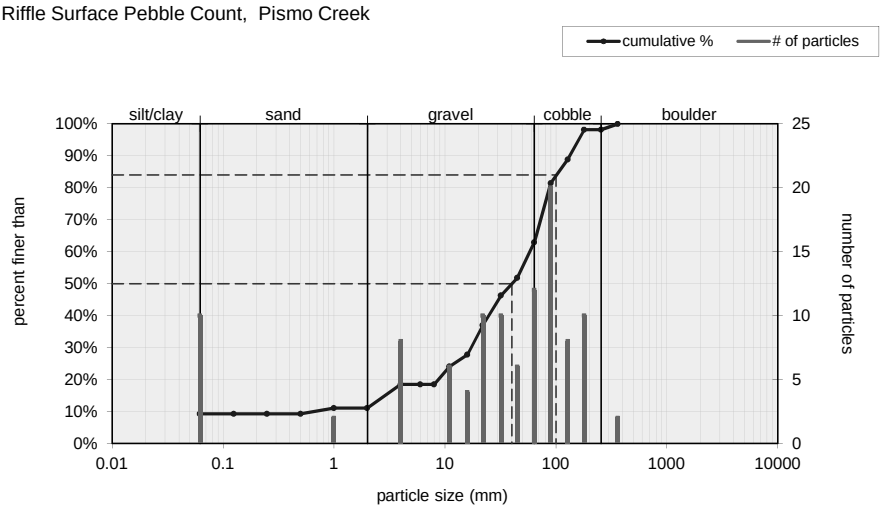
Size Distribution	
mean	0.2
dispersion	3.8
skewness	0.45

Type			
silt/clay	57%		
sand	20%		
gravel	10%	wood/det	10%
cobble	2%		
boulder	2%		

Riffle Surface

Material	Size Range (mm)	Count
silt/clay	0 - 0.062	**10**
very fine sand	0.062 - 0.125	
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	
coarse sand	0.5 - 1	**2**
very coarse sand	1 - 2	
very fine gravel	2 - 4	**8**
fine gravel	4 - 6	
fine gravel	6 - 8	
medium gravel	8 - 11	**6**
medium gravel	11 - 16	**4**
coarse gravel	16 - 22	**10**
coarse gravel	22 - 32	**10**
very coarse gravel	32 - 45	**6**
very coarse gravel	45 - 64	**12**
small cobble	64 - 90	**20**
medium cobble	90 - 128	**8**
large cobble	128 - 180	**10**
very large cobble	180 - 256	
small boulder	256 - 362	**2**
small boulder	362 - 512	
medium boulder	512 - 1024	
large boulder	1024 - 2048	
very large boulder	2048 - 4096	
total particle count:		108
bedrock ----------		
clay hardpan ----------		
detritus/wood ----------		**3**
artificial ----------		
total count:		111

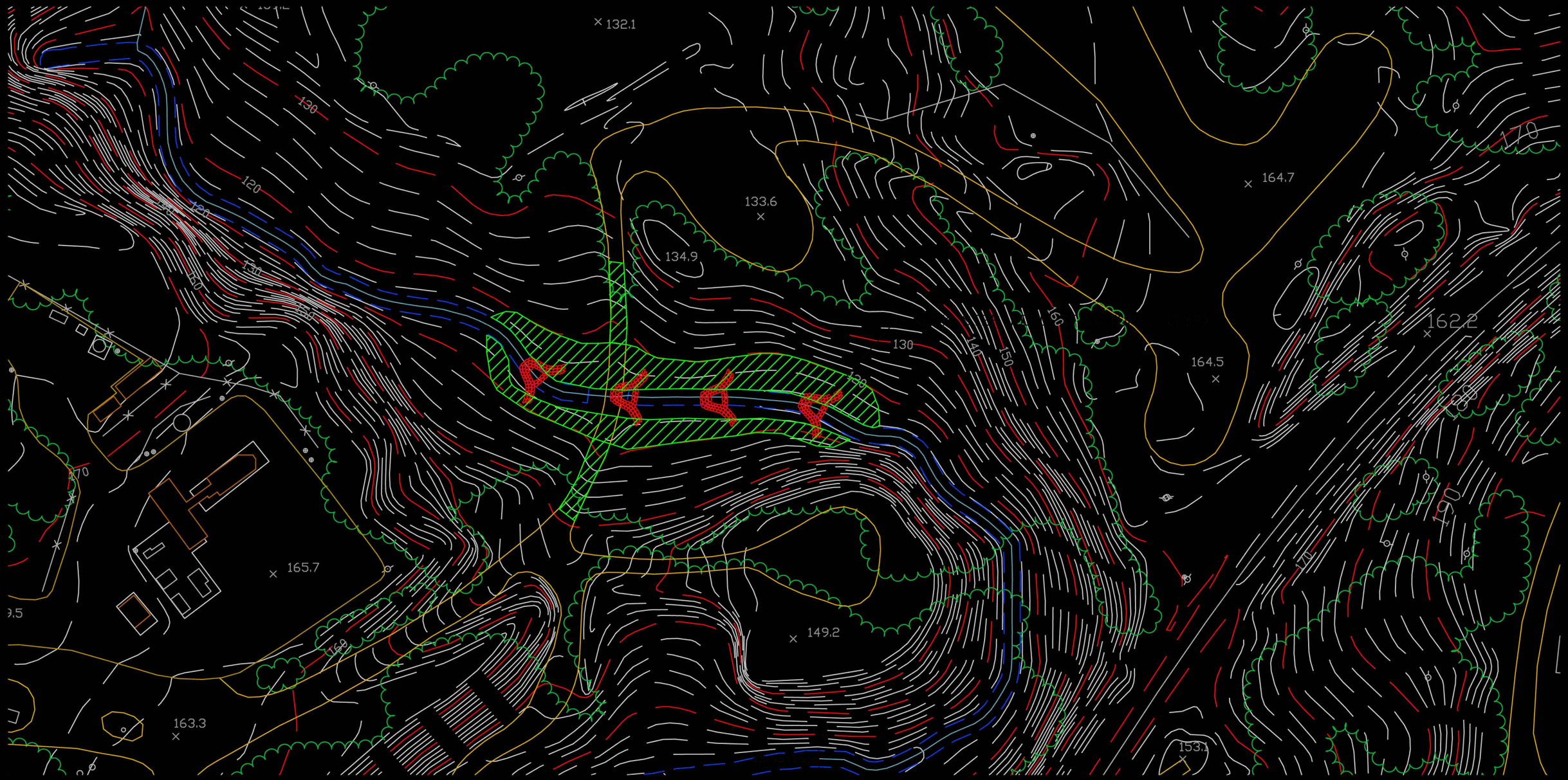
Note: Downstream of Hyla Crossing



Size (mm)		
D16	3.2	3.4
D35	21	12
D50	40	17
D65	66	20
D84	100	29
D95	160	39

Size Distribution	
mean	17.9
dispersion	7.5
skewness	-0.29

Type			
silt/clay	9%		
sand	2%		
gravel	50%	wood/det	3%
cobble	34%		
boulder	2%		



GRADING/REVEGETATION AREA

URS

TABLES

Table 1
Meteorological Data Used in Modeling for Pismo Creek
(Source: Balance Hydrologics 2011)

Parameter	1992 Rainfall	100-year Rainfall
probability	approx 50% (2-yr)[1]	1%
output type	Annual Duration	Annual Duration
intensity duration	5 minutes	5 minutes
storm duration	24 hours	24 hours
Rainfall intensities (inches)		
5 minutes	0.19	0.21
15 minutes	0.33	0.37
1 hour	0.71	0.77
2 hours	1.03	1.13
3 hours	1.26	1.38
6 hours	1.76	1.93
12 hours	2.19	2.4
24 hours	2.73	3.02

Notes:
1) Maximum rainfall intensities from 1992 were used because peak discharge on Lopez Creek that year appears to have been an approximately 1.3-year flood event.
2) Rainfall intensity and duration for the 100-yr strom were derived according to methods outlined in the City and County of San Luis Obispo Waterway Management Plan (2003).
3) Mean Annual Precipitation in the Lopez Watershed is similar to that in the upper Pismo Watershed. data have not been scaled.

Table 2
Pismo Creek Flow Characteristics (Source: Balance Hydrologics 2009)

Watershed Name	Pismo Ck U/S Ormonde Rd	Pismo Ck U/S PxP Trib	PxP Tributary
Subbasin Characteristics			
Drainage Area (mi^2)	1.6	1.5	7.0
Curve Number	81	74	79
Initial Abstraction (in)	0.47	0.70	0.53
Percent Impervious	0%	0%	0%
Sheet Flow Characteristics			
Manning's Roughness Coefficient	0.25	0.25	0.25
Flow Length (ft)	300	300	300
Two-Year 24-hour Rainfall (in)	2.8	2.7	2.9
Land Slope ($^{ft}/_{ft}$)	0.124	0.163	0.118
Sheet Flow Time of Travel (hr)	**0.31**	**0.28**	**0.31**
Shallow Concentrated Flow Characteristics			
Surface Description (1 - unpaved, 2 - paved)	1	1	1
Flow Length (ft)	8,492	6,097	12,880
Watercourse Slope ($^{ft}/_{ft}$)	0.1	0.1	0.1
Average Velocity ($^{ft}/_{s}$)	3.967	3.819	3.635
Shallow Concentrated Flow Time of Travel (hr)	**0.59**	**0.44**	**0.98**
Channel Flow Characterisitics			
Cross-sectional Flow Area (ft^2)	280	280	200
Wetted Perimeter (ft)	51	51	41
Hydraulic Radius (ft)	5.5	5.5	4.9
Channel Slope ($^{ft}/_{ft}$)	0.007	0.005	0.009
Manning's Roughness Coefficient	0.055	0.06	0.05
Average Velocity ($^{ft}/_{s}$)	7.0	5.4	8.0
Flow Length (ft)	2,433	4,799	10,757
Channel Flow Time of Travel (hr)	**0.10**	**0.25**	**0.37**
Basin Time of Concentration (hr)	**1.00**	**0.97**	**1.67**
Basin Lag Time (hr)	**0.60**	**0.58**	**1.00**

Table 3
Peak Flows within Pismo Creek (Source: Balance Hydrologics)

HEC-HMS Description	Type	Drainage Area (mi^2)	2-year Storm		100-year Storm	
			Peak Flow (cfs)	Volume (ac-ft)	Peak Flow (cfs)	Volume (ac-ft)
Pismo Ck U/S Ormonde Rd	subbasin	1.6	212	75	261	114
Pismo Ck at Ormonde Rd	**junction**	**26.6**	**2,909**	**1,265**	**3,565**	**1,914**
Pismo Ck U/S PxP	subbasin	1.5	114	45	143	74
Pismo Ck U/S PxP Tributary	**junction**	**28.2**	**2,972**	**1,309**	**3,647**	**1,988**
PxP Tributary	subbasin	7.0	605	285	748	444
Pismo Ck and PxP Tribuatary	**junction**	**35.2**	**3,441**	**1,594**	**4,242**	**2,433**

ROCK SIZING CALCULATIONS
(Designed for stability in the 100-year event)

Engineered Streambed Material Calculations

Design equations to calculate the gradation and thickness of engineered streambed material used in the roughened channel

Proposed Conditions Site Data		
Design Flow (Q_{100})	2940	cfs
Channel Width =	30	ft
q =	98.0	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.04	ft/ft

Bathhurst (1987)

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)

D_{50} = 3.56 q^2/3 S^.75 / g^1/3

D_{50} = 2.1 ft

Robinson et al. (1998)

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)

$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

q_{design} (m^3/s/m) = 9.10

D_{50} (mm) = 593

D_{50} = 1.9 ft

Abt and Johnson (1991)

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)

D_{50} = 0.436 q_{sizing}^0.56 S^0.43

q_{sizing} = q * sizing factor

sizing factor = 1.35

D_{50} = 1.7 ft

Choose D_{50} = 2.0 ft

Grain Size Distribution (WDFW, 2003)

D_{84}/D_{100} = 0.4
D_{84}/D_{50} = 2.5
D_{84}/D_{16} = 8

Note: Above ratios are based on wide variety of stream beds in different environments. The D_{84}/D_{100} ratio of 0.4 may give too large of boulder size. Judgment should be made to adjust size to something reasonable for the site. ACOE EM 1110-2-1601 suggests using D_{100}=2xD_{50}. If using ACOE steep slope methods to size substrate then D_{84} =1.5D_{30} (WDFW, 2003)

Engineered Streambed Material Results

Size Class	Size	
D_{100} =	4.0	ft
D_{84} =	3.5	ft
D_{50} =	2.0	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Thickness (ACOE EM 1110-2-1601)

Thickness greater of equal to max(1.5XD_{50} or D_{100})

T = 4.0 ft

References:

1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601

Rock Slope Protection Calculations

USACE Riprap Design

EM 1110-2-1601

D_{30} =	$S_f C_s C_v C_T d [(Y_w/\{Y_s-Y_w\})^{0.5} V_{ss} /\{K g d\}^{0.5}]^{2.5}$	(Eq. 3-3)
V_{ss} =	(1.74 - 0.52 LOG (R/W)) x V_{AVG}	(Plate B-33)
C_v	1.28 - 0.2*LOG(R/W)	(pp. 3-6)

Location	Upstream	Units	Entry type	Description
RS	2+80	ft	(enter)	River Station - Design
V_{US}	9.40	fps	(enter)	channel velocity upstream of bend
V_{AVG}	**9.40**	fps	(enter)	DESIGN VELOCITY (average channel velocity at upstream end of bend)
Rc	228	ft	(enter)	Centreline radius of curvature bend of main channel
W	32	ft	(enter)	Width of water surface of main channel at upstream end of bend
Rc/W	7.1	-	(result)	R/W ratio (if greater than 26, Cv=1{not automated})
V_{ss}	12.19	fps	(result)	Side slope (design) velocity
S_f	1.2	-	(enter)	Safety Factor (Import., Acc., Impact, Const., Mat., Ice)
C_s	0.3	-	(constant)	Stability coefficient for angular rock
C_v	1.11	-	(result)	Vert. vel. coeff.
$C_{v\ (INSIDE)}$	1.11	-	(enter)	Vert. vel. coeff. overide (1.0 inside, 1.25 dikes)
C_T	1	-	(constant)	Thickness coefficient
d	5.7	ft	(enter)	Local depth upstream of bend (same location as V)
Y_w	62.4	pcf	(constant)	Unit weight of water
Y_s	165	pcf	(constant)	Unit weight of rock (155pcf : SG = 2.5 min. per Caltrans 72-2.02)
ϑ	33.69	deg	(enter)	Angle of side slope with horizontal
φ	40	deg	(constant)	Angle of repose of riprap (40 typ., 39-42 per Fig 12.1 HEC-23)
K	0.505	-	(constant)	Side slope correction factor
g	32.2	-	(constant)	Gravitational constant
D_{30}	**2.20**	ft	(result)	Riprap size of which 30% is finer by wt.
W_{30}	924	lbs	(result)	Based on a sphere, 165 pcf
$W_{100,\ max}$	7873	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$W_{100,\ min}$	3149	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$W_{50,\ max}$	2335	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$W_{50,\ min}$	1575	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$W_{15,\ max}$	1168	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$W_{15,\ min}$	492	lbs	(enter)	Refer to Table 3-1, p3-3, SG=165 pcf
$D_{100,\ max}$	55	in.	(result)	Based on a sphere, 165 pcf
$D_{100,min}$	41	in.	(result)	Based on a sphere, 165 pcf
$D_{50,\ max}$	37	in.	(result)	Based on a sphere, 165 pcf
$D_{50,\ min}$	32	in.	(result)	Based on a sphere, 165 pcf
$D_{15,\ max}$	29	in.	(result)	Based on a sphere, 165 pcf
$D_{15,\ min}$	22	in.	(result)	Based on a sphere, 165 pcf
t	5	ft	(result)	thickness, t = 1.5D50, max or D100, max
$t_{selected}$	5.0	ft	(enter)	Selected layer thickness (25-75% volume increase for launching, T3-2)

Equivalent CALTRANS Standard Class

W50 ave	1955	lbs	(result)	Average of W50, max and W50, min for use below or use D30 if higher
CLASS	1 ton	-	(enter)	Equivalent class from average of $W_{50,\ min}$ and $W_{50,\ max}$ (Caltrans Table 5-1)
Thickness	4.3	ft	(enter)	Minimum Thickness, per placement method below (T5-3)

Backing - Caltrans Method (Simpler than USACE)

CLASS bak	1 OR 2	-	(enter)	Selected backing class based on Equiv. class (from Caltrans T5-2)
w 50 bak	75 or 25	lbs	(enter)	Selected backing W min (from Caltrans T5-1)
D 50 bak	11" or 8"	in	(enter)	Selected backing D 50 (from Caltrans T5-1)
t bak	1.8 or 1.25	ft	(enter)	Selected backing layer thickness (from Caltrans T5-3)
RSP Fabric	B	-	(enter)	Selected RSP Fabric Type (from Caltrans T5-2) A For <1/4T
Placement	A	-	(enter)	Selected placement (from Caltrans T5-3) A=Placed, B=dumped

Summary of Selected R.S.P.

Outer Class	1 ton
Outer thickness	5 ft
Backing Size	Class 2
Backing thickness	1.3
Fabric type	B
Placement type	A
Toe depth	twg - 4
Total thickness	6.3

Weir Boulder Calculations

Proposed Conditions Site Data

Design Flow (Q100)	2940	cfs
Channel Width =	30	ft
q =	98.0	cu.ft./sec ft
qdesign (1.25q) =	122.5	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.04	ft/ft

Design equation to calculate boulder sizes used in weirs

Steep Slope Riprap Design (ACOE EM 1110-2-1601 eqn.3-5)

D30 = 1.95 q^2/3 S^.555 / g^1/3

applicable for: S range(2% to 20%)
side slopes 2.5H:1V of flatter

D30 = 2.5 ft

Weir Boulder Gradation

Percent Finer	Max Stone Weight (lbs)	Size (ft)	Size (in)
D15	1168	2.4	29
D30 min	1404	**2.5**	30
D50	2335	3.0	36
D90 min	2831	3.2	38
D100	7873	4.5	54

Note: Gradation determined from (ACOE EM 1110-2-1601 pg 3-3)

Results

Use weir boulders with minimum y-axis dimension of 4 feet

References:

1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.

2.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601

APPENDIX D
PLANT SPECIES LIST
(FEBRUARY 2013)

APPENDIX D
PLANT SPECIES LIST

Scientific Name	Common Name	Native/Exotic	Wetland Indicator Status[2]
Ambrosia psilostachya	Western ragweed	N	FACU
Apium graveolens	Wild celery	E[1]	UPL
Artemisia douglasiana	Mugwort	N	FAC
Aster sp.	Aster species	–	–
Baccharis pilularis	Coyote bush	N	UPL
Baccharis salicifolia	Mulefat	N	FAC
Brassica nigra	Black mustard	E[1]	UPL
Carduus pycnocephalus	Italian thistle	E[1]	UPL
Carex sp.	Sedge species	N	–
Conium maculatum	Poison hemlock	E[1]	FACW
Cortaderia selloana	Pampas grass	E[1]	FACU
Cyperus eragrostis	Flatsedge	N	FACW
Delairea odorata (*Senecio mikanioides*)	Cape ivy	E[1]	UPL
Equisetum arvense	Common horsetail	N	FAC
Foeniculum vulgare	Sweet fennel	E[1]	UPL
Geranium spp.	Geranium	E[1]	UPL
Heteromeles arbutifolia	Toyon	N	–
Heterotheca grandiflora	Telegraph weed	N	UPL
Lamiaceae	Mint species	–	–
Medicago polymorpha	Burclover	E[1]	FACU
Nasturtium officinale	Watercress	N	OBL
Piptatherum miliaceum	Smilo grass	E[1]	UPL
Plantago lanceolata	English plantain	E[1]	FAC
Platanus racemosa	Western sycamore	N	FAC
Quercus agrifolia	Coast live oak	N	UPL
Rubus ursinus	California blackberry	N	FAC
Rumex crispus	Curly dock	E[1]	FAC
Salix laevigata	Red willow	N	FACW
Salix lasiolepis	Arroyo willow	N	FACW
Sambucus nigra (*S. mexicana*)	Blue elderberry	N	FAC
Symphoricarpos sp.	Snowberry species	N	–
Toxicodendron diversilobum	Poison oak	N	UPL
Typha spp.	Cattail	N	OBL
Umbellularia californica	California bay tree	N	FAC

APPENDIX D (CONTINUED)
PLANT SPECIES LIST

Scientific Name	Common Name	Native/Exotic	Wetland Indicator Status[2]
Urtica dioica	Stinging nettle	N	FAC
Vinca major	Periwinkle	E[1]	UPL
	Unidentifiable non-native grasses	E[1]	–

1 Listed as invasive by Cal-IPC for the southwest region (Cal-IPC 2013).

2 OBL: Obligate Wetland, FACW: Facultative Wetland, FAC: Facultative, FACU: Facultative Upland, UPL: Upland.

APPENDIX E
TREE SPECIES MEASUREMENTS

APPENDIX E
TREE SPECIES MEASUREMENTS

							Diameter at Breast Height (Inches)								
Species	Waypoint	Number of Individuals	DBH Range (Inches)[1]	Area (Feet^2)[1]	Drip Line (Feet)[2]	Number of Stems	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	Stem 6	Stem 7	Stem 8	Stem 9
Coast live oak	Oak001	1			3	1	3								
Coast live oak	Oak002	1			36	3	35	29	11						
Coast live oak	Oak003	1			45	1	30								
Coast live oak	Oak004	1			35	1	20.5								
Coast live oak	Oak005	1			45	1	18.9								
Coast live oak	Oak006	1			45	1	18.2								
Coast live oak	Oak007	1			50	1	35								
Coast live oak	Oak008	1			35	1	13								
Coast live oak	Oak009	1			3.5	1	6.4								
Coast live oak	Oak010	1			7	1	7.2								
Coast live oak	Oak011	1			45	1	> 50								
Coast live oak	Oak012	1			45	1	26								
Coast live oak	Oak013	1			15	1	14								
Coast live oak	Oak014	1			50	1	> 50								
Coast live oak	Oak015	1			45	1	45								
Coast live oak	Oak016	1			30	1	19.6								
Coast live oak	Oak017	1			25	4	25	18	16	8					
Coast live oak	Oak018	1			12	1	11								
Coast live oak	Oak019	1			10	1	8.5								
Coast live oak	Oak020	1			3	1	3.2								
Coast live oak	Oak021	1			25	1	20.4								
Coast live oak	Oak022	1			20	1	18.5								
Coast live oak	Oak023	1			50	1	45								
Coast live oak	Oakwood001	10	3–14												
Coast live oak	Oak024	1			3	1	1.5								
Coast live oak	Oak025	1			3	1	2.7								
Coast live oak	Oak026	1			3	1	3.4								
Coast live oak	Oak027	1			30	1	22.5								
Coast live oak	Oak028	1			40	1	34								
Coast live oak	Oak029	1			10	1	5.5								
Coast live oak	Oak030	1			15	4	9	7	6	6					
Coast live oak	Oak031	1			9	1	8.2								
Coast live oak	Oak032	1			10	2	7.8	5.2							

TABLE E-1 (CONTINUED)
TREE SPECIES MEASUREMENTS

							Diameter at Breast Height (Inches)								
Species	Waypoint	Number of Individuals	DBH Range (Inches)[1]	Area (Feet^2)[1]	Drip Line (Feet)[2]	Number of Stems	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	Stem 6	Stem 7	Stem 8	Stem 9
Coast live oak	Oak033	1			10	1	9.8								
Coast live oak	Oak034	1			12	2	12	8.2							
Coast live oak	Oak035	1			15	2	12.5	10.2							
Coast live oak	Oak036	1			6	1	7.5								
Coast live oak	Oak037	1			22	1	10.5								
Coast live oak	Oak038	1			4	1	4								
Coast live oak	Oak039	1			8	1	4								
Coast live oak	Oak040	1			40	1	> 50								
Coast live oak	Oak041	1			5	2	4	4							
Coast live oak	Oak042	1			12	2	7.6	7.1							
Coast live oak	Oak043	1			50	4	24	22.4	9.5	8.2					
Coast live oak	Oak044	1			30	1	21.2								
Coast live oak	Oak045	1			28	1	22.5								
Coast live oak	Oak046	1			27	4	24	22.4	9.5	8.2					
Coast live oak	Oak047	1			20	9	12.5	11	10.5	10	8.5	7.5	7	6	5
Toyon	Toy001	1			12	1	3								
Western sycamore	Syc001	Unknown		1307											
Western sycamore	Syc002	1			50	1	> 50								
Western sycamore	Syc003	1			50	3	18	17	6.5						
Willow – Arroyo	Ar001	1			15	1	13.4								
Willow – Arroyo	Ar002	1			40	2	9	8.5							
Willow – Arroyo	Ar003	Unknown		0.02											
Willow - Red	Red001	1			8	1	4.7								
Willow - Red	Red002	5	3–30												
Willow - Red	Red003	1			25	1	17								
Willow - Red/Arroyo	Red/Ar001	Unknown	1–2	0.11											
Willow - Red/Arroyo	Red/Ar002	6			25										
Willow - Red/Arroyo	Red/Ar003	Unknown		0.08											
Willow - Red/Arroyo	Red/Ar004	Unknown		0.11											
Willow - Red/Arroyo	Red/Ar005	Unknown		0.11											
Willow - Red/Arroyo	Red/Ar006	Unknown	1–16	0.03											

[1] Values approximated when possible due to impassable barrier present (i.e. thick vegetation, steep slopes, poison oak).
[2] Area was calculated for areas that could not be directly surveyed due to presence of impassable barrier (i.e. thick vegetation, steep slopes, poison oak).

APPENDIX F
NON-PROTOCOL CALIFORNIA RED-LEGGED FROG SURVEY FORMS (FEBRUARY, 2013)PROTOCOL CALIFORNIA RED-

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 02/01/2013 (mm/dd/yyyy)

Survey Biologist: Johanna Kephart (Last name) Kisner Kelly (first name)

Survey Biologist: Gibbs (Last name) Michelle (first name)

Site Location: San Luis Obispo Co.; Hyla Crossing on Pismo Creek
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 1900 **End Time:** 2000

Cloud cover: clear **Precipitation:** 0 in

Air Temperature: 46.3F **Water Temperature:** 49 F

Wind Speed: 2 mph from the N **Visibility Conditions:** clear

Moon phase: waning gibbous **Humidity:** 41%

Description of weather conditions: Cooler night than previous nights

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
nothing observed or heard, likely due to cold temperatures					

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: prickly sculpin, crawdads

Other notes, observations, comments, *etc*.

1 large fish, which was likely steelhead

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 02/15/2013 (mm/dd/yyyy)

Survey Biologist: Kephart (Last name) Kelly (first name)

Survey Biologist: Deutsch (Last name) Jamie (first name)

Site Location: San Luis Obispo Co.; Hyla Crossing on Pismo Creek
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 1830 **End Time:** 2000

Cloud cover: 15% **Precipitation:** 0 in.

Air Temperature: 63.5F **Water Temperature:** 50F

Wind Speed: 1 mph mph from SW **Visibility Conditions:** clear

Moon phase: Waxing crescent **Humidity:** 49%

Description of weather conditions: Mostly clear, calm, warmer than usual

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CA red-legged frog	1	O	adult	large	100%
Pacific treefrog	10+	2(O)5(H)	adult	med-lrg	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: prickly sculpin, crawdads

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

APPENDIX G
PROTOCOL CALIFORNIA RED-LEGGED FROG SURVEY FORMS (JUNE AND JULY 2013)

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/03/2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Pismo Creek upstream & downstream of Hyla crossing, small pond at water plant;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 0800 **End Time:** 1500

Cloud cover: overcast **Precipitation:** 0.01 inches

Air Temperature: 68F **Water Temperature:** 16.5C - 17C

Wind Speed: <5 mph **Visibility Conditions:** clear; 10 mile visibility

Moon phase: Waning crescent **Humidity:** 93% (start), 63% (end)

Description of weather conditions: Overcast with light mist, air temperature 68F, no wind.

Brand name and model of light used to conduct surveys: Maglite 4D and Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8X42 and Nikon Monarch 8X42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06-04-2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co./ Pismo Creek upstream & downstream of Hyla crossing, small pond at water plant, large stock pond;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 2100 **End Time:** 0100

Cloud cover: None **Precipitation:** 0 in.

Air Temperature: 54F **Water Temperature:** 16C

Wind Speed: <5 mph **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waning crescent, not visible **Humidity:** 83% (start), 90% (end)

Description of weather conditions: Clear skies, no moon, air temperature 54F, winds less than 5 mph.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8X42, Nikon Monarch 8x42

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	7	1(O) 1(H)	adult	med-large	
	70+	50+ (H)			

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

One possible CRLF jumped from vegetation into creek, but was not able to be identified.

Most observations were upstream and downstream of the Hyla Crossing

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/06/2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Upper reach of Pismo Creek to pipe crossing, drainage to wetland, large and small ponds;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** (continued) **2** **3** **4** **5** **6** **7** **8**

Begin Time: 0830 **End Time:** 1200

Cloud cover: Overcast **Precipitation:** 0 in.

Air Temperature: 55F **Water Temperature:** 16C

Wind Speed: <5 mph **Visibility Conditions:** clear, 10 mile visibiilty

Moon phase: Waning crescent **Humidity:** 90% (start), 61% (end)

Description of weather conditions: Overcast, winds less than 5 mph, air temperature 55F.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8X42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/07/2013 (mm/dd/yyyy)

Survey Biologist: Kephart (Last name) Kelly (first name)
Kisner David

Survey Biologist: Whitsitt (Last name) Tiffany (first name)

Site Location: San Luis Obispo Co.; Upstream & downstream of Hyla crossing, large and small ponds;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 2100 **End Time:** 0100

Cloud cover: Partly cloudy **Precipitation:** 0 in.

Air Temperature: 55F **Water Temperature:** not recorded

Wind Speed: 3.5 mph or less **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waning crescent, almost new **Humidity:** 84% (start), 93% (end)

Description of weather conditions: Partly cloudy, air temperature 55F, winds 3.5 mph or less.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/11/2013 (mm/dd/yyyy)

Survey Biologist: Love (Last name) Julie (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Pismo Creek upstream & downstream of Hyla crossing, large & small ponds;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 0800 **End Time:** 1500

Cloud cover: Mostly cloudy **Precipitation:** 0 in.

Air Temperature: 61 - 74F **Water Temperature:** not recorded

Wind Speed: 0 - 17.3 mph, from NW **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waxing crescent **Humidity:** 81% (start), 52% (end)

Description of weather conditions: Mostly cloudy, air temperature 61 - 74F, winds up to 17.3 mph from NW.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/14/2013 (mm/dd/yyyy)

Survey Biologist: Love (Last name) Julie (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Pismo Creek upstream & downstream of pipe crossing;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** (continued) **3** **4** **5** **6** **7** **8**

Begin Time: 0800 **End Time:** 1500

Cloud cover: None **Precipitation:** 0 in.

Air Temperature: 61 - 77F **Water Temperature:** not recorded

Wind Speed: 4.6 - 6.1 mph from WSW **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waxing crescent **Humidity:** 72% (start), 37% (end)

Description of weather conditions: Clear skies, air temperature 61 - 77F with 4.6 - 6.1 mph winds from WSW.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/14/2013 (mm/dd/yyyy)

Survey Biologist: Kephart (Last name) Kelly (first name)
Fletcher Billy

Survey Biologist: Whitsitt (Last name) Tiffany (first name)

Site Location: San Luis Obispo Co.; Pismo Creek Upstream & downstream of Hyla crossing, upstream and downstream of northern pipe crossing, Drainage B, retention basin, and pad 17 pond;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Culvert Maintenance Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Cont.

Begin Time: 2100 **End Time:** 0100

Cloud cover: Partly cloudy **Precipitation:** 0 in.

Air Temperature: 55F **Water Temperature:** not recorded

Wind Speed: 4.6 mph or less **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waxing crescent **Humidity:** 87% (start), 89% (end)

Description of weather conditions: Partly cloudy, air temperature 55F, winds 4.6 mph or less.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%
Rana sp.					

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/21/2013 (mm/dd/yyyy)

Survey Biologist: Love (Last name) Julie (first name)

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Carpenter Canyon Tributary to Pismo Creek near Pad 41, drainage at water plant;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project

Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** (continued) **3** **4** **5** **6** **7** **8**

Begin Time: 0800 **End Time:** 1500

Cloud cover: None **Precipitation:** 0 in.

Air Temperature: 59 - 74F **Water Temperature:** not recorded

Wind Speed: 9.2 - 27.6 mph from NW **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waxing gibbous **Humidity:** 69% (start), 39% (end)

Description of weather conditions: Clear skies, air temperature 59 - 74F with 9.2 - 27.6 mph winds from NW.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	2	1(O) 1(H)	adult	large	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: crawdads, prickly sculpin

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/22/2013 (mm/dd/yyyy)

Survey Biologist: Kephart Whitsitt (Last name) Kelly Tiffany (first name)

Survey Biologist: Julian (Last name) Chris (first name)

Site Location: San Luis Obispo Co.; Upstream & downstream of the Hyla- and pipe crossings, Carpenter Canyon Tributary to Pismo Creek near Pad 41, large & small ponds, and drainage at water plant;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 2100 **End Time:** 0100

Cloud cover: None **Precipitation:** 0 in.

Air Temperature: 65F **Water Temperature:** not recorded

Wind Speed: 0 mph **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Supermoon **Humidity:** 72% (start), 80% (end)

Description of weather conditions: Clear skies, warm, full supermoon. Air temperature 65F with no winds.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
Pacific Treefrog	22	3(O)19(H)	adult	full	100%
American bullfrog	6	O	adult	large	100%
unknown frog	1	O	adult	large	0%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: bullfrogs, crawdads, and 1 rat observed.

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 06/30/2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)
Deutsch Jamie

Survey Biologist: Kephart (Last name) Kelly (first name)

Site Location: San Luis Obispo Co.; Upstream & downstream of the Hyla- and pipe crossings, Carpenter Canyon Tributary to Pismo Creek near Pad 41, large & small ponds, and drainage at water plant;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 2100 **End Time:** 0030

Cloud cover: None **Precipitation:** 0 in.

Air Temperature: 69F **Water Temperature:** not recorded

Wind Speed: <2 mph **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Third quarter **Humidity:** 61% (start), 75% (end)

Description of weather conditions: Clear skies, warm, air temperature 69F, slight breeze less than 2 mph.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
American bullfrog	9	6(O) 3(H)	adult	large	100%
Pacific treefrog	30+	10(O)20+(H)	adult	full	100%
Pacific treefrog	50+	0	tadpoles	n/a	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: bullfrog and crawdads

Other notes, observations, comments, *etc.*

small fish, great horned owl.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 07/23/2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)
Kisner David

Survey Biologist: Deutsch (Last name) Jamie (first name)

Site Location: San Luis Obispo Co.; Pismo Creek Upstream & downstream of the Hyla and Northern pipe crossings, Cañada Verde Tributary, retention basin, pad 17 pond, and drainage B;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport McMoRan Oil & Gas - Phase V
Brief description of proposed action:

Freeport McMoRan Oil & Gas proposes to expand operations at the 1,480-acres Arroyo Grande Oil Field through a Phase V Development Plan. The following principal activities are proposed to occur over approximately 10 years: addition of 11 new well pads (with access roads) and modification of 34 existing well pads; Drilling ~350 wells; decommission of old wells; installation of five 85 MMBtu/hr steam generators; installation of additional production and steam lines to support Phase V production; expansion of existing electrical power system/lines; and replacement of an existing pipe bridge over Pismo Creek.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 0730 **End Time:** 1130

Cloud cover: Partly cloudy **Precipitation:** 0 in.

Air Temperature: 61F **Water Temperature:** 18C

Wind Speed: <5 mph **Visibility Conditions:** Partly foggy, 10 mile visibility

Moon phase: Supermoon **Humidity:** 86% (start), 50% (end)

Description of weather conditions: Air temperature 61F, foggy, cool, low clouds, winds less than 5 mph.

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
American bullfrog	2	H	Adult	large	100%
Pacific Treefrog	90+	O	Tadpoles	n/a	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: bullfrogs, crawdads, large fish (trout?)

Other notes, observations, comments, *etc*.

1 southwestern pond turtle on Carpenter Canyon Tributary
1 coyote
small fish

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: 07/24/2013 (mm/dd/yyyy)

Survey Biologist: Kisner (Last name) Johanna (first name)
Kisner David

Survey Biologist: Schuetze (Last name) Anthony (first name)

Site Location: San Luis Obispo Co.; Pismo Creek upstream & downstream of the Hyla- and pipe crossings, Carpenter Canyon Tributary to Pismo Creek near Pad 41, drainage at water plant, large & small ponds;
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Freeport-McMoRan Oil & Gas - Hyla Crossing Replacement Project
Brief description of proposed action:
Freeport-McMoRan Oil & Gas proposes to provide safe, permanent, all-weather access to the previously permitted and approved Hyla Extension lease area and to allow for the removal of the existing Hyla road crossing that is structurally compromised and currently presents a barrier to migration of steelhead. The Project objectives include replacing the existing Hyla Crossing with a new span bridge in 2015. Following installation of the new bridge and removal of the existing roadway, restoration and enhancement of the streambed upstream and downstream of the Hyla Crossing will take place.

Type of Survey (circle one): **DAY** **NIGHT** **BREEDING** **NON-BREEDING**

Survey number (circle one): **1** **2** **3** **4** **5** **6** **7** **8**

Begin Time: 2100 **End Time:** 0100

Cloud cover: Partly cloudy **Precipitation:** 0 in.

Air Temperature: 63.5F **Water Temperature:** 22C

Wind Speed: 0 - 2 mph from SW **Visibility Conditions:** clear, 10 mile visibility

Moon phase: Waning gibbous **Humidity:** 94% (start), 90% (end)

Description of weather conditions: Foggy, partly cloudy, air temperature 63.5F, wind 0 - 2 mph from SW

Brand name and model of light used to conduct surveys: Maglite 4D, Surefire

Were binoculars used for the surveys (circle one)**?** **YES** **NO**
Brand, model, and power of binoculars: Eagle Optics 8x42, Nikon Monarch 8x42

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification
CA red-legged frog	1	O	adult	large	100%
American bullfrog	4	3(O)1(H)	adult	med-lrg	100%
unknown Rana sp. likely bullfrog	1	O	adult	large	10%
Pacific treefrog	2	1(O)1(H)	adult	full	100%
Pacific treefrog	50+	O	tadpoles	n/a	100%

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: prickly sculpin, crawdads, bullfrogs

Other notes, observations, comments, *etc.*

3 Mallards at large pond
small fish

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

APPENDIX H
WETLAND DETERMINATION DATA FORMS – ARID WEST REGION

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site:	AG PXP - Hyla Crossing	City/County:	San Luis Obispo Co	Sampling Date:	2/11/2013
Applicant/Owner:	PXP	State:	CA	Sampling Point:	SP1
Investigator(s):	J. Love, T. Whitsitt	Section, Township, Range:	Corral De Piedra Land Grant		
Landform (hillslope, terrace, etc.):	Creek Bottom	Local Relief (concave, convex, none):	None	Slope (%):	0%
Subregion (LRR):	C	Lat: 35^0 11'5.603"N	Long: 120^0 37'2.023" W	Datum:	NAD83
Soil Map Unit Name:	Arnold loamy sand, 5 to 15 percent slopes	NWI Classification:	PFOC: Palustrine, Forested, Seasonally Floo		

Are climatic/hydrological conditions on the site typical for this time of the year? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☐ or Hydrology ☐ naturally problematic? (If needed, explain answers in remarks)

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

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

Remarks:
Sampling point located on north bank, east of the Hyla Crossing. Sampling point is located on a floodplain terrace.

VEGETATION

Tree Stratum — Plot size: 30' radius	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix laevigata/lasiolepis	15	Y	FACW
2. Platanus racemosa	3	N	FAC
3.			
4.			
Total Cover:	18		
Sapling/Shrub Stratum — Plot size: 20' radius			
1. Baccharis salicifolia	3	Y	FAC
2. Platanus racemosa	2	Y	FAC
3. Salix laevigata/lasiolepis	4	Y	FACW
4.			
5.			
Total Cover:	9		
Herb Stratum — Plot size: 10' radius			
1. Equisetum arvense (dormant)	40	Y	FAC
2. Rumex crispus	1	N	FAC
3. Piptatherum miliaceum	2	N	NI
4. Cyperus eragrostis	<1	N	FACW
5. Foeniculum vulgare	1	N	NI
6. Aster - unknown (live and dormant)	1	N	
7.			
8.			
Total Cover:	46		
Woody Vine Stratum — Plot size: 10' radius			
1. Rubus ursinus	25	Y	FAC
2. Delairea odorata	5	N	NI
Total Cover:	30		
% Bare Ground in Herb Stratum: 29	% Cover of Biotic Crust: 0		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiplied by:	
OBL species		x1 =	0
FACW species		x2 =	0
FAC species		x3 =	0
FACU species		x4 =	0
UPL species		x5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

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

Remarks:
California blackberry (RUUR) and Cape ivy (DEOD) overlap; All willows lack leaves for specific identification; however a dtermination that they were either

SALLAS or SALLAE was possible.

SOIL

Sampling Point: SP1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100%	N/A				SaLo	

[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

Remarks:
Shovel refusal at 12". No hydric soil indicators are present.

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 Rhizopheres 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	Depth (inches): _____
Water Table Present?	☐ Yes	☑ No	Depth (inches): _____
Saturation Present? (Includes capillary fringe)	☐ Yes	☑ No	Depth (inches): _____

Wetland Hydrology Present? ☑ Yes ☐ No

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

Remarks:
Surface water is present in the active channel, approximately 7' away; however surface water is not present adjacent to the sampling point. FAC-neutral test is satisfied.

2:1.