Initial Study/Mitigated Negative Declaration

Buckman Road Bridge Replacement Project

February 2023

Prepared for:
San Joaquin County
Department of Public Works
1810 E. Hazelton Avenue
Stockton, CA 95205

Prepared by:

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SECTION 1.0: INTRODUCTION

The proposed Buckman Road Bridge Replacement Project is a project as defined under the California Environmental Quality Act (CEQA). This Initial Study (IS) was prepared for the San Joaquin County Public Works Department (County) pursuant to California Environmental Quality Act of 1970, Public Resources Code § 21000, et seq., as amended and implementing State CEQA Guidelines, Title 14, Chapter 3 of the California Code of Regulations (collectively, CEQA).

1.	**Project Title:**	Buckman Road Bridge Replacement (Bridge Number 29C-307)
2.	**Lead Agency Name and Address:**	San Joaquin County Public Works Department 1810 East Hazelton Ave. Stockton, CA 95201
3.	**Contact Person and Phone Number:**	Michael Chung, P.E., Senior Bridge Engineer mchung@sjgov.org (209) 468-3586
4.	**Project Location:**	Eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line on Buckman Road. Assessor's Parcel Numbers (APN) 187-310-09; 187-310-15; 187-310-16
5.	**Project Sponsor**	San Joaquin County
6.	**General Plan Land Use Designation:**	General Agriculture (A/G)
7.	**Zoning:**	General Agriculture (AG-160)
8.	**Surrounding Land Uses and Setting:**	Agricultural
9.	**Description of Project:**	The County would replace the existing bridge across North Fork Duck Creek. The existing bridge has been determined to be functionally obsolete and would be reconstructed with a bridge that is consistent with appropriate design standards for roadway geometry, accessibility, hydraulics, and structural integrity.

Date Initial Study Completed: January 2023

1.1 PURPOSE OF STUDY

This IS examines the potential effects on the environment of the San Joaquin County Public Works Department's (County's) proposed Buckman Road Bridge Replacement Project and associated construction of a temporary low water crossing adjacent to the existing bridge to serve as a detour during construction (Proposed Project).

The Proposed Project assessed within this IS is described in **Section 2.0** and includes provisions to address known environmental concerns. The project description, including these provisions, provides the project baseline for which environmental impacts are analyzed in **Section 3.0**. This IS was prepared pursuant to CEQA.

This study has identified potentially significant impacts and mitigation measures, which, when incorporated into the Proposed Project as described in **Section 2.0**, would reduce these impacts to less than significant levels. Therefore, this IS would support a Mitigated Negative Declaration under CEQA Guidelines Section 15070.

1.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

Impacts to all resources listed below are evaluated using the checklist included in **Section 3.0**. However, only the environmental factors that have been checked could be potentially affected by the Proposed Project, involving impacts requiring mitigation to bring it to a less-than-significant level. The unchecked resource areas were determined to have a less-than-significant impact or no impact, even without mitigation.

- ☐ Aesthetics
- ☐ Agriculture and Forestry Resources
- ☐ Air Quality
- ☒ Biological Resources
- ☒ Cultural Resources
- ☐ Energy
- ☒ Geology and Soils
- ☐ Greenhouse Gas Emissions
- ☒ Hazards and Hazardous Materials
- ☒ Hydrology and Water Quality
- ☐ Land Use and Planning
- ☐ Mineral Resources
- ☒ Noise
- ☐ Population and Housing
- ☐ Public Services
- ☐ Recreation
- ☐ Transportation and Circulation
- ☒ Tribal Cultural Resources
- ☒ Utilities and Service Systems
- ☐ Wildfire
- ☒ Mandatory Findings of Significance

1.3 SIGNIFICANCE DETERMINATION

On the basis of the environmental evaluation presented in **Section 3.0**:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to the earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Brian Newburg	February 7, 2023
Signature	Date
Brian Newburg	San Joaquin County Public Works Department
Printed Name	Lead Agency

SECTION 2.0: PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

This IS provides project-level CEQA review for the demolition of the existing single lane Buckman Road Bridge (No. 29C-307), construction of a new cast-in-place reinforced concrete bridge over North Fork Duck Creek, and construction of a temporary low water crossing that will serve as a detour during construction (Proposed Project). The new bridge would consist of a single 10-foot wide travel lane, with two 6-foot shoulders, to facilitate agricultural equipment crossing North Fork Duck Creek. The approach roadway would be paved with asphalt concrete over compacted aggregate base. The Proposed Project location, background, objectives, and construction are described in more detail below.

2.1.1 EXISTING SETTING

Project Site Location

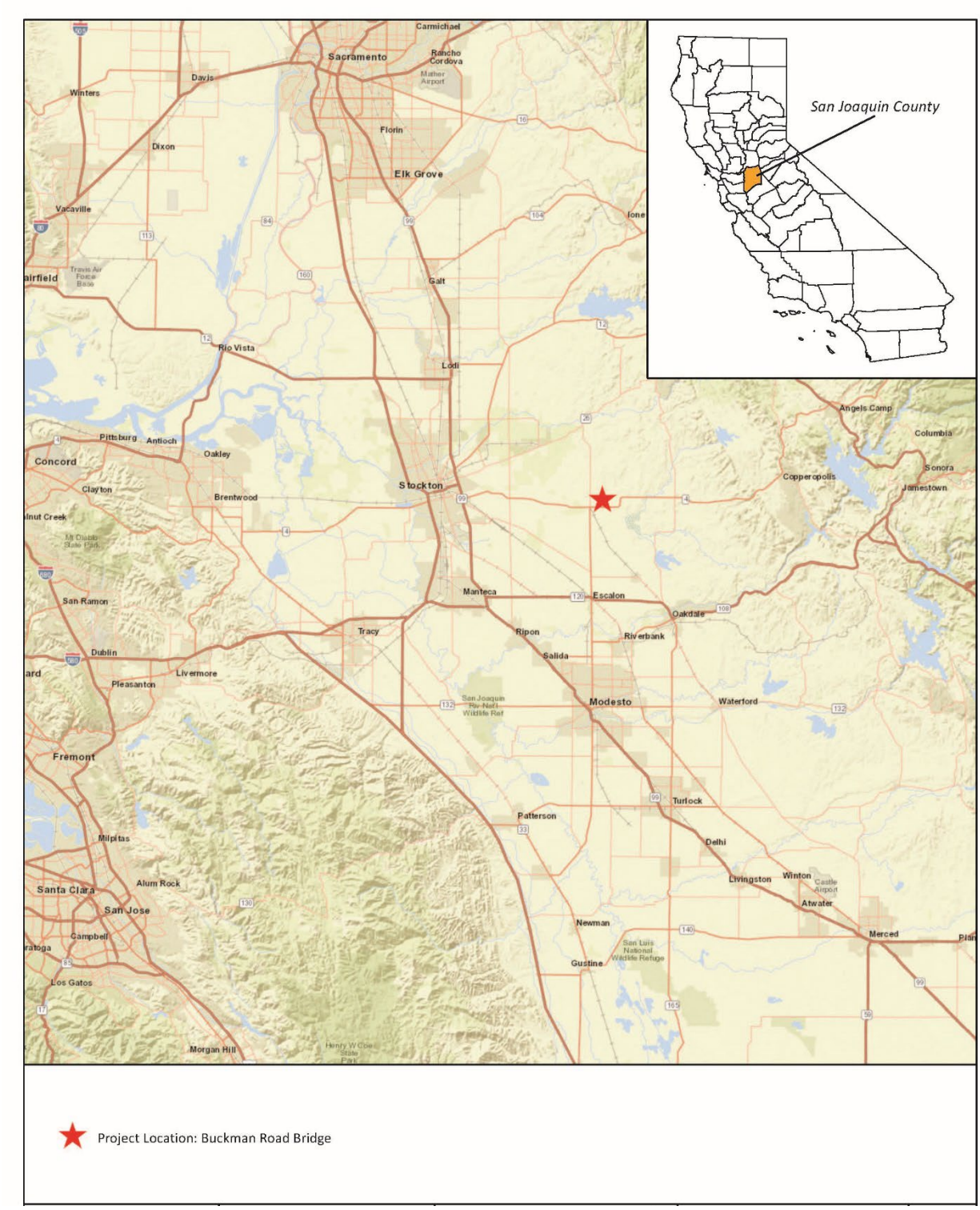
The Proposed Project Site crosses over North Fork Duck Creek in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line on Buckman Road, approximately 0.8 miles north of State Route (SR) 4 (**Figure 2-1, Figure 2-2**). The Proposed Project would take place on three Assessor's Parcel Numbers (APN) in San Joaquin County: 187-310-09, 187-310-15, and 187-310-16.

The approximately 1.36-acre Proposed Project Site (**Figure 2-3**) includes all areas that would be temporarily or permanently impacted by the Proposed Project due to demolition of the existing bridge, construction of the new bridge, construction and removal of the temporary low water crossing (culvert detour), the widening of roadway approaches, and a staging area. The Project Site extends approximately 200 feet north of the existing bridge to 380 south of the bridge, and 170 feet across the bridge (**Figure 2-3**). Pile driving would occur up to 80 feet deep for the bridge footings; these areas are also considered part of the Project Site. This horizontal and vertical area encompasses the maximum extent of potential ground-disturbing activities reasonably expected from the Proposed Project and is referred to as the “Project Site” throughout the remainder of this document.

Project Site Existing Conditions

Buckman Road Bridge has an Average Daily Traffic (ADT) of approximately 32 vehicles per day (as of 2016) and projected ADT of 42 vehicles per day in 2036 (Griffith, 2016). The current speed limit is 55 miles per hour (mph); however, the design speed is 35 mph. The existing bridge was constructed in 1931 and consists of timber deck planks on timber stringers supported by Douglas fir pile caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and column bents on PCC pedestal footings. This segment of Buckman Road is a single-lane local roadway ending approximately 200-feet north of the

Figure 2-1. Regional Location

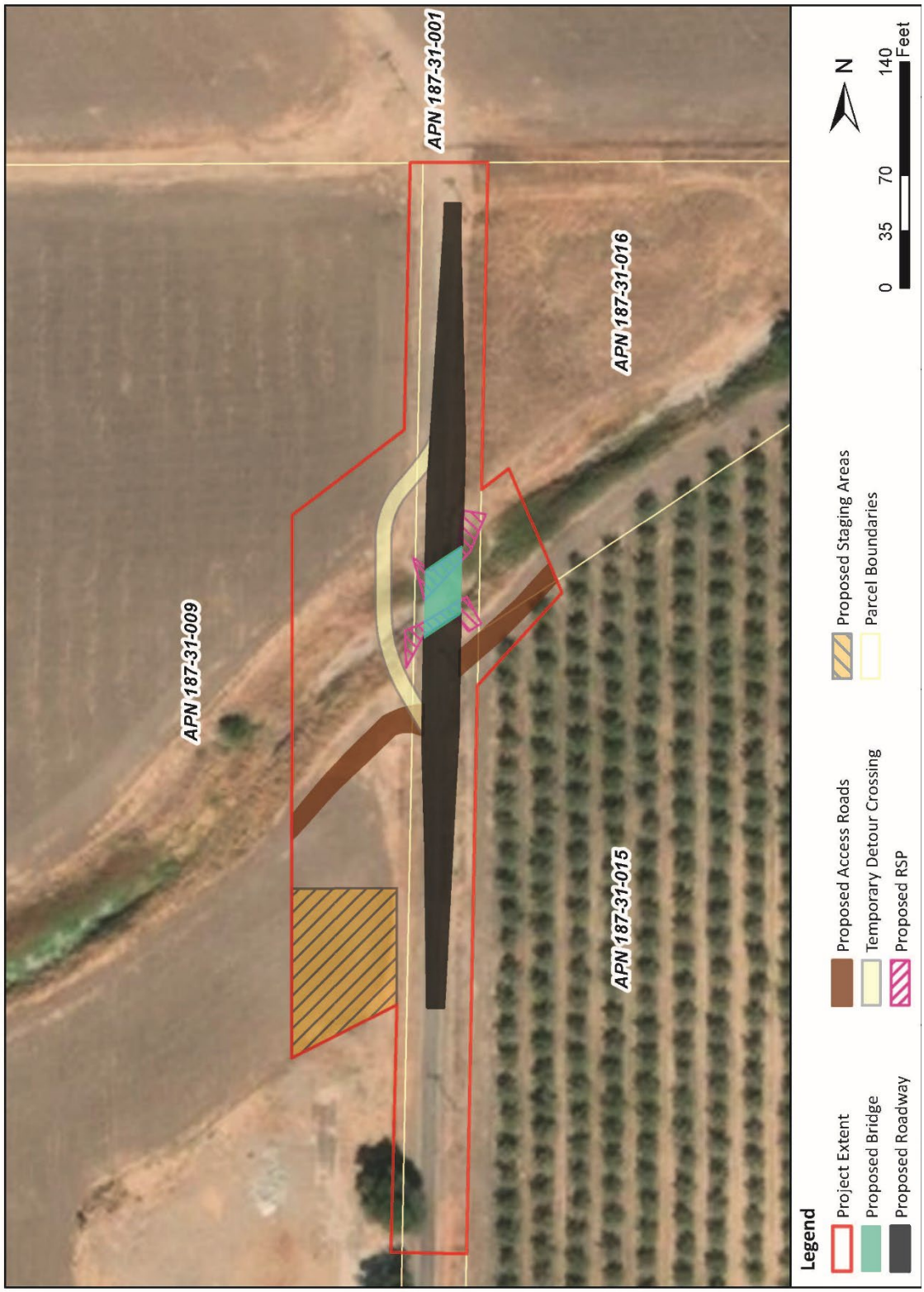


Source: Appendix A.

Figure 2-2. Project Location

Source: Appendix A

Figure 2-3. Proposed Project Site



Source : Appendix A

existing bridge. The road services multiple agricultural fields, as well as a couple of residences beyond the bridge.

According to the Caltrans Bridge Inspection Report (BIR) dated November 7, 2017, the existing bridge has a Sufficiency Rating (SR) of 78.4 and is classified as Functionally Obsolete due to insufficient deck geometry; the bridge is eligible for replacement under the Federal Highway Bridge Program administered for the Federal Highway Administration (FHWA) by Caltrans (**Appendix F**). The timber cap at Bent 3 has a check half its length along the neutral axis and the asphalt construction in the timber deck has cracks along each deck plank. The left wingwall at Abutment 1 has moved laterally. There is a large gap measuring seven inches at the top of the wall between the abutment and the left wingwall. A cable to help reduce the lateral movement was placed behind abutment 1 and is attached from the left to the right wingwall. The bridge railings have been removed without permission or otherwise damaged by wide agricultural equipment using the narrow bridge (San Joaquin County, 2018). Therefore, the objective of the Proposed Project is to construct a new bridge that is consistent with appropriate design standards for roadway geometry, accessibility, hydraulics, structure integrity, and to provide long-term access over North Fork Duck Creek for the public, surrounding property owners, and others accessing nearby farmland.

Project Site and Adjacent Land Uses

The San Joaquin County General Plan designates all three related Proposed Project parcels and all adjacent parcels as General Agriculture (A/G) with AG-160 zoning. The A/G designation is for agricultural and grazing uses outside of urban development (SJC, 2016d). Adjacent land uses are agricultural. The closest residence is located approximately 1,500 feet south of the Proposed Project Site. Adjacent properties do not have structures that would be potentially affected by the Proposed Project.

2.2 PROJECT DESCRIPTION

A Technical Memorandum was prepared for the Proposed Project in order to evaluate bridge replacement alternatives (SJC, 2018a). Three potential alternatives were evaluated: precast prestressed single span slab bridge, cast in place single span slab bridge, and a 3-Cell Precast Box culvert. The cast in place single span slab bridge was chosen as the best alternative. The Proposed Project involves demolition of the existing bridge, construction of the new bridge and approaches, and installation and removal of the temporary construction crossing (culvert detour). Construction would occur in coordination with San Joaquin County and California Department of Transportation (Caltrans) District 10.

2.2.1 CONSTRUCTION ACTIVITIES

Clearing and Grubbing

Areas within the Project Site would be cleared of vegetation and existing fencing, as necessary, in order to provide for a temporary crossing and sufficient space for construction activities, equipment, and materials storage/staging. Existing vegetation includes herbaceous annual and perennial species such as cattails and blackberries.

Installation of Temporary Culvert Detour

A temporary low water crossing (culvert detour) would be placed approximately 20 feet west of and adjacent to the existing bridge (see **Figure 2-3**) to allow access for residences and agricultural field entrances during construction. The detour would include placing two 72-inch diameter corrugated metal pipes within North Fork Duck Creek which would be covered with clean aggregate fill to a height above the ordinary high-water mark. Geotextile fabric would be placed over the aggregate fill and compacted aggregate base would be placed to minimize migration of soil into the creek. This temporary stream diversion system would be removed once the new bridge is constructed and the streambed would be restored to its pre-construction condition. In-stream work would be conducted during the dry season, defined as between June 1 through October 31.

Demolition of Existing Bridge

The existing bridge, abutment retaining walls, and asphalt would be demolished and properly disposed of offsite. Heavy equipment would be required to demolish and remove such features. The creek below the bridge would be protected from contamination and all debris generated by the demolition through implementation of a Stormwater Pollution Prevention Plan (SWPPP) and Best Management Practices (BMP) that prevent construction pollutants from contacting stormwater and limiting erosion. Demolition of the existing bridge would be performed in accordance with the Caltrans Standard Specifications modified to meet the environmental permit requirements of the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 Permit, California Department of Water Resources Clean Water Act Section 401 Certification, and California Fish and Game Code Section 1602 Streambed Alteration Agreement. Prior to construction, the contractor would be required to prepare and submit for approval a bridge demolition plan, including creek diversions/bypass details, that are in conformance with the agency permits from California Department of Fish and Wildlife (CDFW), USACE, and the Regional Water Quality Control Board (RWQCB).

Utility Relocation

To accommodate construction, it's anticipated that overhead powerlines and fiberoptic cables in the vicinity of the Project Site would need to be relocated.

Construction of New Bridge and Approaches

The replacement bridge would be a single span reinforced concrete bridge consisting of one 10-foot lane and 6-foot shoulders to allow for the agricultural equipment that utilizes the bridge. The total outside width of the new structure would be 25 feet 6 inches, with a length of 43 feet 6 inches. From the end of the bridge, the County would transition the paved 22-foot clear width to match the existing 18-foot roadway. The southern approach transition would be approximately 232 feet while the northern approach would transition at approximately 110 feet. Pile driving would occur up to 80 feet deep for the bridge footings. Work would also include the construction of approach guard railing with terminal end systems and appropriate approach road work at the ends of the bridge. In addition, rock slope protection would be placed in the channel to prevent further scour on the new structure.

Dewatering may be required if groundwater is encountered. During in-water work, BMPs would be used to reduce the amount of sediment and debris that may be produced and avoid or minimize impacts to fish, flora, and wildlife, in accordance with the San Joaquin County General Plan Natural and Cultural Resources Element (SJC, 2016a). The Proposed Project would comply with the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit, including the preparation and implementation of SWPPP that identifies erosion, sediment, and stormwater BMPs to protect water quality during construction of the Proposed Project (Drake Haglan and Associates [Drake Haglan], 2019).

Staging is anticipated to occur within existing rights-of-ways; the new bridge would be designed to avoid additional right-of-way acquisition. A staging area in the southwest corner of the Project Site (see **Figure 2-3**) has been evaluated in this IS, in the event that the contractor needs additional staging area and to use the area as a temporary construction easement. Upon completion of the Proposed Project construction, staging area would be restored to its existing conditions.

2.2.2 CONSTRUCTION EQUIPMENT

Construction equipment is anticipated to include the following:

- Pile Driver
- Hoe ram
- Water truck
- Haul truck
- Concrete trucks
- Vibratory compactor
- Asphalt paver
- Crane
- Jack hammer
- Bulldozer/loader
- Front-end loader
- Motor grader
- Vibratory rollers

2.2.3 CONSTRUCTION TIMELINE

Construction is anticipated to take approximately three months to complete and is anticipated to start in May 2024. The expected period of construction for all work outside of North Fork Duck Creek is proposed to be between May 1 and October 31. In-stream work would be conducted during the dry season, defined as between June 1 through October 31. As North Fork Duck Creek does not provide suitable habitat for any fish species, the operational timeline for the creek diversion would likely be May 1 to October 1, depending on the regulatory permit mitigation measures.

During construction, work hours would be limited to 6:00 a.m. to 9:00 p.m. to comply with the San Joaquin County Development Title (Section 9-1025.9). This title specifically exempts construction-related noise impacts associated with the maintenance of public utilities if activities are conducted during daytime hours (6 a.m. to 9 p.m.).

2.2.4 PROJECT APPROVAL PROCESS

The project may require the following permits:

- U.S. Army Corps of Engineers Clean Water Act Section 404 Permit
- California Department of Water Resources Clean Water Act Section 401 Certification
- State Water Resources Control Board (SWRCB) General Construction Permit for Stormwater (Stormwater Pollution Prevention Plan)
- San Joaquin County Watercourse Encroachment Permit
- San Joaquin County approval and acquisition of a temporary construction easement
- CDFW California Fish and Game Code Section 1602 Streambed Alteration Agreement

SECTION 3.0: ENVIRONMENTAL CHECKLIST

Pursuant to CEQA *Guidelines* Section 15063, an IS should provide the lead agency with sufficient information to determine whether to prepare an environmental impact report (EIR), negative declaration (ND), or Mitigated ND (MND) for a proposed project. The CEQA *Guidelines* state that an IS may identify environmental impacts by use of a checklist, matrix, or other method, provided that conclusions are briefly explained and supported by relevant evidence. If it is determined that a particular physical impact to the environment could occur, then the checklist must indicate whether the impact is Potentially Significant, Less-Than-Significant with Mitigation, or Less-Than-Significant. Findings of No Impact for issues that can be demonstrated not to apply to a proposed project do not require further discussion.

This IS was prepared to assess the environmental impacts of the Proposed Project in accordance with CEQA to provide State permitting agencies with sufficient information to determine whether to prepare an EIR, ND or MND for the Proposed Project.

3.1 AESTHETICS

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Except as provided in Public Resources Code 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.1 ENVIRONMENTAL SETTING

The Buckman Road Bridge over North Fork Duck Creek is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line on Buckman Road, approximately 0.8 miles north of State Route (SR) 4. The nearest residence is approximately 1,500 feet south of the existing bridge and proposed construction zone. The project area includes banks of Duck Creek and agricultural land on both sides of Buckman Road.

The scenic quality of the Project Site is characterized by undeveloped open space, agricultural fields, orchards, and rural residential areas. The Project Site is composed of relatively flat to gently rolling terrain.

The Proposed Project is not located on an officially designated state or county Scenic Highway (Caltrans, 2017). The site of the Proposed Project is not located within or immediately adjacent to a Wild and Scenic River System (National Wild and Scenic Rivers System, 2022).

3.1.2 IMPACT DISCUSSION

Question A

The project area includes banks of the North Fork Duck Creek, pasture land, dilapidated barns, and an orchard. The Proposed Project would consist of construction activities which include demolition of the existing bridge, construction of the new bridge and approaches, and installation and removal of the temporary construction crossing (culvert detour), followed by removal of the culvert detour once construction of the bridge is complete. Areas within the Project Site would be cleared of vegetation and existing fencing, as necessary, in order to provide for a temporary crossing and sufficient space for construction activities, equipment, and materials storage/staging. Existing vegetation includes herbaceous annual and perennial species such as cattails and blackberries. There are no scenic vistas in the area and the Proposed Project would result in the replacement of an existing bridge.

Less-Than-Significant Impact.

Question B

The Project Site is not located on a state scenic highway nor a county scenic highway and thus would not damage any scenic resources such as trees, rock outcroppings, or historic buildings within the viewshed of any scenic highway.

No impact.

Question C

The Proposed Project is located in a rural area along Buckman Road, which receives low traffic (32 average vehicles per day, as of 2016 and a projected Average Daily Traffic of 42 in 2036). The bridge, as constructed currently, is approached by a road from the north which continues to the south.

As a result of the Proposed Project, the change in the visual character of the site during construction and operation would be minimal. Construction will last for a temporary period and would mainly consist of excavating, demolition, construction, and stream channel work for the installation of a temporary culvert and low water crossing. The change in the visual character of the site during operation would include a staging area of approximately 0.12 acres (100 feet by 50 feet) which is proposed to be located southwest of the bridge and west of Buckman Road.

During project work, construction activities would affect the visual quality for a short period, which would affect a minimal number of travelers, given the low traffic volume of 32 vehicles per day. Onlookers from the rural residential area are located 1,500 feet south of the bridge, but would be in viewing distance during construction. Given the rural nature of the Project Site and limited access points, the Project Site is not anticipated to draw in additional onlookers. However, the replacement of the currently structurally deficient bridge is expected to improve the aesthetic quality of the area. The remaining areas of the site would appear visually unchanged.

Less-Than-Significant Impact.

Question D

Currently, the site does not contain any form of lighting. The Proposed Project does not include the installation of any temporary lighting as construction activities would occur during the day. Furthermore, no permanent lights are included in the bridge design. Therefore, the Proposed Project would not add substantial sources of new daytime or nighttime lighting or glare and thus would not adversely affect day or nighttime views in the area.

No Impact.

3.2 AGRICULTURE AND FORESTRY RESOURCES

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation (CDOC) as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest Range Assessment Project and Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☒	☐
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☒	☐
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

3.2.1 ENVIRONMENTAL SETTING

San Joaquin County is a major producer of a wide variety of farm products, with the top five crops by value for 2018 being almonds, grapes, walnuts, cherries, and blueberries. According to

the Farmland Mapping and Monitoring Program (FMMP), there were 744,835 acres of land identified as farmland or grazing land in San Joaquin County in 2016. The agricultural land in San Joaquin County in 2016 was as follows: 51.03% Prime Farmland, 11.09% Farmland of Statewide Importance, 11.00% Unique Farmland, 9.25% Farmland of Local Importance, and 17.42% Grazing Farmland. Prime farmland and Farmland of Local Importance are the only farmland types mapped within the Proposed Project area (Drake Haglan, 2020).

In 2015, 60,256 acres within San Joaquin County were enrolled under the Williamson Act as farmland security zone. All three parcels affected by the proposed Project (APN 187-31-009, APN 187-31-015, and APN 187-31-016) are enrolled under the Williamson Act (Drake Haglan, 2020).

3.2.2 REGULATORY SETTING

Farmland Mapping and Monitoring Program

Under the FMMP, the CDOC Division of Land Resource Protection monitors and documents land use changes that affect California's farmland. The CDOC produces Important Farmland Maps, which use a classification system based on the U.S. Department of Agriculture Natural Resource Conservation Service's soil survey data and land use. The FMMP classifies land as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land.

California Land Conservation Act

The California Legislature passed the California Land Conservation Act (commonly referred to as the "Williamson Act") in 1965 to preserve agricultural lands and open space by discouraging premature and unnecessary conversion to urban uses. Under the Williamson Act, private landowners contract with counties and cities to voluntarily restrict privately-owned land to agricultural and compatible open-space uses. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than their potential market value. The vehicle for these agreements is a rolling-term, 10-year contract that is automatically renewed unless either party files a "notice of nonrenewal." All three parcels affected by the proposed Project (APN 187-31-009, APN 187-31-015, and APN 187-31-016) are enrolled under the Williamson Act.

San Joaquin County

Lands of the Proposed Project Site within San Joaquin County are zoned as AG with General Plan land use designations of A/G and AG-160 zoning and all are in current use for agriculture (Drake Haglan, 2020).

3.2.3 IMPACT DISCUSSION

Questions A through E

The Proposed Project would permanently impact up to 0.046 acres of designated Prime Farmland and up to 0.001 acres of Farmland of Local Importance. The Proposed Project would

temporarily impact up to 0.637 acres of Prime Farmland and 0.058 acres of Farmland of Local Importance. The Proposed Project would result in the permanent loss of up to 0.017 acres of actively cultivated Prime Farmland and would result in the temporary impacts to up to 0.338 acres of actively cultivated Prime Farmland. The Proposed Project would not result in impacts to actively cultivated Farmland of Local Importance. The impact of farmland conversion has been rated on a USDA Form AD-1006 (Drake Haglan, 2020).

Temporary impacts to Prime Farmland and Farmland of Local Importance would result from the implementation of the staging areas, installation of the temporary low water crossing and temporary water diversion system, and through general Project construction activities. Temporary impacts associated with the Proposed Project would prohibit the use of these areas for farming activities for the duration of construction. Upon completion of Project construction, temporarily impacted areas would be restored to existing conditions and would be available for farming activities. Temporary impacts would affect up to 0.695 acres of designated farmland and up to 0.338 acres of actively cultivated farmland.

All three parcels affected by the proposed Project (APN 187-31-009, APN 187-31-015, and APN 187-31- 016) are enrolled under the Williamson Act. Williamson Act contracts may be cancelled through condemnation of public acquisition of the land subject to the contract. When the action is to acquire less than the entire parcel, as is the case for the Proposed Project, then the Williamson Act contract is deemed null and void only for that portion of land that is subject to the action (Government Code Section 51295). These three parcels average approximately 35.102 acres each, for a total of approximately 105.307 acres. Permanent impacts to the farmland on these three parcels total 0.046 acres of Prime Farmland and Farmland of Local Importance. This equates to approximately 0.044% of the three parcels cancelled from the Williamson Act contract.

All property owners would be compensated in accordance with fair market values based on appraisals of the potential parcel acquisitions. Where permanent impacts would occur and ROW acquisition is required, after completion of CEQA clearances, all real property transactions shall comply with the property acquisition and relocation standards of the State of California, the Caltrans Relocation Assistance Program, and the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Permanent and temporary impacts to Prime Farmland and Farmland of Local Importance are minimal and would not cause a burden to the surrounding community. Impacts to farmland are considered minimal, restricted to marginal areas of adjacent parcels, and would not create a significant loss of land used for farming purposes. Therefore, the Proposed Project would have a less-than-significant impact on agricultural resources, forest resources or Williamson Act lands, and would not conflict with existing zoning for these lands.

Less-than-Significant Impact.

3.3 AIR QUALITY

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

3.3.1 ENVIRONMENTAL SETTING

San Joaquin County is located at the northern end of the San Joaquin Valley Air Basin (SJVAB) and is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAB is the southern half of California's Central Valley and is approximately 250 miles long and averages 35 miles wide. The SJVAB is bordered by the Sierra Nevada mountains in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. There is a slight downward elevation gradient from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the valley opens to the San Francisco Bay at the Carquinez Strait. At its northern end is the Sacramento Valley, which comprises the northern half of California's Central Valley. The bowl-shaped topography inhibits movement of pollutants out of the valley.

In compliance with the federal Clean Air Act (CAA), U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) standards for ambient air quality of common pollutants requirements, the SJVAPCD prepares plans for reducing pollutants, particularly ozone, fine and ultrafine particulate matter (PM10 and PM2.5), and carbon monoxide emissions to meet the EPA's National Ambient Air Quality Standards (NAAQS) as well as the more stringent California standards. An air basin is in "nonattainment" when pollutant concentrations exceed these levels.

3.3.2 REGULATORY SETTING

The 1977 federal CAA required the EPA to identify NAAQS to protect public health and welfare. NAAQS have been established for the six "criteria" air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (PM), and lead. PM is designated into two size classes, course particulate matter 10 micrometers or less in diameter (PM_{10}) and fine particulate matter 2.5 micrometers or less in diameter ($PM_{2.5}$). The smaller size of $PM_{2.5}$ allows it to enter the cardiovascular system and cause more serious health problems. For this reason, the NAAQS sets a more stringent standard on $PM_{2.5}$ in ambient air quality. Pursuant to the 1990 CAA Amendments (CAAA), the EPA has classified air basins (or portions thereof) as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. The attainment statuses of San Joaquin County for the NAAQS are listed in **Table 3.3-1**.

CARB has adopted California ambient air quality standards (CAAQS) that are more stringent than the federal standards for the criteria air pollutants. Under the California Clean Air Act (CCAA), patterned after the federal CAA, areas have been designated as attainment or nonattainment with respect to CAAQS. The San Joaquin County attainment statuses for the CAAQS are listed in **Table 3.3-1**. The Proposed Project is in a nonattainment area for both state and federal ozone and $PM_{2.5}$ standards, and nonattainment for State PM_{10} standards.

TABLE 3.3-1 SAN JOAQUIN COUNTY ATTAINMENT STATUS

Pollutant	Designation/Classification	
	Federal Standards	**State Standards**
Ozone – 1 Hour	No Federal Standard	**Nonattainment/Severe**
Ozone – 8 Hour	**Nonattainment/Extreme**	**Nonattainment**
PM_{10}	Attainment	**Nonattainment**
$PM_{2.5}$	**Nonattainment**	**Nonattainment**
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment
Source: CARB, 2020a; CARB, 2019b; EPA, 2020; EPA, 2019.		

The SJVAPCD has developed rules and regulations to help achieve the NAAQS and CAAQS (CARB, 2019b; SJCOG, 2012b). Pertinent rules and regulations for SJVAPCD include, but are not limited to:

- Regulation II – Permits
  - Rule 2010 – Permits Required
  - Rule 2092 – Standards for Permits to Operate
- Regulation IV – Prohibitions
  - Rule 4101 – Visible Emissions

  - Rule 4102 – Nuisance
  - Rule 4103 – Open Burning
  - Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters
  - Rule 4201 – PM Concentration
  - Rule 4202 – PM Emission Rate
  - Rule 4203 – PM Emissions from Incineration of Combustible Refuse
- Regulation VII – Toxic Air Pollutants
- Regulation VIII – Fugitive PM10 Prohibition
- Regulation IX – Mobile and Direct Sources

The SJVAPCD has also set thresholds of significance for "criteria" pollutants, as shown in **Table 3.3-2** below. These thresholds allow for the determination of significant air quality impacts at a project-level scale. As shown, the SJVAPCD's criteria for emissions from both nitrogen oxides (NOx) and/or reactive organic gases (VOC) is 10 tons per year (SJVAPCD, 2015). For all criteria pollutants, emissions must not exceed 100 pounds per day. Project emissions that exceed these thresholds are considered to have a significant effect on regional air quality and attainment of NAAQS and CAAQS, and therefore require mitigation. Additionally, exposure of sensitive receptors to substantial pollutant concentrations are considered a significant impact.

TABLE 3.3-2 SJVAPCD THRESHOLDS OF SIGNIFICANCE FOR CRITERIA POLLUTANTS

Pollutant/Precursor	Construction Emissions	Operational Emissions
	(tons per year)	
CO	100	100
NOx	10	10
ROG	10	10
SOx	27	27
PM_{10}	15	15
$PM_{2.5}$	15	15
Source: SJVAPCD 2015.		

Sensitive Receptors

Sensitive receptors are places typically occupied for extended periods by individuals with greater susceptibility to air pollution's hazardous effects (such as children, the elderly, the acutely ill, and the chronically ill). Land uses typically associated with sensitive receptors include residences, hospitals, medical clinics, schools, day care centers, playgrounds, retirement homes, and convalescent facilities where there is reasonable expectation of continuous human exposure to poor air quality standards (CARB, 2020b).

The nearest sensitive receptor to the Proposed Project Site is a single-family residence located approximately 1,500 feet south of the Proposed Project Site. There are no other sensitive receptors in the vicinity of the Project Site.

3.3.3 IMPACT DISCUSSION

Question A

A project is generally deemed inconsistent with air quality plans if it would result in population and/or employment growth that exceeds growth estimates set forth in the applicable air quality plan. Accordingly, a proposed project must be evaluated to determine whether it would generate population and employment growth, and if so, whether that growth would exceed the growth rates specified in the relevant air plans. The Proposed Project would replace an existing bridge, and would not introduce new housing or employment-related construction, and thus would not induce population or employment growth. Therefore, impacts to applicable air quality plans of the SJVAPCD would be less than significant.

Less-Than-Significant Impact.

Question B

Air quality impacts potentially associated with the Proposed Project include those resulting from short-term construction and demolition activities. Construction-related emissions could include exhaust from construction equipment and fugitive dust from land clearing, earthmoving, movement of vehicles, and wind erosion of exposed soil during construction. Construction of the project would result in short-term emissions and/or odors associated with construction equipment and dust from earthmoving activities.

The Proposed Project's construction emissions were estimated using the Roadway Construction Emissions Model (RCEM), Version 9.0.0, by the Sacramento Metropolitan Air Quality Management District (SMAQMD), which is the accepted model for all CEQA roadway projects throughout California. The RCEM results are compared with the SJVAPCD Air Quality Significance Thresholds in **Table 3.3-3**. The emissions presented are based on the best information available at the time of calculations. The emissions represent the maximum construction emissions that would be generated by construction of the Proposed Project.

TABLE 3.3-3 CONSTRUCTION EMISSIONS

Construction Phase	CO	NOx	ROG	SOx	PM_{10}	$PM_{2.5}$
	(tons per year)					
Grubbing/Land Clearing	0.03	0.03	0.00	0.00	0.00	0.00
Grading/Excavation	0.84	0.98	0.10	0.00	0.04	0.04
Drainage/Utilities/ Sub-Grade	0.53	0.59	0.06	0.00	0.03	0.02
Paving	0.06	0.04	0.00	0.00	0.00	0.00
Project Total	**1.47**	**1.65**	**0.16**	**0.00**	**0.07**	**0.06**
SJVAPCD Thresholds	*100*	*10*	*10*	*27*	*15*	*15*
Exceed SJVAPCD Threshold?	No	No	No	No	No	No
Source: **Appendix H**.						

As shown in **Table 3.3-3,** construction emissions from the Proposed Project would not exceed the SJVAPCD significance thresholds. Further, SJVAPCD fugitive dust control requirements for construction sites would apply to all earthmoving and ground-disturbing activities (Regulation VIII), which would reduce PM impacts to less than significant levels. Accordingly, with compliance with existing regulations, impacts associated with violations of air quality standards are anticipated to be less than significant. The Proposed Project would not violate air quality standards or substantially contribute to air quality violations.

Less-Than-Significant Impact.

Questions C and D

Construction of the Proposed Project could result in temporary emissions of pollutants from equipment and vehicles. Construction equipment also has the potential to emit odor in the vicinity of the Proposed Project Site; however, construction odors are not anticipated to be detected beyond the Proposed Project Site boundaries. Construction odors often dissipate quickly and are generally not noticeable off-site. As discussed above, as a bridge replacement project, the Proposed Project is not expected to require equipment or construction activities that would produce emissions in excess of the SJVAPCD thresholds intended to determine potential significant impact of producing criteria air pollutants. Additionally, SJVAPCD fugitive dust control requirements for construction sites (Regulation VIII) and SJVAPCD PM regulations would apply to all construction and demolition activities, which would further reduce potential of transport of pollutants and odors from the Proposed Project Site.

The nearest sensitive receptors to the Proposed Project Site are residences located approximately 1,500 feet south of the Buckman Road Bridge. Construction odors are not expected to be detected beyond the Proposed Project Site. Construction activities would occur along the existing roadbed and staging area adjacent to the existing bridge, and would require implementation of SJVAPCD PM regulations and fugitive dust control measures. This would further reduce exposure of sensitive receptors to criteria pollutants. Therefore, the Proposed Project would result in a less-than-significant impact of substantial pollutant concentrations affecting sensitive receptors or of objectionable odors that would affect a substantial number of people.

Less-Than-Significant Impact.

3.4 BIOLOGICAL RESOURCES

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS?	☐	☒	☐	☐
c) Have a substantial adverse effect on state or federally-protected wetlands (including, but not limited to, marsh, vernal pool, coastal, *etc.*) through direct removal, filling, hydrological interruption or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.4.1 ENVIRONMENTAL SETTING

The following summarizes special-status species, critical habitat/essential fish habitat, and describes the Proposed Project Site setting. Results from the analysis were used in addressing the impacts and developing mitigation measures. A Biological Study Area (Proposed Project Site) was developed to inventory biological resources, including habitat quality that could be affected by the Proposed Project, and existing disturbances. The Proposed Project Site includes the project footprint of the Proposed Project Site, all access and staging areas, and lands beyond the footprint that were determined necessary to inventory in order to perform an adequate analysis of Proposed Project impacts.

Critical Habitat

To determine if critical habitat, or essential fish habitat, occurs on the Project Site, a National Marine Fisheries Service (NMFS) official Endangered Species Act species list was requested by Caltrans, the federal lead agency, as designated by FHWA, and San Joaquin County, as the project proponent (nonfederal lead agency) and online mapper of listed Critical Habitat (CH). A California Native Diversity Database (CNDDB) and U.S. Fish and Wildlife Service (USFWS) map was consulted for areas marked as critical habitat for listed species (see Appendix A of the NES [**Appendix C**])

Special-Status Species

For the purposes of this assessment, special status has been defined to include those species that are:

- Listed as endangered or threatened under the Federal Endangered Species Act (FESA) (or formally proposed for, or candidates for, listing);
- Listed as endangered or threatened under the California Endangered Species Act (CESA) (or proposed for listing);
- Designated as endangered or rare, pursuant to CDFW Code (§1901);
- Designated as fully protected, pursuant to CDFW Code (§3511, §4700, or §5050);
- Designated as species of concern to the CDFW;
- Covered under the International Migratory Bird Treaty Act; or
- Defined as rare or endangered under CEQA.

An official special-status species list was generated from the USFWS Information, Planning, and Conservation (IPaC) system, CDFW's CNDDB, and the California Native Plant Society *Electronic Inventory of Rare and Endangered Plants* referencing the *Farmington* quadrangle and the eight surrounding United States Geological Survey 7.5-minute quadrangles*: Linden, Valley Springs SW, Jenny Lind, Peters, Bachelor Valley, Avena, Escalon,* and *Oakdale* (see Appendix A of NES **(Appendix C**). These lists identify three amphibian species, four bird species, seven flowering plant species, four invertebrate species, three fish species, one mammal species, and two reptile species with the potential to occur in the region of the Proposed Project Site. Essential fish habitat and details for each special-status species with potential to occur are further discussed in **Appendix A**.

Habitats

The Proposed Project Site consists of the project footprint and includes the project impact area, totaling 0.50 acres. The Proposed Project Site contains a variety of terrestrial and aquatic habitat types. These habitats include agriculture, ruderal (disturbed), urban (developed), and riverine (North Fork Duck Creek). A summary of total acreages, as well as the temporary and permanent acres of each habitat type to be impacted by the Proposed Project within the Proposed Project Site are shown in **Table 3.4-1** below. A map that illustrates the impacts on terrestrial and aquatic habitat types within the Action Area is presented in Figure 4-1 of the NES (**Appendix C**).

TABLE 3.4-1. SUMMARY OF TEMPORARY AND PERMANENT EFFECTS BY HABITAT TYPE

Habitat Community	Temporary Impacts (acres)	Permanent Impacts (acres)	Total Impacts (acres)
Agriculture	0.04	0.14	0.18
Ruderal (Disturbed)	0.03	0.01	0.04
Urban (Developed)	0.19	0.02	0.21
Riverine (NF Duck Creek)	0.004	0.07	0.074
Total Acreage	**0.26**	**0.24**	**0.50**

3.4.2 REGULATORY SETTING

Federal Endangered Species Act (FESA) of 1973

Under FESA, the Secretary of the Interior and the Secretary of Commerce have the joint authority to list a species as threatened or endangered (16 U.S. Code [U.S.C.] 1533c). The purposes of FESA are to provide a means to conserve the ecosystems that endangered and threatened species depend on, and to provide a program for conservation and recovery of the species with the intent of removing the species from a listed, protected status. Regulatory protection is given to any species listed as endangered or threatened.

The USFWS and the National Marine Fisheries Service (NMFS) are the federal agencies that enforce FESA. Pursuant to the requirements of FESA, an agency reviewing a project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the Proposed Project will have an impact on such species. Under FESA, habitat loss is considered to be an impact to the species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed for listing under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 U.S.C. 1536).

Migratory Bird Treaty Act (MBTA)

Migratory birds are protected under the federal MBTA of 1918 (16 U.S.C 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed under 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The direct injury or death of a migratory bird, due to construction activities or other construction-related disturbance that causes nest abandonment, nestling abandonment, or forced fledging would be considered take under federal law. As such, project-related disturbances must be reduced or eliminated during the nesting season.

Bald and Golden Eagle Protection Act

In addition to protection offered through the MBTA, bald and golden eagles receive special protection under the Bald and Golden Eagle Protection Act. The Bald Eagle Protection Act was originally enacted in 1940 to protect bald eagles and was later amended to include golden eagles (16 USC Subsection 668-668). It prohibits the taking or possession of and commerce in bald and golden eagles, parts, feathers, nests, or eggs with limited exceptions. Bald and golden eagles may not be taken for any purpose unless a permit is issued prior to the taking. The statute imposes criminal and civil sanctions as well as an enhanced penalty provision for subsequent offenses.

California Endangered Species Act

The CDFW implements state regulations pertaining to fish and wildlife and their habitat. The CESA of 1984 (California Fish and Game Code Section 2050 et seq., and California Code of Regulations (CCR) Title 14, Sections 670.2, 670.51) prohibits the take (interpreted to mean the direct killing of a species) of species listed under the CESA (Fish and Game Code § 2080; 14 CCR §§ 670.2, 670.5). A CESA permit (Individual Take Permit) must be obtained if a Modified Project would result in the "take" of listed species, either during construction or over the life of the project.

Section 2081 allows CDFW to authorize take prohibited under Section 2080 provided that: (1) the taking is incidental to an otherwise lawful activity; (2) the taking will be minimized and fully mitigated; (3) the applicant ensures adequate funding for minimization and mitigation; and (4) the authorization will not jeopardize the continued existence of listed species (Fish and Game Code § 2081).

Under the CESA, the CDFW is responsible for maintaining a list of threatened and endangered species designated under state law (California Fish and Game Code § 2070). In addition to the list of threatened and endangered species, CDFW also maintains lists of species of special concern, which serve as "watch lists." Pursuant to requirements of the CESA, an agency reviewing a Modified Project within its jurisdiction must determine whether any state-listed species may be present in the project area and determine whether the Modified Project would have a potentially significant impact upon such species. Project-related impacts to species on the CESA list would be considered significant and require mitigation.

California Department of Fish and Wildlife

California Law, Fish and Game Code sections 3503 and 3503.5, provides protection of birds and birds' nests by prohibiting the take of birds, their nests, or their eggs. California Law, Fish and Game Code section 1600 et seq., requires notification to the CDFW for proposed projects that may: divert, obstruct, or change the natural flow or the bed, channel or bank of any river, stream, or lake; use material from a streambed; or result in the disposal or deposition of debris, waste, or other material where it may pass into any river stream, or lake.

CEQA Guidelines

Several federal and state statutes protect rare, threatened, and endangered species. The CEQA Guidelines Article 20, Section 15380 provides that a species not listed on the federal or state list of protected species may be considered rare, threatened, or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definitions of endangered, rare, or threatened provided in FESA and CESA. This section of the Guidelines gives public agencies the ability to protect a species from any potential impacts of proposed projects until the respective government agency has the opportunity to designate (list) a species as protected, if warranted.

The California Native Plant Society (CNPS) maintains an extensive list of plant species that it considers to be rare, threatened, or endangered, but have no designated status or protection under federal or state endangered species legislation. Impacts to CNPS listed species (e.g., CNPS list 1B and 2) are considered pursuant during CEQA environmental review.

3.4.3 IMPACT DISCUSSION

Potential impacts to biological, wetlands or waters of the U.S. resources were evaluated in the following Project technical reports, which are incorporated herein:

- Biological Assessment (BA; **Appendix A**)
- Wetland Study / Jurisdictional Delineation Report (**Appendix B**)
- Natural Environmental Study (NES; **Appendix C**)

The NES is a standard Caltrans report for documenting and evaluating the potential Project impacts to biological resources. The BA is prepared to support Endangered Species Act consultation with USFWS and NMFS. The Wetland Study / Jurisdictional Delineation Report, NES and BA conclude the following regarding special-status resources:

- Within the Proposed Project Site, riverine (North Fork Duck Creek) habitat is likely to be considered jurisdictional waters of the U.S.
- Migratory birds and other birds of prey, protected under the MBTA (50 CFR 10), have the potential to nest within the Proposed Project Site.
- The Proposed Project Site provides suitable habitat for state-listed tricolored blackbird *(Aeglaius tricolor*), burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), western spadefoot (*Spea hammondii*), and western pond turtle (*Emys marmorata*).
- The Action Area does not contain habitat for any other federal-listed or federal-proposed plant or animal species.
- The riparian habitat along North Fork Duck Creek in the Project Site is a habitat of significant biological and ecological resource protected under the San Joaquin County General Plan, and CDFW pursuant to Section 1602 of the California Fish and Game Code (CFGC).

Question A

Impacts to candidate, sensitive, or special status species in the Action Area consist of the following.

Special-Status Plant Species

Surveys were conducted to determine the presence and/or potential for presence of special-status plant species within the Proposed Project Site during the appropriate bloom season, and no special-status plant species were found to be present within the Proposed Project Site. Avoidance and minimization are not recommended due to the absence of suitable habitat to support special-status plant species within the Proposed Project Site.

Less-Than-Significant Impact.

Tricolored Blackbird

The tricolored blackbird is largely found in the Central Valley, extending into the south coast range from Monterey County south, but populations are also documented from the Peninsular Range near San Diego County and extreme northern California. The tricolored blackbird forms the largest breeding colonies of any North American land bird, with a primary breeding season extending from March through early August, although they have been observed to breed from September through November. The largest breeding colonies are associated with freshwater emergent wetlands in rice growing communities. However, they are tied to areas with open accessible water, protected nesting vegetation, and adequate foraging habitat within a few kilometers of their breeding colony. Typical nesting substrate consists of tule, cattail, willow, and blackberry, although they have been observed utilizing other species as well. During the winter, the tricolored blackbird form large mixed-flocks with other blackbird species wherein they forage in agricultural fields and grasslands.

There is one recorded occurrence of tricolored blackbird within 5 miles of the Proposed Project Site. This occurrence was recorded in 1994, approximately 4.5 miles east of the Proposed Project Site on the north side of SR 4 where it crosses Rock Creek. Habitat consisted of willow riparian along Rock Creek where about 2,000 – 4,000 birds were observed.

Construction activities associated with the Proposed Project could impact tricolored blackbird, since habitat for this species may be present within the Proposed Project Site if it was to enter the project work limits or attempt to establish nests. Direct impacts to this species would be avoided through the implementation of avoidance and minimization measures presented in **BIO-1 through BIO-6** including preconstruction surveys and worker awareness training. With the implementation of these measures the Proposed Project would result in a determination of may affect but is not likely to adversely affect tricolored blackbird.

Less-Than-Significant Impact with Mitigation.

Burrowing Owl

Burrowing owls are relatively small raptors that occur in a variety of upland habitats including open grassland, prairie, plains, savannah, agricultural fields, and other ruderal areas such as vacant lots and waste yards. This species is colonial and requires pre-existing burrows that have been abandoned by other animals (e.g., squirrel, fox, woodchuck) for roosting and nesting. Occupied burrows can be identified by a lining of feathers, pellets, and debris. Burrowing owls spend most of their time on the ground or on low-lying perches such as fence posts or dirt mounds. Most burrowing owls seek cover during the warmest part of the day, though they are capable of hunting during the day and night. The nesting season of this species extends from March through August and young fledge approximately two to four weeks after hatching. The range of this species includes the entire Central Valley to the Transverse Range, most of the Great Basin region, and most of the eastern and southern desert regions of Southern California.

There are two recorded occurrences of burrowing owl within 5 miles of the Proposed Project Site. The closest occurrence is approximately 1 mile northeast of the Proposed Project Site along North Fork Duck Creek, where several small colonies of owls were observed along the banks of the creek in 1987. Soils within the Proposed Project Site are sandy and friable and, although there are no mounds, the banks of the creek could provide potential nesting sites. The agriculture habitat also provides suitable foraging habitat for this species. This species was not observed during the surveys conducted in March 2018. The Proposed Project could potentially impact individual burrowing owls if they occupied the Proposed Project Site prior to construction. Indirect impacts to nesting birds during construction could extend up to 500 feet from the limits of construction. Potential impacts could include abandonment of nest sites and the mortality of young. The Proposed Project could also result in a temporary loss of foraging opportunities for burrowing owl in and adjacent to the Proposed Project Site during construction. Direct impacts to this species would be avoided through the implementation of avoidance and minimization measures presented in **BIO-1 through BIO-5 and BIO-7** including preconstruction surveys and worker awareness training. With the implementation of these measures, the Proposed Project would have may affect, but is not likely to adversely affect burrowing owls.

Less-Than-Significant Impact with Mitigation.

Swainson's Hawk

Swainson's hawks require suitable terrestrial habitat for nesting. Swainson's hawks arrive in the Central Valley and nest peripherally in valley riparian systems, as well as in lone trees or groves of trees in agricultural fields. Suitable habitat for nesting, including Valley oak, Fremont cottonwood, walnut, and willow trees, are typically found in riparian and grassland habitats at elevations in the range of 41 to 82 feet above sea level. Nesting typically occurs between March and August. Breeding pairs construct nests composed of sticks, leaves, and bark. Eggs are laid from mid- to late-April and are incubated into mid-May when young begin to hatch. Young remain near the nest and depend on adults for approximately four weeks after fledging until they permanently leave the breeding territory. Swainson's hawks feed on small mammals, birds, and insects; young are fed rodents, rabbits, and reptiles. When not breeding, Swainson's hawks are atypical because they are almost exclusively insectivorous (England et al., 1997). Typical

foraging habitat includes annual grasslands, alfalfa, and other dry-farm crops that provide suitable habitat for small mammals.

Suitable foraging habitat nearby nesting sites is critical for fledging success. A nest with a pair of adults and one juvenile were observed in a large oak within a remnant patch of riparian vegetation outside of the Proposed Project Site during the March 2018 survey. There is one CNDDB record of Swainson's hawks within 5 miles of the Proposed Project Site. Construction activities associated with the Proposed Project could impact Swainson's hawks, because habitat and nesting sites for this species may be present within 500 feet of the Proposed Project Site, if it was to enter the project work limits. Direct impacts to this species would be avoided through the implementation of avoidance and minimization efforts presented in **BIO-1 through BIO-5** and **BIO-8**, including preconstruction nesting surveys and worker awareness training conducted prior to construction initiation. With the implementation of these measures, the Proposed Project would have may affect, but is not likely to adversely affect Swainson's hawks.

Less-Than-Significant Impact with Mitigation.

Western Spadefoot

The western spadefoot toad occurs throughout the Central Valley and adjacent foothills (including the Sierra foothills). It also occurs in the Southern Coast Range from Santa Barbara County to the Mexican border. This species primarily inhabits lowlands, including such features as washes, floodplains of rivers, alluvial fans, playas, and alkali flats. The toad is almost completely terrestrial, entering water only to breed. Preferring areas of short grasses, where the soil is sandy or gravelly, it can be found in valley and foothill grasslands, open chaparral, and pine-oak woodlands. Though some surface activity may occur in any month between October and April, it typically becomes surface-active following relatively warm rains in late winter-spring and fall. The western spadefoot toad breeds in temporary pools, such as vernal pools, or pools in ephemeral waterways. In order for young to successfully metamorphose, breeding pools must lack exotic predators, such as fishes, bullfrogs, and crayfishes. Breeding occurs between January and May (Stebbins, 2003).

There are six recorded occurrences of western spadefoot within 5 miles of the Proposed Project Site. The closest record, from 1978, is approximately 1.03 miles north of the Proposed Project Site. Tadpoles were observed in several slow-moving creeks that crossed Southworth Road and Ospital Road. The most recent record is from 1992 and is approximately 1.2 miles south-southwest of the Proposed Project Site. Tadpoles were found in three natural ponds in grasslands along dredge tailings which are likely utilized as terrestrial habitat by the adults during most of the year. The slow-moving nature of North Fork Duck Creek could provide potential dispersal habitat for this species, while the ruderal (disturbed) habitat could provide marginally suitable upland dispersal habitat. This species was not observed during the surveys conducted in March 2018. Construction activities associated with the Proposed Project could impact western spadefoot, since habitat for this species may be present within the Proposed Project Site for dispersal, if it was to enter the project work limits. Direct impacts to this species would be avoided through the implementation of avoidance and minimization efforts presented in **BIO-1 through BIO-5 and BIO-9**, including preconstruction nesting surveys and worker awareness training conducted prior to construction initiation. With the implementation of these mitigation measures, the Proposed Project would not affect western spadefoot.

Less-Than-Significant Impact with Mitigation.

Western Pond Turtle

Western pond turtle populations have declined in conjunction with habitat alteration due to urbanization and agricultural development. Nesting and basking habitats are important for egg maturation and are crucial to a self-sustaining population. Loss of emergent wetland vegetation due to grazing and trampling results in less-suitable habitat for hatchlings and juveniles. Fire suppression on native grasslands causes overgrowth, which in turn excessively shades nesting grounds. Introduced predators, such as bullfrogs and warm-water fish, decimate hatchling turtle numbers. Western pond turtles require suitable habitat for breeding. Aquatic breeding habitats, including ponds, marshes, rivers, streams, and irrigation ditches that typically have muddy or rocky bottom and grow aquatic vegetation, are typically found in Pacific-slope drainages at elevations of approximately 1,450 meters above mean sea level. Western pond turtles require

basking sites, such as logs or mats of submerged vegetation, and prefer habitats with stable banks, open areas to bask, and underwater coverage provided by logs, large rocks, bulrushes, or other vegetation. This species leaves its aquatic site only to reproduce and to hibernate. Breeding typically occurs between April and September. Egg-laying, which may take place up to 0.5 kilometers from water, occurs in May and June. Hibernation occurs between October and March (Stebbins, 2003).

Western pond turtle (*Actinemys marmorata*), is a CDFW species of special concern. There are no CNDDB records of western pond turtles within 5 miles of the Proposed Project Site. Duck Creek is a suitable aquatic habitat for foraging given its typical water retention through June, presence of small amphibians, presence of aquatic vegetation, and suitable basking locations. The uplands adjacent to Duck Creek may provide suitable breeding habitat for western pond turtle. Construction activities associated with the Proposed Project could impact western pond turtles, since habitat for this species may be present within the Proposed Project Site, if it was to enter the project work limits. Direct impacts to this species would be avoided through the implementation of avoidance and minimization measures outlined in **BIO-1 through BIO-5 and BIO-10**, that would eliminate the chance of western pond turtle being present within the construction area. With the implementation of these measures, the Proposed Project would have no impacts to western pond turtles.

Less-Than-Significant Impact with Mitigation.

Migratory Birds and Other Birds of Prey

The following avoidance and minimization measures shall be implemented to avoid project-related impacts to nest sites for birds of prey and migratory birds. In addition to the avoidance measures **BIO-3 through BIO-8**, **BIO-11, and BIO-12,** would help avoid project-related impacts to migratory birds. Implementation of Avoidance and Minimization Measures BIO-1 through BIO-15 would reduce impacts on sensitive species to less than significant.

Less-Than-Significant Impact with Mitigation.

Question B

Natural communities of concern (i.e., riparian, wetlands, and oak woodlands) are considered sensitive under CEQA and may be regulated by the CDFW pursuant to Section 1602 of the California Fish and Game Code (CFGC). Riparian communities and wetlands may also be regulated by the USACE and/or Regional Water Quality Control Board (RWQCB) if the community is determined to be waters of the United States, or waters of the State.

Riparian Habitat

Proposed Project designs would result in 0.004 acres of permanent impacts and 0.07 acres of temporary impact to riparian habitat under the Proposed Project. Riparian areas may be indirectly affected by stormwater runoff during construction. With the implementation of avoidance and minimization efforts **BIO-1** through **BIO-4**, and all applicable conditions within the permits shall ensure that impacts to riparian habitat would be less than significant.

Less-Than-Significant Impact with Mitigation.

Question C

A preliminary jurisdictional delineation has been prepared to identify jurisdictional Waters within the Proposed Project Site (**Appendix B**). The preliminary jurisdictional delineation report identifies riverine (North Fork Duck Creek) habitat as the only Waters of the U.S. within the Proposed Project Site; no wetlands were identified. The proposed Project would impact non-wetland waters subject to regulation by the USACE, RWQCB, and CDFW as discussed above under Question B.

Less-than-Significant Impact.

Question D

Construction of the new bridge would not interfere with any movement corridors or the movement of any native resident, migratory fish, or wildlife species.

Nesting habitat for migratory birds and other birds of prey protected under the MBTA may include the trees in the vicinity of the Project Site. Potential disruption of nesting migratory birds and other birds of prey during construction could result in nest abandonment or mortality. Disturbance of migratory birds during nesting season (February 1 to August 31) could result in "take", which is prohibited under the Migratory Bird Treaty Act and Section 3513 of the CFGC. Implementation of avoidance measures **BIO-1 through BIO-12** would reduce impacts to less than significant.

Less-Than-Significant Impact with Mitigation.

Question E

The Proposed Project is subject to Goal NCR-2.1 of County of San Joaquin General Plan (SJC, 2016a). Impacts to riparian habitat would be minimized to the maximum extent possible. The Proposed Project would not conflict with any other ordinances, plans or policies protecting biological resources. With the implementation of avoidance measures **BIO-1 through BIO-12** would reduce impacts to less than significant.

Less-Than-Significant Impact with Mitigation.

Question F

The Proposed Project is not subject to any approved local, regional, or state habitat conservation plan and thus would not affect any such plans or areas.

No Impact.

Mitigation Measures

BIO-1: Obtain All Required Permits

Prior to construction, the Proposed Project shall obtain all required permits. Permits may include, but not be limited to, the following: CDFW Section 1602 permit, a USACE Section 404 permit, and a RWQCB Section 401 permit. Coverage under a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the Construction General Permit (CGP), Order 2009-009-DWQ. All conditions within the issued permits shall be adhered to.

BIO-2: Limit In-Stream Work to Dry Season

All in-stream construction activities shall be performed during the dry season, defined as the timeframe between June 1 and October 31, or the first significant rainfall, whichever comes first. This period coincides with the time of year when North Fork Duck Creek has little to no flow. The required permits are anticipated to include provisions for any required ensuring dewatering does not impact the stream, removal of fill within the stream, and sediment control during and immediately after the work.

If the work site needs to be temporarily dewatered by pumping, water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any diversion or barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

Alternation of the stream bed will be minimized to the maximum extent possible; any imported material will be removed from the stream bed upon completion of the project.

BIO-3: Restoration of Stream Channel after Construction

Before the end of construction, any work done to the new bridge alignment within the North Fork Duck Creek stream channel and during the installation and removal of the temporary bypass road, the stream channel shall be restored to a condition allowing for connectivity of the Ordinary High Water Mark (OHWM) and the bed and bank between the upstream and downstream sections of the Proposed Project Site. All temporarily disturbed areas shall be returned to pre-project conditions upon completion of construction, including habitat contours. These areas will be properly protected from washout and erosion using appropriate erosion control devices including coir netting, hydroseeding, and revegetation. The un-impacted areas above and below the work areas will serve as baseline for restoration evaluation.

BIO-4: Demarcate Work Area Boundary

In consultation with a qualified biologist, construction personnel shall demarcate the outer perimeter of the surveyed work area to prevent damage to adjacent habitat even though no suitable for special-status species were seen there during the detailed survey of the Proposed Project Site. This fencing shall provide visual orientation to the limits of the work and survey cleared areas. Material appropriate for creating a barrier for animal species, such as properly installed silt fencing, shall be installed prior to the start of construction, and shall be maintained in place and in good working order during all periods of construction. All persons employed or otherwise working on the Project Site shall be instructed about the restrictions that the marking represents.

BIO-5: Conduct Environmental Awareness Training for Special-Status Species

Prior to construction commencement, all construction personnel shall participate in environmental awareness training regarding identification, descriptions, behavior and habitat indicators for all special-status species with the potential to be found within the Proposed Project Site. If new construction personnel are added, they must receive this mandatory training prior to initiating work. As part of the training, an environmental awareness handout shall be distributed to all personnel that describes and illustrates all special-status animal species with the potential to occur within the Proposed Project Site. In addition, information on general measures that will be taken to protect these species as they relate to the Proposed Project, the penalties for non-compliance, and the boundaries of the Proposed Project Site will be included. The handout shall also list any applicable permit conditions provided by each regulatory agency. Upon completion of training, employees will sign a form stating that they attended the training and understand all the conservation and protection measures.

BIO-6: Avoidance and Minimization Measures for Tricolored Blackbird

If feasible, conduct all tree and shrub removal and grading activities during the non-breeding season (generally September 1 through January 31). If grading and tree removal activities are scheduled to occur during the breeding and nesting season (February 1 through August 31), pre-construction surveys would be performed prior to the start of Proposed Project activities. If construction, grading, or other Proposed Project-related activities are schedule during the nesting season (February 1 to August 31), preconstruction surveys for other migratory bird species would take place no less than 14 days and no more than 30 days prior to the beginning of construction within 250 feet of suitable nesting habitat. If the pre-construction surveys do not identify any nesting migratory bird species within areas potentially affected by construction activities, no further mitigation would be required. Should active nest sites be discovered within areas that may be affected by construction activities, Proposed Project-related construction impacts would be avoided by establishment of appropriate no-work buffers to limit Proposed Project-related construction activities near the nest site. The size of the no-work buffer zone would be determined in consultation with the DFW, although a 500-foot buffer zone would be used when possible. The no-work buffer zone would be delineated by highly-visible temporary construction fencing. In consultation with DFW,

monitoring of nest activity by a qualified biologist may be required if the Project-related construction activity has potential to adversely affect the nest or nesting behavior of the bird. No Proposed Project-related construction activity would commence within the no-work buffer area until a qualified biologist and CDFW confirms that the nest is no longer active.

BIO-7: Avoidance and Minimization Measures for Burrowing Owl

Prior to construction, surveys shall be conducted by a qualified biologist to determine presence/absence of burrowing owls and/or occupied burrows in and within 500 feet of the Proposed Project Site according to the 2012 CDFW Staff Report on Burrowing Owls. If presence is confirmed, during that same year, a winter survey will be conducted between December 1 and January 31 and a nesting survey will be conducted between April 15 and July 15. Preconstruction surveys will also be conducted within 30 days prior to construction to ensure that no additional burrowing owls have established territories since the initial surveys. If no burrowing owls are found during any of the surveys, no further mitigation will be necessary. If burrowing owls are found, then the following measures shall be implemented prior to the commencement of construction. During the non-breeding season (September 1 through January 31), burrowing owls occupying the Proposed Project Site should be evicted from the Proposed Project Site by passive relocation as described in the Staff Report on Burrowing Owls (CDFW, 2012). During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed and shall be provided with a 250-foot protective buffer unless a qualified biologist approved by CDFW verifies through non-invasive means that either: 1) the birds have not begun egg-laying, or 2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. Once the fledglings are capable of independent survival, the burrow can be destroyed.

BIO-8: Avoidance and Minimization Measure for Swainson's Hawk

Prior to construction, surveys will be conducted by a qualified biologist to determine presence/absence of nesting Swainson's hawk in and within 0.50 miles of the Proposed Project Site according to the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee, 2000). If no Swainson's hawks are found during any of the surveys, no further mitigation will be necessary. If Swainson's hawk nests are found, CDFW will be consulted regarding measures to reduce the likelihood of forced fledging of young or nest abandonment by adult birds. These measures will likely include, but are not limited to, the establishment of a no-work zone around the nest until the young have fledged as determined by a qualified biologist.

BIO-9: Avoidance and Minimization Measure for Western Spadefoot

For work conducted during the western spadefoot migration and breeding season (November 1 to May 31), a qualified biologist will survey the active work areas (including access roads) in mornings following measurable precipitation events. Construction may

commence once the biologist has confirmed that no spadefoot are in the work area. When feasible, there will be a 50-foot no-disturbance buffer around burrows that provide suitable upland habitat for western spadefoot. Burrows considered suitable for spadefoot will be identified by a qualified CDFW biologist. The biologist will delineate and mark the no-disturbance buffer. If western spadefoot is found within the construction footprint, it will be allowed to move out of harm's way of its own volition or a qualified biologist will relocate the organism to the nearest burrow that is outside of the construction impact area. Prior to beginning work each day, a qualified biologist will inspect underneath equipment and stored pipes greater than 1.2 inches (3 cm) in diameter for western spadefoot. If any are found they will be allowed to move out of the construction area under their own accord. Trenches and holes will be covered and inspected daily for stranded animals. Trenches and holes deeper than one foot deep will contain escape ramps (maximum slope of 2:1) to allow trapped animals to escape uncovered holes or trenches. Holes and trenches will be inspected prior to filling.

BIO-10: Avoidance and Minimization Measure for Western Pond Turtle

If dewatering is necessary, the construction area shall be dewatered prior to construction activities. CDFW shall be notified prior to dewatering activities. No more than two weeks prior to the commencement of ground-disturbing activities, the County shall retain a qualified biologist to perform surveys for western pond turtle within suitable aquatic and upland habitat within the Project Site. Surveys will include western pond turtle nests as well as individuals. The biologist (with the appropriate agency permits) will temporarily move any identified western pond turtles upstream of the construction area, and temporary barriers will be placed around the construction area to prevent ingress. Construction will not proceed until the work area is determined to be free of turtles. The results of these surveys will be documented in a technical memorandum that will be submitted to CDFW (if turtles are documented). Standard construction BMPs shall be implemented throughout construction to avoid and minimize adverse effects to the water quality within the Proposed Project Site.

BIO-11: Install Exclusionary Netting beneath the Existing Bridge

Remove all existing unoccupied nests on the bridge during the non-nesting season (September 1-January 31). Keep the bridge free of nests, using exclusionary netting or other approved methods, until the completion of construction activities. Inspect all listed structures for nesting activity a minimum of three days per week; no two days of inspection would be consecutive. A weekly log would be submitted to the Project biologist. The contractor would continue inspections until bridge removal and completion of construction on the new bridge. If an exclusion device were found to be ineffective or defective, the contractor would complete repairs to the device within 24 hours. If birds were found trapped in an exclusion device, the contractor would immediately remove the birds in accordance with USFWS guidelines. Submittal of working drawings or written proposals of any exclusion devices, procedures, or methods to the Project biologist before installation is necessary. The method of installing exclusion devices would not damage permanent features of the new bridge structure. Approval by the Project

biologist of the working drawings or inspection performed by the authorized Project biologist would in no way relieve the contractor of full responsibility for deterring nesting, or preventing potential impacts to nesting birds or roosting bats. The underside of the existing bridge shall be netted with tightly strung netting, with less than a half-inch of mesh before February 1 of the year construction is scheduled to take place. There should be no opening greater than a half-inch along any seams, transitions, or connection points with the bridge during the timeframe, from February through the start of construction. Netting shall be checked weekly and repairs made immediately. Demolition and removal of the existing bridge shall only be initiated after the bridge has been confirmed to be free of nesting migratory birds.

BIO-12: Conduct Preconstruction Surveys for Active Nests

The avoidance and minimization measures described in **BIO-6** will also protect other nesting migratory songbirds and raptors protected under the MBTA.

3.5 CULTURAL RESOURCES

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

3.5.1 ENVIRONMENTAL SETTING

This section is partially excerpted from an Archaeological Survey Report (ASR) and Historic Properties Survey Report (HPSR) prepared for the Proposed Project by Starkey in 2019.

Natural Setting

The Proposed Project is located on the eastern margin of the alluvium-filled Central Valley, near the interface of undulating Sierra Nevada Foothills that gently rise eastward to the Sierra Nevada Mountain Range. The Project is at an elevation 117 feet above mean sea level with no discernable slope or major landscape feature other than Duck Creek, a shallow, meandering drainage of the Duck Creek Watershed, that bisects the Proposed Project Site in an east/west trending fashion. Prehistorically, regional drainages would have offered variations in biotic zones. The dominant natural vegetative communities in the project region would have been California steppe, prairie grasslands, and tule marshes, with some areas of riparian woodland. Valley oak, cottonwood, sycamore, and willows once grew on the verge of streams and rivers. Tule marshes were represented by stands of tules, cattails, sedges, rushes, and clumps of willows. Vegetation tended to be sparse in the prairie grasslands, limited to grasses and flowering herbs. However, a single valley oak could produce 300–500 pounds of acorns each year and tule roots could be ground into meal to supplement the abundant faunal resources as well as supplying reeds for housing, clothing, rafts, and baskets.

The Proposed Project is situated on a Holocene-age (11,700 years B.P. – present) low stream terrace with a potential soil depth of over 5 feet. The underlying landform, mapped as the Modesto Formation, was deposited during the last glacial period (late Pleistocene), where lowered sea levels promoted channel incisions and erosion.

Agricultural crops, including row crops and orchards, have tilled and worked the ground in the Proposed Project Site since the mid-1800s, which would displace surficial archaeological remains if present. The proximity to water and known sites in the area increases the potential for

encountering buried prehistoric archaeological deposits. However, the underlying landform is Pleistocene-age, which pre-dates the known human occupation of the region, therefore, the potential to encounter deeply buried prehistoric deposits during Project construction is low.

Prehistoric Setting

The San Joaquin Valley was a focus of early research in California. Archaeological work during the 1920s and 1930s led to the cultural chronology for central California eventually leading to the Central California Taxonomic System (CCTS) which proposed a sequence of cultural succession in Central California defined by cultural changes. These periods are detailed below.

Paleo-Indian Period

The Paleo-Indian Period (12,000 to 8000 B.P.) saw the first demonstrated entry and spread of humans into California. Sites were situated along lake shores, and a developed milling tool technology may have existed during this period. Social units were not heavily dependent upon exchange of resources, with exchange activities occurring on an ad hoc, individual basis. Most resources were acquired by seasonal migration calculated to take advantage of appropriate habitats. Characteristic artifacts included fluted projectile points and chipped stone crescents.

Lower Archaic Period

The beginning of the Lower Archaic Period (8000 to 5000 B.P.) coincided with a middle Holocene climatic change to generally drier conditions. Subsistence was focused on the consumption of plant foods over those obtained by hunting. Settlement appears to have been semi-sedentary with little emphasis on wealth. Most tools were manufactured of local materials, and exchange activities remained limited. Distinctive artifact types included large dart points, the milling slab, and handstone.

Middle Archaic Period

The Middle Archaic Period (5000 to 3000 B.P.) began at the end of mid-Holocene climatic conditions when the climate became similar to present-day conditions. Cultural change was primarily in response to this changing environment. Economies were more diversified, possibly with the introduction of acorn technology. Hunting remained an important source of food. Sedentism became more fully developed, and there was general population growth and expansion, but there is little evidence for development of regularized exchange relationships. Artifacts diagnostic of this period include the bowl mortar and pestle, and the continued use of large projectile points.

Upper Archaic Period

The growth of sociopolitical complexity marked the Upper Archaic Period (3000 to 1500 B.P.). The development of status distinctions based upon wealth has been well documented. There was greater complexity of exchange systems with evidence of regular, sustained trading between groups. Shell beads gained significance as possible indicators of personal status and as important trade items. Groups who occupied the lowland valleys of central California appear to have lived in comparatively high-density villages, utilized a broad range of specialized

technologies, and worked logistically from permanent or semi-permanent settlements. Group-oriented religions emerged and may be the origins of the Kuksu religious system at the end of the period.

Roughly 800 years ago, a significant change regarding obsidian production and trade is recognized throughout central California. In the Northern San Joaquin Valley, this change is identified through shifts in obsidian source frequencies. Napa Valley obsidian becomes the primary source material used in this region, supplanting material obtained from eastern quarries. Haliotis ornaments and large quantities of shell beads manufactured in southern California and along the central and northern California coast are found in residential sites throughout the Sacramento Valley and lower foothills of the Sierra and Coast ranges. Clam shell disk beads occur widely throughout the Central Valley and adjacent foothills.

Emergent Period

Several technological and social changes distinguish the Emergent Period (1500 A.D. to 200 B.P.). The bow and arrow were introduced, ultimately replacing the dart and atlatl. Territorial boundaries between groups became well established and resembled those documented in the ethnographic literature. It became increasingly common that distinctions in an individual's social status could be linked to acquired wealth. Exchange of goods between groups became more regularized and increasingly sophisticated after AD 1500. The clamshell disk bead was adopted as a monetary unit for exchange, and increasing quantities of goods moved greater distances. It was during the latter decades of this period that large-scale Euro-American-related impacts to Native American groups took place.

Ethnographic Setting

The San Joaquin Valley was inhabited by a number of tribal groups, including the Northern Valley Yokuts, within the current project area. The core of Northern Valley Yokuts territory was the San Joaquin River; their lands surrounding the river extended eastward from the crest of the Coast Ranges into the Sierra Nevada foothills and southward from Bear Creek to the upper San Joaquin River. Because of their rapid decimation as a result of disease, Missionization, and Euro-American settlement, the Northern Valley Yokuts are generally not well documented in the ethnographic record (Wallace, 1978).

The Northern Valley Yokuts were organized into small political units or tribes. Each tribe had a population of approximately 300 people, most of who lived within one principal settlement that usually had the same name as the political unit. Within the villages, structures included sweathouses, ceremonial chambers, and oval single-family dwellings made of tule (Wallace, 1978). Because of their close proximity to the San Joaquin River and its major tributaries, fishing was a particularly important part of Northern Valley Yokuts subsistence and economic practices (Wallace, 1978). To gather, collect, and process food resources, a wide variety of tools, implements, and enclosures were employed including the bow and arrow, nets, slings, traps, and blinds (Wallace, 1978).

Historic Setting

Gabriel Moraga led a series of expeditions into the project region in the early 19th century while in search of appropriate sites for Spanish missions. Later exploration by John C. Fremont and Kit Carson followed. However, European settlement began in earnest with the Gold Rush, when miners began working along the San Joaquin River. The miners soon recognized the agricultural potential of the land and turned to grain farming, orchards, and ranching. Arable land was found along the major river corridors and valley bottom, while cattle and sheep ranching were established in the foothills.

One of the key components to the settlement of the region arrived in the 1870s, when the Central Pacific Railroad constructed its line through the San Joaquin Valley to reach Southern California. This revolutionized the transportation network, passenger travel, and the ability of farmers and ranchers to sell their goods in distant markets. During the late 1800s, the San Joaquin Valley became the center of California's wheat belt. While ranching remained an important industry, large-scale irrigation in the early 1900s led to diversified crops and orchards.

Research Methods

A cultural resource record search was performed by the Central California Information Center (CCIC) of the California Historical Resources Information System on January 8, 2018. The record search encompassed a 0.5-mile radius around the Proposed Project Site. The CCIC reviewed maps showing recorded cultural resource sites and lists of cultural resource studies carried out in the area. This record search included, but was not necessarily restricted, to a review of the National Register of Historic Places (NRHP), California Inventory of Historical Resources, the Office of Historic Preservation (OHP) Archaeological Determinations of Eligibility, and the OHP Directory of Properties in the Historic Property Data File. This last directory includes information relating to the NRHP, California Register of Historical Resources (CRHR), California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. The CCIC found that no previous studies had included the Proposed Project Site and that two resources had been documented within a mile, but none within site boundaries.

The Native American Heritage Commission was contacted on January 5, 2018, with a Sacred Land File (SLF) and Native American Contact List request for Township 1 North, Range 9 East, Section 15, San Joaquin, California. The SLF check was negative for cultural resources, and a list of tribes was provided who may have information about the study area or recommend others with specific knowledge. A letter or email was sent to the provided list with the Project information; results of the SLF check and records search; as well as requesting any knowledge they may have of the area, concerns they may have about the Project, and if they would like to consult. The results of consultation are included in **Section 3.18**, Tribal Cultural Resources.

Field Survey

An intensive pedestrian survey using tight (5 meter) transects was conducted by Anna M. Starkey on March 19, 2018 and documented in a Historic Property Survey Report (HPSR) and an Archaeological Survey Report (ASR). Constraints to the survey included thick vegetation

obscuring the ground surface in the northeast quadrant and portions of the right-of-way, otherwise visibility was excellent. The remainder of the Proposed Project Site consisted of recently-plowed fields, an immature orchard, the creek, the bridge, and right-of-way. The road was described as an elevated prism at least 1 foot above the original ground surface. The ground was closely inspected for evidence of surficial or buried prehistoric resources, including midden soil, flaked stone artifacts, fire-cracked rock, or historic-era debris and features. All areas of rodent or human disturbance were troweled and inspected for cultural deposits.

One historic-era resource was identified in the Project Site; Bridge Number 29C-307 over North Fork Duck Creek. Bridge Number 29C-307, built in 1931, was determined not eligible for listing in the NRHP (Caltrans, 2019). Three prehistoric isolates, two greenstone cores, and a greenstone flake tool were found lying on the ground surface in the plowed field beyond the road prism on the south side of North Fork Duck Creek. The ASR speculated that road fill may have come from County-generated soils borrowed from an archaeological site along Rock Creek, as they were consistent with other, similar finds. Although the Project Site is situated on a culturally sensitive landform in proximity to a water source, the 2018 field investigation found no evidence of archaeological remains or buried deposits. The ASR concluded that the Project Site is heavily disturbed by a hundred years of agricultural activity which would likely, along with bioturbation, bring evidence of archaeological deposits to the surface. The isolates discovered during the survey appeared to be redeposited as road base and not associated with a subsurface deposit. No similar artifact types or cultural constituents were identified in the surrounding area and no greenstone or similar material stone cobbles were observed except for in the right-of-way. The three isolated artifacts were treated as exempt from evaluation per the January 2014 *First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act* (Section 106 PA), Attachment 4 of the Section 106 PA - Properties Exempt from Evaluation as isolated prehistoric finds consisting of fewer than three items per 100 square meters.

In October 2022, a new survey was completed as part of a Native American consultation program (see **Section 3.18**). The participants in that effort concluded that the only elevation of the road bed was produced during the excavation of large road-side ditches rather than via the use of imported fill. Like the 2018 survey, artifacts including greenstone cores and quartz flakes were found in the orchard and plowed field south of North Fork Duck Creek. Unlike the ASR, in 2022 it was concluded that these artifacts represent an *in situ* archaeological site disturbed by farming activities. There has been no subsurface testing, and therefore it is not known whether there is a more deeply buried intact cultural deposit.

3.5.2 REGULATORY SETTING

California Environmental Quality Act

CEQA requires that, for projects financed by, or requiring the discretionary approval of public agencies in California, the effects that a proposed project has on historical or unique archaeological resources be considered (Public Resources Code [PRC] Section 21083.2).

Historical resources include: buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance (PRC Section 50201). CEQA Guidelines Section 15064.5 define three cases in which a property may qualify as a historical resource for the purpose of CEQA review:

- If it is listed in, or determined to be eligible by the State Historical Resources Commission for listing in the CRHR; or
- It is included in a local register of historical resource or identified as significant in a qualifying historical resource survey; or
- The resource appears in, or is determined eligible for the listing, in the CRHR. Public Resources Code Section 5024.1 and CEQA Guidelines 15064.5 define eligibility requirements and states that a resource may be eligible for inclusion in the CRHR if it:
    1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    2) is associated with the lives of persons important in our past;
    3) embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values; or
    4) has yielded, or may be likely to yield, information important in prehistory or history.

Sites younger than 45 years, unless of exceptional importance, are not eligible for listing in the CRHR. Properties must retain integrity to be eligible for listing on the CRHR. Properties that are listed in, or are eligible for, listing in the National Register of Historic Places are automatically considered eligible for listing in the CRHR, and thus are significant historical resources for the purpose of CEQA (PRC section 5024.1(d)(1)).

1. The resource is included in a local register of historic resources, as defined in section 5020.1(k) of the PRC, or is identified as significant in a historical resources survey that meets the requirements of section 5024.1(g) of the PRC (unless the preponderance of evidence demonstrates that the resource is not historically or culturally significant).

2. The lead agency determines that the resource may be a historical resource as defined in PRC section 5020.1(j), 5024.1, or significant as supported by substantial evidence in light of the whole record.

Public Resources Code Section 21083.2 governs the treatment of unique archaeological resources, defined as "an archaeological artifact, object, or site about which it can be clearly demonstrated" as meeting any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

- Has a special and particular quality such as being the oldest of its type or the best example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

3.5.3 IMPACT DISCUSSION

Question A

The 2018 HPSR/ASR prepared for the Proposed Project concluded that no historical resources, as defined in CEQA Guidelines 15064.5, were identified within the Proposed Project Site. The existing Buckman Road Bridge was constructed in 1931, but was evaluated as Category 5 Not Eligible by Caltrans and therefore is not a historical resource (Caltrans, 2019). The three isolated artifacts were thought to be in redeposited soils and were exempt from evaluation.

On October 14, 2022 the site was resurveyed. Most of the Project Site was open, with 100% ground surface visibility in the orchards and plowed fields which surround the area, except for the banks of North Fork Duck Creek, which were almost entirely obscured by vegetation. Similarly, to the 2018 survey, artifacts were identified south of the creek, and included a sparse scatter of greenstone cores and quartz flakes. No subsurface exploration was completed; the fields where artifacts were identified include a walnut orchard southeast of the Buckman Road Bridge and plowed fields southwest of Buckman Road Bridge. Contrary to the 2018 effort, it was concluded that any minor elevation of the road and bridge prism was created by the excavation of deep roadside ditches on both sides of Buckman Road, rather than from imported fill as suggested in the 2018 ASR. As a result, it appeared that the artifacts come from an archaeological site, apparently spanning both sides of Buckman Road south of North Fork Duck Creek, representing a disturbed but *in situ* archaeological site. With implementation of **Mitigation Measure CR-1**, impacts to archaeological resources uncovered during construction of the Proposed Project would be reduced to less than significant with mitigation.

Less-Than-Significant Impact with Mitigation.

Question B

No archaeological resources, as defined in CEQA Guidelines 15064.5, were identified within the Proposed Project Site. The physical landform does allow the possibility for buried resources; however, decades of plowing would likely have uncovered some elements of a buried site, should they exist, however none were identified during the survey. This does not preclude the potential for resources to be found during Project construction. With implementation of **Mitigation Measure CR-1**, impacts to archaeological resources discovered during construction of the Proposed Project would be reduced to less than significant with mitigation.

Less-Than-Significant Impact with Mitigation.

Question C

It is unlikely that human remains are located within the Proposed Project Site due to the general history of farming, which would likely have uncovered remains at some point in the past. However, if any human remains are encountered during ground-disturbing activities, impacts to these remains would be potentially significant. With implementation of **Mitigation Measure CR-2**, impacts to human remains discovered during construction would be reduced to less than significant with mitigation.

Less-Than-Significant Impact with Mitigation.

Mitigation Measures

CR-1: It is understood that the temporary bypass road will consist of imported soils placed over the ground surface on either side of North Fork Duck Creek and that minor grading within the channel may be required. After the conclusion of construction, the imported soils would be removed. To limit potential impacts to any potential buried cultural deposits, the construction contractor shall:

- Lay ground cloth, tarps, geo-fabric or some other visual and non-intrusive barrier on the current ground surface, then place fill on top;
- The fill shall be obtained from a location understood not to contain cultural resources;
- When the fill is removed, excavation shall not proceed below the ground barrier;
- The construction contractor shall retain a qualified professional archaeologist and a Native American monitor to observe ground-disturbing activities on the banks of Duck Creek associated with grubbing, clearing, and excavation for the Proposed Project; and
- At the conclusion of construction, the archaeologist shall prepare a California Department of Parks and Recreation site record form and submit it to the Central California Information Center documenting the resources identified during the two field surveys and noting the potential for buried resources.
- Should unusual amounts of bone, stone, shell, features including foundations, wells, historic trash pits, or other features be uncovered during project construction, all work within 50 feet of the find shall halt immediately, and the Caltrans District 10 Local Assistance Archaeologist, and the Local Assistance Engineer shall be notified. Caltrans and County officials shall formulate appropriate measures for the evaluation and treatment of the find; these measures shall be implemented by the County prior to the resumption of construction. Potential treatment methods for significant and potentially significant resources may include, but would not be limited to, avoidance of the resource through changes in construction methods or project design or implementation of a program of testing and data recovery, in accordance with all

applicable federal and state requirements. Any efforts shall be documented in a cultural resource report to be filed with the CCIC.

CR-2: Stop work within 50 feet if human remains are uncovered during construction. California law recognizes the need to protect interred human remains, particularly Native American burials and items of cultural patrimony, from vandalism and inadvertent destruction. The procedures for the treatment of discovered human remains are contained in California Health and Safety Code §7050.5 and California PRC §5097. If remains are uncovered, the Caltrans District 10 Local Assistance Archaeologist, the Local Assistance Engineer, and the County coroner shall be notified immediately. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). The project applicant or its appointed representative and the professional archaeologist shall contact the Most Likely Descendent (MLD), as determined by the NAHC, regarding the remains. The MLD, in cooperation with the County shall determine the ultimate disposition of the remains and any associated artifacts.

3.6 ENERGY

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

3.6.1 ENVIRONMENTAL SETTING

The Proposed Project Site is located in unincorporated San Joaquin County and is surrounded by agricultural and gazing land, open space and rural residential properties. Electrical lines are located in the vicinity of the Proposed Project Site; however, no electricity is supplied for usage to the Proposed Project Site. As a roadway and bridge used for local residents and surrounded by open, largely uncultivated and unimproved land, the only the Proposed Project Site's associated operational emissions include transportation emissions from vehicle use on Buckman Road and occasional roadway, bridge and utility infrastructure maintenance equipment.

3.6.2 REGULATORY SETTING

Warren-Alquist Act

The 1974 Warren-Alquist Act (PRC § 25000 et seq.) established the California Energy Commission (CEC) and created a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Legislature continues to amend the Act to address pressing energy needs and issues, and the CEC publishes an updated version of the Act each year. The 2019 edition of the Warren-Alquist Act was published in February of 2019.

State of California Integrated Energy Policy Report

Senate Bill (SB) 1389 requires the CEC to adopt an Integrated Energy Policy Report (IEPR) every two years. The IEPR contains an assessment of major energy trends and issues facing the electricity, natural gas, and transportation fuel sectors within California. The IEPR provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the economy of California; and protect public health and safety.

The IEPR calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the IEPR identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for Zero Emission Vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled (VMT) and accommodate pedestrian and bicycle access.

The Draft 2019 IEPR was submitted for public comment on November 8, 2019 and covers a broad range of topics including decarbonizing buildings, integrating renewables, energy efficiency, energy equity, electricity reliability, climate adaptation activities for the energy sector, a natural gas assessment, a transportation energy demand forecast, and the California Energy Demand Forecast. The 2019 IEPR provides the results of the CEC assessments on a variety of energy issues facing California. Many of these issues will require action if the State is to meet its climate, clean energy, air quality, and other environmental goals while maintaining reliability and controlling costs.

Assembly Bill 1007 (Pavley)-Alternative Fuel Standards

AB 1007, (Pavley, Chapter 371, Statutes of 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California; therefore, the CEC prepared the State Alternative Fuels Plan in partnership with CARB and in consultation with other local, State, and federal agencies. The final State Alternative Fuels Plan, published in December 2007, attempts to achieve an 80% reduction in greenhouse gas (GHG) emissions associated with personal transportation, even as the population of California increases.

3.6.2 IMPACT DISCUSSION

Questions A and B

The Proposed Project would replace the existing structurally deficient Buckman Road Bridge. The Proposed Project would require diesel and/or gasoline fuel for powering construction equipment. No electrical power or stationary fuel sources would be built on-site. The adjacent site usage would remain as agricultural and grazing land, open space and rural residential properties. Operational energy use of the Proposed Project is not expected to differ from that of the existing site use, as the Proposed Project would involve the same site use as prior to construction. Additionally, with bridge structural improvements, maintenance needs on the Proposed Project Site would not increase. Because no building structures would be built on site, the Proposed Project would not be required to comply with CalGreen energy efficiency building requirements, nor would it conflict with San Joaquin County General Plan requirements. By improving roadway access and returning traffic to Buckman Road upon bridge completion, the Proposed Project would likely reduce operational energy intensity from on-road transportation. The Proposed Project would also comply with CalGreen's standard for construction waste diversion from landfills. Energy demands of the Proposed Project would adhere to all state and local plans for renewable energy and energy efficiency.

Less-Than-Significant Impact.

3.7 GEOLOGY AND SOILS

		Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:					
a)	Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving	☐	☐	☒	☐
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
	ii) Strong seismic ground shaking?	☐	☐	☒	☐
	iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
	iv) Landslides?	☐	☐	☒	☐
b)	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

3.7.1 ENVIRONMENTAL SETTING

The Proposed Project Site is located within San Joaquin County near the western Calaveras County boundary line. San Joaquin County is located within the Great Valley Geomorphic Province, an asymmetrical synclinal trough, approximately 50 miles wide and 400 miles long. (DOC, 2002). The western edge of Calaveras County and the eastern edge of San Joaquin County are characterized by rolling hills approaching the foothills of the Sierra Nevada range to the east.

Site Topography

The Proposed Project Site is located in Township 1 North, Range 9 East, Section 15, as depicted on the U.S. Geological Survey (USGS) "Farmington, CA" 7.5-minute topographic quadrangle. As noted in **Section 2.1.1**, the site includes the Buckman Road Bridge (No. 29C-0307) over North Fork Duck Creek in eastern San Joaquin County. The site is located southeast of the community of Peters and encompasses a total of 1.36 acres. The study area is rural and surrounding land uses are agricultural. The Proposed Project Site is situated at an approximate elevation of 115 feet above mean sea level.

This segment of North Fork Duck Creek contains no cobbles or gravels and is heavily overgrown with Himalayan blackberries, and mostly non-native vegetation; the soils of the adjacent agricultural fields and orchards are fine, dark brown loam (**Appendix D**). The bed of North Fork Duck Creek is sandy silt with patches of hydrophytic vegetation (cattails) growing within the channel. These creek traits indicate the tendency for sediment deposition rather than scour.

Seismicity

The Proposed Project Site is located in an area of California with the lowest potential for catastrophic earthquakes. The Foothills Fault System of the Sierra Nevada is the nearest fault system, located approximately 20 miles east of the Project Site. This fault is considered potentially active, which refers to faults that have been active within the past 1.6 million years but not within the last 10,000 years (DOC, 2016).

Soils

Soil survey reports for the Proposed Project Site are available online through the USDA Natural Resources Conservation Service, which provides a summary of major physical characteristics with recommendations based on the soil characteristics. Mapped soil types within the Proposed Project Site are uniform and consist of Hicksville loam with 0 to 2% slopes, occasionally flooded along the entirety of the Project Site. Hicksville loam is moderately well-drained and comprised of alluvium derived from mixed rock sources (NRCS, 2022). Hicksville loam is found on low stream terraces and alluvial flats along drainageways of terraces and hills.

A soil type's potential to induce electrochemical or chemical action that corrodes or weakens concrete is known as "risk of corrosion." The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. In regards to site development, this soil type has a low potential to corrode concrete. Soils on the Project Site

have a moderate potential to corrode steel. NRCS classifies land capability of soils within the Property as Class 4, subclasses w and s, defined as soils with very severe limitations limited through water (4w) and shallowness (4s) respectively (NRCS, 2022).

Soils comprised of sand and sandy loam in areas with high groundwater tables or high rainfall are subject to liquefaction during intense seismic events. Liquefaction is the sudden loss of soil strength caused by seismic forces acting on water-saturated, granular soil, leading to a "quicksand" condition generating various types of ground failure. The Project Site is not in a liquefaction or landslide zone (CGS, 1990). Landslides pose little threat in areas surrounding the Project Site due to the relatively flat topography.

The Hydraulic Study Report (**Appendix G**) prepared for the Proposed Project Site indicates that local scour depth is currently seven (7) and 3.3 feet at bridge abutments 1 and 2 respectively, while scour potential is classified by Caltrans as "U" meaning there is not enough information to determine scour potential of the Proposed Project Site.

The physical layout of the immediate vicinity of the existing bridge does not indicate an overall scour pattern, as immediately upstream and downstream the creek bends gradually southwards so that water flowing past the bridge abutments does not strongly strike any focused portion of the banks; instead water meanders during low flow event within a broadly and gently sloped bank rising from the ordinary high-water mark (**Appendix A**).

Linear extensibility is used to determine the shrink-swell potential of soils and is a suitable metric to determine the expansive potential of a soil. The shrink-swell potential is low if the soil has a linear extensibility of less than 3%; moderate if 3% to 6%; high if 6% to 9%; and very high if more than 9%. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. The soils on the Project Site have a linear extensibility index of 2.5 (NRCS, 2022).

3.7.2 REGULATORY SETTING

Federal

Clean Water Act Section 402– National Pollutant Discharge Elimination System

CWA is discussed in detail below in Section 3.10, Hydrology and Water Quality. Since Section 402 of CWA is directly relevant to earthwork, additional information is provided here.

The 1987 amendments to CWA added Section 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES program. As described in Section 3.9, the EPA has delegated authority to the State Water Resources Control Board (SWRCB) for administration of the NPDES program in California, where it is implemented by the state's nine Regional Water Quality Control Boards (RWQCB). Under the NPDES Phase II Rule, any construction activity disturbing 1 acre or more must obtain coverage under the state's General Permit for Stormwater Discharges Associated with Construction Activity (General Permit). General Permit applicants are required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) that describes the BMPs that will be

implemented to avoid adverse effects on receiving water quality as a result of construction activities, including earthwork.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation subtitle of the Omnibus Public Land Management Act, 16 U.S.C. 470aaa to 470aaa-11 requires the U.S. Department of Agriculture and the U.S. Department of the Interior to issue implementation regulations to provide for the preservation, management, and protection of paleontological resources on Federal lands, and ensure that these resources are available for current and future generations to enjoy as part of America's national heritage.

Paleontological resources are defined as the traces or remains of prehistoric plants and animals. Such remains often appear as fossilized or petrified skeletal matter, imprints or endocasts, and reside in sedimentary rock layers. Fossils are important resources, due to their scientific and educational value. Fossil remains of vertebrates are considered significant. Invertebrate fossils are considered significant if they function as index fossils. Index fossils are those that appear in the fossil record for a relatively short and known period of time, allowing geologists to interpret the age range of the geological formations in which they are found.

Significance Criteria

Significance for Paleontological Resources is reflected in terms of compliance with the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for the protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. Additional provisions appear in the Archaeological and Historic Data Preservation Act of 1974, as amended, for the survey, recovery, and preservation of significant scientific, prehistoric, historic, archaeological, or paleontological data, in such cases wherein this type of data might be otherwise destroyed or irrecoverably lost as a result of federal projects.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972; it prohibits the placement of structures intended for human occupancy from being built across active fault traces in California. The Act requires delineation of zones (Alquist-Priolo zones) along active faults in order to address seismic concerns as they relate to public safety and project design. The Act only addresses the hazards of surface fault rupture and is not intended to regulate activities relating to other earthquake hazards such as liquefaction, landslides, or tsunamis. Cities and counties are required to regulate development projects within Alquist-Priolo zones.

California Building Standards Code

The State of California provides minimum standards for building design through the California Building Standards Code (CBC) (CCR Title 24). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls. The CBC also applies to building

design and construction in the state and is based on the International Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed and/or more stringent regulations.

Local

San Joaquin County General Plan

San Joaquin County General Plan (SJC, 2016b) provides goals and policies relevant to hazards and hazardous materials. Relevant goals and policies include the following:

Public Health and Safety Element

GOAL PHS-2: To protect people and property from flood hazards.

Policy PHS-2.3: Evaluation of Flood Protection for New Development - The County shall require evaluation of potential flood hazards prior to approval of new development projects to determine whether the proposed development is reasonably safe from flooding, and shall approve such development consistent with applicable State and Federal laws.

GOAL PHS-3: To protect life and property from seismic and geologic hazards.

Policy PHS-3.1: Consider Geologic Hazards for New Development - The County shall consider the risk to human safety and property from seismic and geologic hazards in designating the location and intensity for new development and the conditions under which that development may occur. (RDR/PSP)

Policy PHS-3.4: Liquefaction Studies - The County shall require proposals for new development in areas determined by the County to have high liquefaction potential to include detailed site-specific liquefaction studies. (RDR/PSR)

Policy PHS-3.5: Subsidence or Liquefaction - The County shall require that all proposed structures, utilities, or public facilities within County-recognized areas of near-surface subsidence or liquefaction be located and constructed in a manner that minimizes or eliminates potential damage. (RDR)

Policy PHS-3.8: Soil Conservation and Restoration - The County shall support soil conservation and restoration efforts of the U. S. Soil Conservation Service and the Resource Conservation Districts. (IGC)

3.7.3 IMPACT DISCUSSION

Question A (i-iv)

Ground surface ruptures occur along earthquake fault lines. As discussed in the Environmental Setting section above, the Project Site is not located within an Alquist-Priolo Fault Zone. The Proposed Project would not be developed in an area showing recent seismic activity (DOC, 2016). Due to the relatively flat topography and soil structure, the construction of the Proposed Project would not increase the risk of landslides. In addition, the Proposed Project would be

constructed in accordance with CBC standards. Therefore, the Proposed Project would not expose people or structures to potentially substantial adverse effects including the risk of loss, injury, or death.

Less-Than-Significant Impact.

Question B

During the construction, underlying soils at the Project Site would be temporarily exposed during grading and underground activities, which could lead to an increase in erosion. Exposed soils are more likely to erode during rainfall or high winds because stabilizing vegetation has been removed. The State Water Resources Control Board requires the project applicant to obtain a NPDES permit for construction activities. The NPDES permit is required for all projects that include construction activities, such as clearing, grading, and/or exaction that disturb at least one acre of land area. The NPDES permit requires that the Proposed Proponent prepare and submit to the City of approval a Project Specific Stormwater Prevention Plan (SWPPP) to control soil erosion during construction because the site is larger than one acre. The SWPPP would identify BMPs, which would include a combination of erosion control and sediment control measures to reduce or eliminate sediment discharge to surface water during construction. With implementation of the SWPPP, the potential for erosion impacts during construction would be less than significant. During operation, the bridge would not increase the potential for erosion compared to existing conditions.

Less-Than-Significant Impact.

Question C

As described above, the Proposed Project is not located on geological soil that is unstable or would become unstable as a result of the Proposed Project activities. There is no evidence of historical landslides, lateral spreading, subsidence, liquefaction, or collapse on or near the Project Site. Therefore, as the Project Site does not contain unstable soils and the site is relatively flat, the Proposed Project would not result in an increased risk of landslides, lateral spreading, subsidence, liquefaction, or collapse.

No Impact.

Question D

The Project Site is not located on expansive soils as defined in Table 18-1-B of the Uniform Building Code. As discussed under the Setting section above, the soils on the Project Site have a linear extensibility index of 2.5; interpreted as a low potential for expansion. Therefore, the Proposed Project would not create a substantial direct or indirect risk to life or property due to expansive soils.

Less-Than-Significant Impact.

Question E

No septic tanks or sewer lines are proposed; therefore, the Proposed Project Site would no impact.

No Impact.

Question F

As discussed in **Section 3.5.3**, an HPSR/ASR was prepared for the Proposed Project in 2018; the Project Site was resurveyed on October 14, 2022 and no paleontological resources were observed. In addition, a search of the University California Museum of Paleontology (UCMP) online database was examined for a list of fossils which might have been observed in the Proposed Project region (UCMP, 2023). The UCMP database listed a total of 984 specimens in San Joaquin County, including a range of microfossils, horse, mammoth, bison, pronghorn, and beaver-grouped rodents. The Proposed Project is not located on or near any UCMP listed paleontological specimens. However, there is always the remote potential that previously unknown unique paleontological resources or sites could be encountered during subsurface construction activities, primarily associated with excavation. This is a potentially significant impact. In the event that paleontological resources or sites are found, **Mitigation Measure GEO-1** would ensure that the Proposed Project would not directly or indirectly destroy a unique paleontological resource or site. After implementation of **Mitigation Measure GEO-1**, impacts to paleontological resources would be less than significant.

Less-Than-Significant Impact with Mitigation.

Mitigation Measures

GEO-1: In the event of any inadvertent discovery of paleontological resources, procedures for inadvertent discovery include the following:

- All work within 50 feet of the find shall halt until a qualified professional paleontologist can evaluate the significance of the find. Appendix G (part VII) of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, which states a project will normally result in a significant impact on the environment if it “would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.”

- Should any evidence of paleontological resources (e.g., fossils) be encountered, work shall be suspended within 50 feet of the discovery, and the County shall be notified immediately. At that time, a qualified professional paleontologist shall be retained to assess the resource and provide appropriate management recommendations. Recommendations shall include, but are not limited to, salvage and treatment as described by the Society of Vertebrate Paleontology (SVP, 2010). This treatment shall include preparation, identification, determination of significance, and curation in a public museum.

3.8 GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

3.8.1 ENVIRONMENTAL SETTING

"Global warming" and "climate change" are common terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century. Natural processes and human actions have been identified as impacting climate. The IPCC has concluded that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. Since the 19th century however, increasing GHG concentrations resulting from human activity such as fossil fuel combustion, deforestation, and other activities are believed to be a major factor in climate change. GHGs in the atmosphere naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space—a phenomenon sometimes referred to as the "greenhouse effect." Some GHGs occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have trapped solar radiation and decreased the amount that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Carbon dioxide, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6) are the principal GHGs. When concentrations of these gases exceed historical concentrations in the atmosphere, the greenhouse effect is intensified. CO_2, CH_4, and N_2O occur naturally and are also generated through human activity. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing, natural gas leaks from pipelines, and industrial processes and incomplete combustion associated with agricultural practices, landfills, energy providers, and other industrial facilities. Other human-generated GHGs include fluorinated gases such as HFCs, PFCs, and SF_6, which have much higher heat-absorption potential than CO_2, and are byproducts of certain industrial processes.

CO_2 is the reference gas for climate change, as it is the GHG emitted in the highest volume. The effect that each of the GHGs have on global warming is the product of the mass of their emissions and their global warming potential (GWP). GWP indicates how much a gas is

predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. For example, CH_4 and N_2O are substantially more potent GHGs than CO_2, with GWPs of approximately 30 and approximately 275 times, respectively, that of CO_2, which has a GWP of 1.

In emissions inventories, GHG emissions are typically reported as metric tons of CO_2e. CO_2e is calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in higher quantities and it accounts for the majority of GHG emissions in CO_2e, both from commercial developments and human activity in general.

3.8.2 REGULATORY SETTING

The climate change strategy for California is multifaceted and involves a number of State agencies implementing a variety of laws and policies, as well as broad goals set by governors. Below is a summary of these goals, laws, and policies.

Executive Order S-3-05

Executive Order (EO) S-3-05 was signed by the California Governor on June 1, 2005. EO S-3-05 established the following statewide emission reduction targets.

- Reduce GHG emissions to 2000 levels by 2010.
- Reduce GHG emissions to 1990 levels by 2020.
- Reduce GHG emissions to 80% below 1990 levels by 2050.

EO S-3-05 created a Climate Action Team (CAT) headed by the Cal/EPA that included several other State agencies. The CAT is tasked by EO S-3-05 with outlining the effects of climate change on California and recommending an adaptation plan, as well as creating a strategy to meet the emission reduction targets.

Assembly Bill 32, California Global Warming Solutions Act

Signed by the California Governor on September 27, 2006, AB 32 codifies a key requirement of EO S-3-05, specifically the requirement to reduce GHG emissions in California to 1990 levels by 2020. AB 32 tasks CARB with monitoring State sources of GHGs and designing emission reduction measures to comply with emission reduction requirements. However, AB 32 also continues the efforts of the CAT to meet the requirements of EO S-3-05 and states that the CAT should coordinate overall State climate policy.

To accelerate the implementation of emission reduction strategies, AB 32 requires that CARB identify a list of discrete early action measures that can be implemented relatively quickly. In October 2007, CARB published a list of early action measures that it estimated could be implemented and would serve to meet about 25% of the required 2020 emissions reductions (CARB, 2007). To assist CARB in identifying early action measures, the CAT published a report in April 2007 that updated their 2006 report and identified strategies for reducing GHG emissions (CARB, 2007). In its October 2007 report, CARB cited the CAT strategies and other

existing strategies that can be utilized to achieve the remainder of the emissions reductions (CARB, 2007). AB 32 requires that CARB prepare a comprehensive “scoping plan” that identifies all strategies necessary to fully achieve the required 2020 emissions reductions. Consequently, in December 2008, CARB released its scoping plan to the public; the plan was approved by CARB on December 12, 2008. An update to the Climate Change Scoping Plan occurred on May 22, 2014, which included new strategies and recommendations to ensure reduction goals of near-term 2020 are met with consideration of current climate science.

A second update to the Climate Change Scoping Plan was adopted on December 14, 2017. The 2017 Scoping Plan Update addresses the 2030 target established by Senate Bill (SB) 32, as discussed below, and establishes a proposed framework of action for California to meet a 40% reduction in GHG by 2030 compared to 1990 levels. The key programs that the 2017 Scoping Plan Update builds on include the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, increasing the use of renewable energy in the State, and reduction of methane emissions from agricultural and other wastes (CARB, 2017).

Executive Order S-01-07

EO S-01-07 was signed by the California Governor on January 18, 2007. It mandates a state-wide goal to reduce the carbon intensity of transportation fuels by at least 10% by 2020. This target reduction was identified by CARB as one of the AB 32 early action measures in the October 2007 report (CARB, 2007a).

Senate Bill 375

SB 375 was approved by the California Governor on September 30, 2008. SB 375 provides for the creation of a new regional planning document called a Sustainable Communities Strategy (SCS). An SCS is a blueprint for regional transportation infrastructure and development that is designed to reduce GHG emissions from cars and light trucks to target levels set by CARB for 18 regions throughout California. Each of the various metropolitan planning organizations must prepare an SCS that is included in their respective regional transportation plan (RTP). An SCS informs the metropolitan planning organizations’ transportation funding decisions by ensuring that they consider the growth anticipated by the general plans of the local governments within their jurisdiction. CARB determines whether the SCS would achieve the applicable regional GHG emissions reduction goals. As SCS is updated every four years, consistent with the RTP four-year cycle.

Senate Bill 605

On September 21, 2014, Governor Jerry Brown signed SB 605 which requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide [CO_2]." SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, CARB completed an inventory of sources and emissions of short-lived climate pollutants in the state

based on available data, identified research needs to address any data gaps, identified existing and potential new control measures to reduce emissions, and prioritized the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities.

The final strategy released by CARB in March 2017 focuses on methane, black carbon, and fluorinated gases, particularly hydrofluorocarbons, as important short-lived climate pollutants. The final strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion). The measures identified in the final strategy and their expected emission reductions will feed into the update to the CARB Scoping Plan.

Executive Order B-30-15

EO B-30-15 was signed by the Governor on April 29, 2015. It sets interim GHG targets of 40% below 1990 levels by 2030, to ensure California will meet its 2050 targets set by EO S-3-05. It also directs CARB to update the Climate Change Scoping Plan. The 2030 Target Scoping Plan Concept Paper was released on June 17, 2016.

Senate Bill 350

SB 350 codifies the GHG targets for 2030 set by EO B-30-15. To meet these goals, SB 350 also raises the Renewables Portfolio Standards from 33% renewable generation by 2020 to 50% renewable generation by December 31, 2030.

Senate Bill 32

Additionally, SB 32, signed in 2016, further strengthens AB 32 with goals of reducing GHG emissions to 40% below 1990 levels by 2030. Based on GHG emissions inventory data compiled by CARB through 2017 and the emission limit of 431 million metric tons (MMT) of CO_2e established in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, California emission reduction goals for near-term 2020 will be met.

The companion bill to SB 32, AB 197 provides additional direction to CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 meant to provide easier public access to air emissions data that are collected by CARB was posted in December 2016.

Senate Bill 100

SB 100 (2018) increased the standards set forth in SB 350 establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. SB 100 states that it is the policy of the State that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California. SB 100 requires that the achievement of 100% zero-carbon electricity resources do not increase

the carbon emissions elsewhere in the western grid, and that the achievement not be achieved through resource shuffling.

Executive Order S-13-08

EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea level rise. Therefore, the EO directs State agencies to take specified actions to assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy Report was issued in December 2009, and an update, Safeguarding California: Reducing Climate Risk, followed in July 2014. To assess the State's vulnerability, the report summarizes key climate change impacts to the State for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016. In January 2018, the California Natural Resources Agency released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that state government should take to build climate change resiliency.

Executive Order B-55-18

Executive Order B-55-18 establishes a carbon neutrality goal for the state of California by 2045; and sets a goal to maintain net negative emissions thereafter. The Executive Order directs the California Natural Resources Agency, CalEPA, the Department of Food and Agriculture, and CARB to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.

Executive Order N-79-20

On September 23, 2020, Governor Newsom issued Executive Order N-79-20 which includes numerous findings related to climate change and clean energy and is intended to have the State of California "pursue actions necessary to combat the climate crisis." The Executive Order establishes a goal for 100% of in-state sales of new passenger cars and trucks to be zero-emission by 2035. In addition, the Executive Order requires that 100% of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations, where feasible, as well as a goal to transition to 100% zero-emission off-road vehicles and equipment by 2035, where feasible.

San Joaquin Valley Air Pollution Control District

Guidance for Assessing and Mitigating Air Quality Impacts

The SJVAPCD prepared the Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI) to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SJVAB (SJVAPCD, 2015). The GAMAQI provides SJVAPCD-recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process. The GAMAQI provides guidance on evaluating short-term (construction) and long-term (operational) emissions. The most recent version of the GAMAQI, adopted March 19, 2015, was used in this evaluation. It contains guidance on the following:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- Methods to mitigate air quality impacts; and
- Information for use in air quality assessments and environmental documents, including air quality, regulatory setting, climate, and topography data.

Climate Change Action Plan

In August 2008, the SJVAPCD adopted the Climate Change Action Plan (CCAP). The CCAP directed the SJVAPCD to develop guidance to assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project-specific GHG emissions on global climate change (SJVAPCD, 2008).

In December 2009, the SJVAPCD adopted the document: *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* and the policy: *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency* (SJVAPCD, 2009). The guidance and policy rely on the use of performance-based standards, otherwise known as Best Performance Standards (BPS), to assess significance of project-specific GHG emissions on global climate change during the environmental review process, as required by CEQA (SJVAPCD, 2009).

Projects implementing BPS in accordance with SJVAPCD's guidance would be determined to have a less than significant individual and cumulative impact on GHG emissions and would not require project specific quantification of GHG emissions.

3.8.3 IMPACT DISCUSSION

Questions A and B

The Proposed Project would replace and improve the safety conditions of the existing bridge on Buckman Road. The Proposed Project is not needed to increase the capacity of the bridge, but rather address existing design and safety deficiencies. Therefore, the Proposed Project would not generate traffic, nor is it anticipated to alter existing traffic patterns and operations. As a result, GHG emissions associated with the Proposed Project would only be related to construction. During construction of the Proposed Project, GHG emissions would be emitted through the operation of construction equipment and from worker and vendor vehicles. The Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, Version 9.0.0. (RCEM) was used to estimate the Proposed Project's GHG emissions. RCEM is approved for use by the SJVAPCD for linear projects. Assumptions used in RCEM are provided in **Appendix H**.

Construction GHG Emissions

Construction of the Proposed Project is scheduled to begin May 2024 and end by August 2024. Construction activities, such as site preparation, site grading, on-site heavy-duty construction

vehicles, equipment hauling materials to and from the Project Site, and motor vehicles transporting the construction crew would produce combustion emissions from various sources. During construction of the Proposed Project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil- based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The SJVAPCD does not have an adopted threshold of significance for construction-related GHG emissions. However, lead agencies are encouraged to quantify and disclose GHG emissions that would occur during construction. Based on the results of the RCEM analysis summarized in **Table 3.8-1**, it is estimated that construction of the Proposed Project would generate a total of approximately 325 metric tons of CO_2e.

TABLE 3.8-1 CONSTRUCTION GHG EMISSIONS

Construction Phase	CO_2e (Metric Tons)
Grubbing/Land Clearing	7.76
Grading/Excavation	196.04
Drainage/Utilities/Subgrade	110.49
Paving	10.72
Total	**325.00**
Source: **Appendix H**.	

Operational GHG Emissions

As described above, the Proposed Project would replace the existing bridge structure. After construction, roadway operations would be expected to return to pre-construction levels. Therefore, the Proposed Project would not alter existing traffic patterns and there would be no increase in associated emissions of GHGs.

Consistency with GHG Reduction Plans

The SJVAPCD has adopted a CCAP, which includes suggested BPS for proposed development projects. Appendix J of the SJVAPCD Final Staff Report for the CCAP contains GHG reduction measures; however, these measures are intended for commercial, residential, and mixed-use projects and are not applicable to the Proposed Project.

Absent any other local or regional Climate Action Plan, the Proposed Project was analyzed for consistency with the goals of AB 32 and the AB 32 Scoping Plan. The Scoping Plan has a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap- and-trade system, and an AB 32 implementation fee to fund the program.

In addition, SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40% below 1990 levels by 2030 contained in

Executive Order B-30-15. SB 32 builds on AB 32 and keeps us on the path toward achieving the State's 2050 objective of reducing emissions to 80% below 1990 levels, consistent with an IPCC analysis of the global emissions trajectory that would stabilize atmospheric GHG concentrations at 450 parts per million CO_2e and reduce the likelihood of catastrophic impacts from climate change.

The AB 32 Scoping Plan includes measures to reduce energy use, water conservation and other efficiency measures that would not be applicable to the Proposed Project. The Scoping Plan measures applicable to the Proposed Project include transportation and motor vehicle measures. The goal of transportation and motor vehicle measures is to develop regional GHG emissions reduction targets for passenger vehicles. Specific regional emission targets for transportation emissions are not directly applicable to the Proposed Project. However, vehicles traveling on the replaced bridge would comply with the Pavley II (LEV III) Advanced Clean Cars Program. The second phase of Pavley standards will reduce GHG emissions from new cars by 34% from 2016 levels by 2025, resulting in a 3% decrease in average vehicle emissions for all vehicles by 2020. In addition, the Proposed Project would replace the existing bridge structure and operation of the roadway would not change. Therefore, the Proposed Project would not conflict with the identified transportation and motor vehicle measures.

Therefore, the Proposed Project would comply with existing State regulations adopted to achieve the overall GHG emissions reduction goals identified in AB 32 and would be consistent with applicable plans and programs designed to reduce GHG emissions. Therefore, the Proposed Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

As shown in the analysis above, the Proposed Project would not result in substantial emissions of GHGs during construction, and would have no effect on long term traffic operations and associated GHG emissions. Additionally, the Proposed Project would not conflict with the goals and objectives of the SJVAPCD's CCAP, with the provisions of the California Scoping Plan, or any other State or regional plan, policy or regulation of an agency adopted for the purpose of reducing GHG emissions. Therefore, the Proposed Project's incremental contribution to cumulative GHG emissions would be less than significant.

Less-Than-Significant Impact.

3.9 HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or to the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☒	☐	☐

3.9.1 ENVIRONMENTAL SETTING

Existing Conditions

Under existing conditions, the Project Site is generally undeveloped and surrounded by rural residents and agricultural lands. The Project Site is not listed as or adjacent to a site containing hazardous materials documented in the Department of Toxic Substances Control's EnviroStor database (DTSC, 2022) or the State Water Resources Control Board's GeoTracker database (SWRCB, 2022). Both databases had a search radius of approximately 6,000 feet from the

Project Site. There are no schools within a 0.25-mile radius of the Project Site. There are no public airstrips or airports located within two miles of the Project Site and the Proposed Project does not conflict with an airport land use plan. According to CalFire's Fire Hazard Severity Zone (FHSZ) Map, the Project Site is located in a State Responsibility Area (SRA) within a "moderate" FHSZ (CAL FIRE, 2022).

3.9.2 REGULATORY SETTING

Federal

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also called the Superfund Act; 42 USC § 9601 *et seq.*) is intended to protect the public and the environment from the effects of past hazardous waste disposal activities and new hazardous material spills. Under CERCLA, the EPA has the authority to seek the parties responsible for hazardous materials releases and to ensure their cooperation in site remediation. CERCLA also provides federal funding (through the "Superfund") for the remediation of hazardous materials contamination. The Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act of 1976 (RCRA; 42 USC § 6901 *et seq.*), as amended by the Hazardous and Solid Waste Amendments of 1984, is the primary federal law for the regulation of solid waste and hazardous waste in the United States. These laws provide for the "cradle-to-grave" regulation of hazardous wastes, including generation, transportation, treatment, storage, and disposal. Any business, institution, or other entity that generates hazardous waste is required to identify and track its hazardous waste from the point of generation until it is recycled, reused, or disposed of.

The EPA has primary responsibility for implementing RCRA, but individual states are encouraged to seek authorization to implement some or all RCRA provisions. California received authority to implement the RCRA program in August 1992. The California DTSC is responsible for implementing the RCRA program in addition to California's own hazardous waste laws, which are collectively known as the Hazardous Waste Control Law.

Occupational Safety and Health Administration

OSHA is responsible at the federal level for ensuring worker safety. OSHA sets federal standards for implementation of workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

State

California Occupational Safety and Health Administration

Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations in California. Cal/OSHA regulations pertaining to the use of hazardous materials in the workplace (CCR Title 8) include requirements for safety training, availability of safety equipment, accident and illness prevention programs, warnings about exposure to hazardous substances, and preparation of emergency action and fire prevention plans. Hazard communication program regulations that are enforced by Cal/OSHA require workplaces to maintain procedures for identifying and labeling hazardous substances, inform workers about the hazards associated with hazardous substances and their handling, and prepare health and safety plans to protect workers at hazardous waste sites. Employers also must make material safety data sheets available to employees and document employee information and training programs.

CAL FIRE Wildland Fire Management

The Office of the State Fire Marshal and the California Department of Forestry and Fire Protection (CAL FIRE) administer state policies regarding wildland fire safety. Construction contractors must comply with the following requirements in the Public Resources Code during construction activities at any sites with forest-, brush-, or grass-covered land:

- Earthmoving and portable equipment with internal combustion engines must be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (Public Resources Code § 4442).
- Appropriate fire-suppression equipment must be maintained from April 1 to December 1, the highest-danger period for fires (Public Resources Code § 4428).
- On days when a burning permit is required, flammable materials must be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor must maintain the appropriate fire-suppression equipment (Public Resources Code § 4427).
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines must not be used within 25 feet of any flammable materials (Public Resources Code § 4431).

Government Code § 65962.5

Originally enacted in 1985, Government Code § 65962.5 requires the California Environmental Protection Agency (Cal/EPA) to prepare a hazardous waste and substances site list, known as the “Cortese list.” A presence on the Cortese list has a bearing on local permitting processes.

Title 13 of the California Code of Regulations, Division 2, Chapter 6, Article 3, §§ 1160-1167

Article 3 within Chapter 6, Division 2, and Title 13 applies to the transportation of hazardous materials in vehicles listed in Vehicle Code § 34500 and in any other vehicle for which the display of placards is required pursuant to Vehicle Code § 27903 as prescribed in Vehicle Code § 31309. Sections 1160 to 1167 of the California Code of Regulations (CCR) sets definitions

and regulations for the transport of hazardous materials in the State of California. The California Highway Patrol and Caltrans are the two primary state agencies responsible for enforcing the regulations specified in §§ 1160 to 1167.

Hazardous Substance Control Laws

The California HSC § 25501 provides the following definition for "hazardous material."

1. A substance or product for which the manufacturer or producer is required to prepare a safety data sheet pursuant to the Hazardous Substances Information and Training Act (Chapter 2.5 [commencing with § 6360] of Part 1 of Division 5 of the Labor Code) or pursuant to any applicable federal law or regulation.
2. A substance listed as a radioactive material in Appendix B of Part 30 (commencing with § 30.1) of Title 10 of the Code of Federal Regulations (CFR), as maintained and updated by the Nuclear Regulatory Commission.
3. A substance listed pursuant to Title 49 of the CFR.
4. A substance listed in § 339 of Title 8 of the CCR.
5. A material listed as a hazardous waste, as defined by California HSC §§ 25115, 25117, and 25316.

Local

San Joaquin General Plan

San Joaquin County General Plan (SJC, 2016b) provides goals and policies relevant to hazards and hazardous materials. Relevant goals and policies include the following:

Public Health and Safety Element

GOAL PHS-1: To maintain a level of disaster preparedness necessary for the protection of public and private property, and the health, safety, and welfare of people living and working in San Joaquin County.

Policy PHS-1.10: Emergency Vehicles Access - The County shall require all new developments to provide, and existing developments to maintain, adequate primary and alternative access for emergency vehicles. (RDR)

GOAL PHS-7: To protect County residents, visitors, and property from hazardous materials and wastes.

Policy PHS-7.3: Control Hazardous Materials - The County shall require the use, storage, and disposal of hazardous materials and wastes to comply with local, State, and Federal safety standards. (RDR)

Policy PHS-7.5: Locate Hazardous Materials Away from Populated Areas - To the extent feasible, the County shall require proposed activities and land uses that use, store, or dispose of hazardous materials or wastes to be located away from existing and planned populated areas. (RDR/PSP)

3.9.3 IMPACT DISCUSSION

Question A

During operation, the Proposed Project would not require the routine transport, use, or disposal of hazardous materials. Construction activities for the Proposed Project would require handling of hazardous materials, such as fuels, lubricating fluids, and solvents for use with construction equipment on-site. Accidental spills or improper use, storage, transport, or disposal of these hazardous materials could result in a public hazard or the transport of hazardous materials (particularly during storm events) to the underlying soils and groundwater.

Although these hazardous materials could pose a hazard, Proposed Project activities would be required to comply with extensive regulations so that substantial risks would not result. Examples of compliance with these regulations would include preparation of a hazardous materials business plan, which would include a training program for employees, an inventory of hazardous materials, and an emergency plan (Cal OES, 2015). All storage, handling, and disposal of these materials would be done in accordance with regulations established by DTSC, EPA, OSHA, Cal OES, CUPA, and Cal/OSHA.

Additionally, as described in Section 3.10, Hydrology and Water Quality, the Proposed Project would prepare a SWPPP as part of its compliance with applicable NPDES permits. The SWPPP would include appropriate spill prevention and other construction BMPs to prevent or minimize potential for releases of hazardous materials or risks to workers during routine activities.

As a result of compliance with the applicable regulations as described above, no significant risks would result to construction workers, the public, or the environment from the construction-related transport, use, storage, or disposal of hazardous materials. Therefore, this impact would be less than significant.

Less-Than-Significant Impact.

Question B

During operation, the Proposed Project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials.

Construction of the project would involve temporary use of hazardous materials, including fuel for construction equipment, paints, solvents, and sealants. Storage, handling, and use of these materials would occur in accordance with standard construction BMPs to minimize the potential for spill or release and ensure that any such spill or release would be controlled on site. Construction plans and specifications would include standard construction BMPs for handling, storage, use and disposal of hazardous materials, such as requirement to contain materials inside buildings or under other cover, vehicle specifications for hazardous material transport and disposal, procedures for safe storage, and training requirements for those handling hazardous materials.

The Proposed Project's construction would require the use, transport, and disposal of hazardous materials; however, as detailed above, compliance with the applicable regulations and implementation of SWPPP and NPDES permit BMPs would ensure that no substantial risks would result to construction workers, the public, or the environment from reasonably foreseeable upset or accident conditions involving the use of hazardous materials for the Proposed Project's construction activities.

Less-Than-Significant Impact.

Question C

The Project Site is not within 0.25-miles of an existing or proposed school. Therefore, the project would have no impact.

No impact.

Question D

As discussed in the Setting section above, the Project Site is not on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.

No impact.

Question E

The Proposed Project is not located within two miles of a public airport or public use airport.

No impact.

Question F

The proposed project includes removal of an existing bridge and installation of a new bridge. During construction, a temporary low water crossing (culvert detour) would be placed approximately 20 feet west of and adjacent to the existing bridge (see **Figure 2-3**) to allow access for residences and agricultural field entrances. After the old bridge is removed and the new bridge is operational and can support vehicle traffic, the culvert detour can then be removed. The Proposed Project would not result in blockage of access routes or evacuation routes adopted within an emergency response plan or emergency evaluation plan.

Less-Than-Significant Impact.

Question G

The proposed bridge replacement project is surrounded by agricultural land, sparse rural residences, and undeveloped open space. As mentioned above, the Project Site is located in a State Responsibility Area (SRA) within a "moderate" FHSZ (CAL FIRE, 2022). Equipment and vehicles used during construction activities may create sparks, which could ignite vegetation on the Project Site. The use of power tools and acetylene torches may also increase the risk of fire

during construction. **Mitigation Measure HAZ-1** would reduce the wildfire risks associated with sparks.

Less-Than-Significant Impact with Mitigation.

Mitigation Measures

HAZ-1: Construction equipment shall contain spark arrestors, as provided by the manufacturer.

HAZ-2: Staging areas, welding areas, or areas slated for development using spark-producing equipment shall be cleared of dried vegetation or other materials that could serve as fire fuel.

3.10 HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☒	☐	☐
i) result in a substantial erosion or siltation on- or off-site;	☐	☒	☐	☐
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☒	☐	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

3.10.1 ENVIRONMENTAL SETTING AND BACKGROUND

The primary objective of the Proposed Project is to replace the existing Buckman Road Bridge over Duck Creek with a structure that is consistent with current standards. The Proposed Project includes the removal of the existing bridge over Duck Creek, as well as a temporary bypass, construction of a new bridge to meet current standards, roadway alignments that would

not require the acquisition of additional permanent right-of-way and limited in-stream construction activities.

Due to the bridge being a clear span structure, the work proposed within the channel will be limited to replacement of the abutments, footing piledriving, installation and removal of the detour, and installation of rock slope protection within the channel beneath the replacement bridge. Removal of the detour will include restoration of the east and west banks to their pre-project condition. See the Biological Assessment included as **Appendix A**.

The Project Site is located on the boundary line between Calaveras and San Joaquin Counties. Calaveras County is located in the central-western portion of the Sierra Nevada geomorphic province, which has topography and geology influenced by the Sierra Mountain range. The western edge of Calaveras County and the eastern edge of San Joaquin County are characterized by rolling hills approaching the foothills of the Sierra Nevada range. The Project Site is located within the Upper Duck Creek sub-watershed within the San Joaquin Delta.

In March 2019, a Water Quality Technical Memorandum was conducted and approved by Caltrans for the Buckman Road Bridge Replacement Project to survey relevant regulatory requirements, describe surface water and ground water resources in the project area, determine the potential impact of project activities, and recommend mitigation measures needed to reduce impacts to water quality to a less-than-significant level (Drake Hagland, 2019). The Water Quality Technical Memorandum is included in **Appendix E**.

Regulatory Background

A survey of relevant environmental regulations was performed and is discussed in **Appendix E**. Relevant federal, state, regional, and local requirements will be followed including the Clean Water Act, Porter-Cologne Water Quality Control Act, NPDES Construction General Permit (CGP), Section 401 Permitting, the California Endangered Species Act, California Fish and Game Code, and San Joaquin County General Plan.

The Proposed Project would be required to obtain appropriate permits associated with construction in the creek bed. The County shall obtain all necessary permits to construct the Proposed Project and implement all permit terms required by the regulatory agencies. Required permits include CWA Section 404 Nationwide Permit from USACE, CWA Section 401 Water Quality Certification from RWQCB, Section 1602 Streambed Alteration Agreement from CDFW, and NPDES General Permit from the SWRCB.

Existing Water Quality

The San Joaquin River is listed on the Clean Water Act (CWA) Section 303(d) List of Impaired Waters, Category 5. The Category 5 list requires the development of a TMDL for pollutants. The San Joaquin River is impaired for separate constituents within different portions of the River. In the lower portion, the river is impaired from agricultural pesticides and temperature. Other segments of the San Joaquin River are listed for pollutants such as temperature, mercury, boron, pesticides, selenium, arsenic, *Escherichia coli* (E. coli), and insecticides (SWRCB, 2018). North Fork Duck Creek is a tributary to the northern portion of the San Joaquin River into the

San Joaquin Delta and is currently listed for copper, diazinon, E.coli, and low dissolved oxygen impairments on the Section 303(d) list (SWRCB, 2018).

Although the San Joaquin River Basin Plan does not explicitly set beneficial uses for North Fork Duck Creek, it does set existing beneficial uses for the San Joaquin River, to which North Fork Duck Creek is a tributary. The noted beneficial uses include municipal and domestic supply, agriculture water supply, industrial water supply, recreation, commercial and sport fishing, freshwater habitat, migration and spawning of aquatic organisms, and wildlife habitat for terrestrial species. Mitigation measures used for maintenance of beneficial uses for Duck Creek are described in the Water Quality Technical Memorandum in **Appendix E**.

Local Hydrology

The Project Site is located within the Upper Duck Creek sub-watershed within the San Joaquin Delta. This sub-watershed drains approximately 28 square miles, mostly in San Joaquin County. This sub-watershed is bordered with the Camanche Reservoir-Mokelumne River sub-watershed to the north and the Upper Duck Creek sub-watershed to the east (EPA, 2015). North Fork Duck Creek flows through the Proposed Project Site from northeast to southwest.

As stated in **Appendix E**, groundwater levels have steadily declined in the Eastern San Joaquin Subbasin over the past 40 years, at an average rate of 1.7 feet per year and up to 100 feet, cumulatively, in some areas of the subbasin. This decline has been largely attributed to agricultural operations. The San Joaquin Delta is one of California's most productive agricultural areas, and a significant amount of groundwater is drawn upon for irrigation. San Joaquin County has no designated sole-source aquifers. The project is located in unshaded flood Zone X defined by FEMA as an area determined to be outside of the 0.2%-annual-chance floodplain (Caltrans, 2020).

3.10.2 IMPACT DISCUSSION

Question A

Construction activities associated with the Proposed Project would result in temporary disturbance within and adjacent to Duck Creek, an intermittent stream. Direct effects on North Fork Duck Creek would include temporary fill in the creek bed for construction of the temporary creek crossing, as well as excavation and pile driving for construction activities. These activities would result in the deposition of debris and dust during the demolition process.

BMPs would be implemented to help prevent debris and dust from entering North Fork Duck Creek. As discussed in **Appendix E**, if construction in the creek bed cannot be limited to dry months, permit conditions would include provisions for sediment control during construction and removal of fill within the creek. All conditions within the RWQCB Section 401 Water Quality Certification, USACE Section 404 Nationwide Permit, and CDFW Section 1602 Streambed Alteration Agreement would be met.

Dewatering of groundwater is not expected, as dewatering would only be needed for construction access if water was present within the work area at the time of construction. If dewatering were required, a diversion or isolation plan would be developed and utilized during pile driving. To prevent discharges from dewatering from affecting water quality, any water produced from the dewatering activities would be pumped, treated, and discharged in accordance with applicable regulations and Proposed Project permits, including the General Waste Discharge Requirements and NPDES Permit for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters. The treatment of any pumped groundwater prior to discharge would prevent affecting water quality if the effluent contains high levels of chemical pollutants or sediment.

The Proposed Project may result in potential impacts on surface water quality, groundwater quality, and site drainage during construction and operation. These impacts are described in more detail in **Appendix E**, and mitigation measures are recommended within this section to maintain a less-than-significant impact on the water quality.

Required permits include CWA Section 404 Nationwide Permit from USACE, CWA Section 401 Water Quality Certification from RWQCB, Section 1602 Streambed Alteration Agreement from CDFW, and NPDES General Permit from the SWRCB.

No long-term impacts are anticipated with the operation and maintenance of the Proposed Project. However, the **Mitigation Measures WQ-1** through **WQ-4** would avoid and minimize the Proposed Project's effects on water quality.

Less-Than-Significant Impact with Mitigation.

Question B

No groundwater or groundwater wells will be either affected or developed as a result of the Proposed Project. The Proposed Project is not likely to reach depths where the groundwater supply could be accessed. However, a temporary culvert detour would be installed to maintain access to the surrounding agricultural fields, and if water is present when construction is scheduled to begin, a temporary diversion system would be installed to isolate and dewater the work area so construction activities could occur. All water produced from dewatering would be pumped, treated, and discharged according to state and regional permits and regulations. During in-water work, all BMPs would be used to reduce the amount of sediment and debris that may be produced.

Less-Than-Significant Impact.

Question C (i)

The Proposed Project involves construction activities that include excavation, placement of rock and fill, pile driving, demolition, bridge footing construction, and regrading of creek banks, which could result in a temporary increase in turbidity and sediment loads in North Fork Duck Creek.

Construction activities could also result in increased erosion on the Project Site, potentially degrading downstream water quality during storm events. Potential sources of debris, dust, and sediment loading are discussed in **Appendix E**.

To prevent increased sediment loading and erosion, BMPs would be implemented to help prevent debris and dust from entering North Fork Duck Creek.

Construction activities will take place within the creek bed during dry months when no water is present in North Fork Duck Creek within the Project Site. As discussed in **Appendix E**, if construction in the creek bed cannot be limited to dry months, permit conditions shall include provisions for sediment control during construction and removal of fill within the creek. All conditions within the RWQCB Section 401 Water Quality Certification, USACE Section 404 Nationwide Permit, and CDFW Section 1602 Streambed Alteration Agreement shall be met.

As discussed in **Appendix E**, during construction, surface water runoff shall be controlled by directing flowing water away from critical areas and by reducing runoff velocity. Diversion structures such as berms and ditches shall collect and direct runoff water around vulnerable areas to prepared drainage outlets. As discussed under **Mitigation Measure WQ-4**, appropriate erosion control measures would be used such as straw wattles, filter fences, vegetative buffer strips, or other accepted equivalents. Fuel and vehicle maintenance areas shall be established away from all drainage courses and design these areas to control runoff.

Since the existing bridge would be removed, the overall net change in impervious surface area would be minimal. The operation and maintenance of the Proposed Project would have no long-term impacts on runoff or water quality and the project design would likely decrease drift accumulation impacts in the vicinity of the Project Site.

Less-Than-Significant Impact with Mitigation.

Question C (ii)

As discussed above, since the overall net change in impervious surface area would be minimal, the amount of increased impervious surfaces would be minimal and would result in a negligible increase of surface runoff. The negligible increase in surface runoff would not significantly impact any potential flooding on or off-site.

Less-Than-Significant Impact.

Question C (iii)

Runoff water landing on Buckman Road and Buckman Road Bridge would drain towards North Fork Duck Creek and would not exceed the capacity of existing or planned stormwater drainage systems.

During the construction phase of the Proposed project, construction and demolition activities have the potential to increase dust, debris, and sediment loading which may provide additional sources of polluted runoff. Mitigation measures to reduce sediment loading, prevent erosion,

and protect water quality are discussed under Question A and in **Appendix E**.

Less-Than-Significant Impact with Mitigation.

Question D

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. The project is not located within a 100-year floodplain and does not span a designated floodway (County of San Joaquin, 2016). The resulting structure from the Proposed Project will have the capacity to handle a flood event.

In-stream work is scheduled to be completed during the dry season, so there is minimal risk of run-off with increased sediment and erosion during the construction phase of the project, in the event a storm event occurs during the dry season.

Less-Than-Significant Impact.

Question E

There is no implemented water quality control plan regarding the Proposed Project. Additionally, a sustainable groundwater management plan would not pertain to the Proposed Project as no groundwater would be disturbed as a result of the construction or operation of the Proposed Project.

No Impact.

Mitigation Measures

WQ-1: Restore Disturbed Areas to Pre-Project Conditions

All temporarily disturbed areas shall be returned to pre-project conditions upon completion of Proposed Project construction. All fill utilized for construction of the temporary creek crossing shall be removed from North Fork Duck Creek to the maximum extent possible.

WQ-2: Limit In-Stream Work to Dry Season

All in-stream construction activities shall be performed during the dry season (June – October) when no water is present in North Fork Duck Creek. In the event that it is not possible to complete in-stream work during the dry season, project permits shall include provisions for dewatering, removal of fill within the stream, and sediment control. All construction activities shall conform to all applicable conditions within the issued permits.

WQ-3: Develop and Implement Dewatering Plan

If dewatering is required, the contractor shall develop a dewatering plan describing the methods, materials, quantities, and locations of dewatering activities. All dewatering discharges shall adhere to the requirements of the General Waste Discharge Requirements and NPDES Permit for Discharges of Groundwater from Construction and

Project Dewatering to Surface Waters. A Notice of Intent shall be submitted to the CVRWQCB for approval before dewatering activities.

WQ-4: Develop and Implement a Stormwater Pollution Prevention Plan

Construction contractors shall comply with the SWRCB NPDES General Permit. The SWRCB requires that all construction sites have adequate control measures to reduce the discharge of sediment and other pollutants to streams to ensure compliance with Section 303 of the CWA. To comply with the NPDES permit, the County shall file a Notice of Intent with the SWRCB and prepare a SWPPP prior to construction, which includes a detailed, site-specific listing of the potential sources of stormwater pollution; pollution prevention measures (i.e., erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), including a description of the type and location of erosion and sediment control BMPs to be implemented at the Project Site; and a BMP monitoring and maintenance schedule to determine the amount of pollutants leaving the Project Site. A copy of the SWPPP must be current and remain on the Project Site. Control measures are required prior to and throughout the rainy season. Water quality BMPs identified in the SWPPP shall include the following:

1. The contractor will develop and implement a toxic materials control and spill response plan to regulate the use of hazardous materials, such as the petroleum-based products used as fuel and lubricants for equipment and other potentially toxic materials associated with Proposed Project construction.
2. Appropriate erosion control measures will be used (e.g., straw wattles, filter fences, vegetative buffer strips, or other accepted equivalents) to reduce siltation and contaminated runoff from the Project Site. All erosion control materials, including straw wattles and erosion control blanket material used on-site, will be biodegradable. The use of erosion control containing plastic monofilament will not be allowed as wildlife may become entrapped in this material. Wattles should be wrapped with 100% biodegradable materials like burlap, jute, or coir.
3. Measures would be implemented during ground-disturbing activities to reduce erosion and sedimentation. These measures may include mulches, soil binders/erosion control blankets, silt fencing, fiber rolls, and temporary berms.
4. Existing vegetation would be protected using temporary fencing or other protection devices, where feasible, to reduce erosion and sedimentation.
5. Exposed soils would be covered by loose bulk materials or other materials to reduce erosion and runoff during rainfall events. Exposed soils would be stabilized, through watering or other measures, to prevent the movement of dust at the Project Site caused by winds and construction activities, such as traffic and grading activities.
6. All construction roadway areas would be properly protected to prevent excess erosion, sedimentation, and water pollution.
7. Temporary berms would be constructed along the tops of slopes to prevent water from running uncontrolled from slopes during construction activities. Water would be collected in these berms and taken down the slopes in an erosion-proof drainage

system. Sediment that is collected within these berms would be allowed to “settle out” and would be removed from the site.

8. All erosion control measures and stormwater control measures would be properly maintained until the site has been returned to a pre-construction or improved state.

3.11 LAND USE AND PLANNING

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

3.11.1 ENVIRONMENTAL SETTING

The Proposed Project Site is located in eastern San Joaquin County within a rural, unincorporated area. Specifically, the Proposed Project Site is approximately 2.8 miles west of the Calaveras County line on Buckman Road. Buckman Road crosses over North Fork Duck Creek and is approximately 0.8 miles north of SR-4 and 0.3 miles north of the nearest local cross street, East Funck Road. Six rural residential properties lie south of the existing Buckman Road Bridge. The nearest residence is located approximately 1,500 feet south of the Buckman Road Bridge. As noted in **Section 2.1.1 Existing Setting**, the 1.36-acre Proposed Project Site includes banks of Duck Creek and agricultural land on both sides of Buckman Road. The Proposed Project Site includes portions of APNs 187-310-09, 187-310-15, and 187-310-16. Land uses surrounding the Propose Project Site consist of private agricultural land, Duck Creek, and to the south East Funck Road and SR-4.

Buckman Road is a single-lane local roadway ending approximately 200 feet north of the existing bridge. The road services multiple agricultural fields as well as two residential units north of the bridge.

3.11.2 REGULATORY SETTING

As described in **Section 2.1.1 Existing Setting**, the San Joaquin County General Plan designates the Proposed Project Site, including three adjacent parcels, as General Agricultural (A/G) (SJC, 2016c) with AG-160 zoning. The A/G designation is for agricultural and grazing uses outside of urban development, where soils are capable of producing a wide variety of crops or grazing and are subject to Williamson Act contracts and/or capital investments (SJC, 2016d). The AG-160 zoning indicates a minimum parcel size of 160 acres (SJC, 1992).

Surrounding land uses include General Agricultural (A/G) and Resource Conservation (OS/RC). The OS/RC are generally designated to remain in opens space. Other land use designations in the Project vicinity include Rural Residential (R/R) for large lot development, Rural Service Commercial (C/RS) which provides for retail and service areas required by rural residents, and Public Facilities (PF) which provides for the location of services and facilities necessary for the community (SJC,

2016d) (SJC, 2016c). The corresponding zoning designations are AG-160, Agricultural 40-Acres (AG-40) with a minimum parcel size of 40 acres, Rural Residential (R/R) for large lot rural homes, Rural Service Commercial (C/RS) which establishes retail and service uses within rural communities, and Public Facilities (PF) which provides for the establishment of major correctional, medical, and infrastructure facilities; publicly owned recreation facilities and similar facilities (SJC, 1992).

3.11.3 IMPACT DISCUSSION

Question A

The Proposed Project would demolish the existing Buckman Road Bridge over North Fork Duck Creek, construct a new bridge, widen the roadway approaches from Buckman Road, and install and remove a temporary construction crossing (culvert detour). Buckman Road passes through agricultural land. Nearby residences are not located directly adjacent to the Proposed Project Site and residences are dispersed at very low density in the vicinity of Buckman Road. Further, adjacent properties do not have structures that would be potentially affected by the Project. A temporary low water crossing (culvert detour) would be placed approximately 20 feet west of and adjacent to the existing bridge to provide access to residences and agricultural field entrances during construction. The Proposed Project would create a new bridge that improves access for residences south of the bridge along Buckman Road, and would only remove the temporary bypass bridge after the new bridge has been opened for public use. The Proposed Project would not establish a barrier for residents to move amongst the local community. Therefore, the Proposed Project Site would have no impact on dividing or disrupting access within an established community.

No Impact.

Question B

As previously described, the Proposed Project is located within the A/G General Plan land use designation and is zoned AG-160. The Proposed Project would not require the alteration of land use and would therefore remain compatible with existing General Plan and zoning designations. Furthermore, the Proposed Project would not establish new businesses or residences that would increase the local population beyond population growth estimates utilized in the General Plan to assess long-term planning concerns.

However, as described is **Section 3.2, Agricultural and Forestry Resources**, the Project Site is enrolled under the Williamson Act and the Proposed Project Site and surrounding area are designated as Prime Farmland and Farmland of Local Importance. The Proposed Project would result 0.045 acres of permanent impacts to Prime Farmland and 0.001 acres of permanent impacts to Farmland of Local Importance, as designated by the Farmland Mapping and Monitoring Program. In addition, the implementation of the temporary construction crossing, general construction activities, and staging area would temporarily impact approximately 0.637 acres of Prime Farmland and 0.058 acres of Farmland of Local Importance. As concluded in Section 3.2, permanent and temporary impacts to Prime Farmland and Farmland of Local Importance and cancellation of the permanently impacted parcels from the Williamson Act contract would be less than significant, since these impacted areas are minimal, restricted to

marginal areas of adjacent Prime Farmland and Farmland of Local Importance, and would not result in a significant loss of land used for farming purposes.

The Proposed Project would replace an existing structurally deficient bridge to meet AASHTO standards and provide minimal approach roadway improvements. As described further in Section **3.17.2 Transportation and Circulation** below, the Proposed Project is therefore consistent with the plans and goals of the General Plans to maintain and improve an efficient, effective and safe transportation network.

As described in **Section 2.2.1 Construction Activities**, construction staging would occur within existing rights-of-ways (ROW) and a temporary staging area. No additional ROW acquisition would be required.

Therefore, the Proposed Project would not conflict with any County land use plan, policy, or regulation or Farmland designation.

Less-Than-Significant Impact.

3.12 MINERAL RESOURCES

		Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:					
a)	Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?	☐	☐	☐	☒
b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.12.1 ENVIRONMENTAL SETTING

The nearby Stockton-Lodi Production-Consumption (P-C) Region covers 430 square miles and includes large portions of developed and developing areas of San Joaquin County (MGB, 2017). The California Department of Conservation Division of Mines and Geology (DMG) has classified land that contains resources for Portland cement concrete (PCC) aggregate in the Stockton-Lodi P-C Region. This includes sand, gravel, and stone deposits that are suitable as sources of PCC aggregate, high-grade construction aggregate which is costly to transport. The Proposed Project Site is not located in the P-C Region. The USGS maintains an inventory of mineral resources throughout the U.S., including in the vicinity of the Project Site. According to the USGS Mineral Resources Data System, there are no mineral resources on or in the vicinity of the Project Site (USGS, 2022). The County General Plan does not identify specific mineral resource areas, but does promote avoidance of activities that would impede environmentally conscious extraction of mineral resources (SJC, 2016a).

3.12.2 IMPACT DISCUSSION

Question A

The Proposed Project Site is not located in the P-C Region, and no mining permit currently exists on the lands of the Proposed Project Site. Further, the Proposed Project Site is not along an access route to active mines. All local mines in the P-C Region, located in the CGS-designated Wallace and Clements Quadrangles, are accessible via CA Highway 12/ Highway 88. Therefore, the Proposed Project would have no impact on access to and availability of known mineral resources.

No Impact.

Question B

The County of San Joaquin General Plan Natural and Cultural Resources Element notes that lands designated as MRZ-2 must have Agricultural or Open Space land uses to ensure the protection of underlying mineral resources, and a discretionary permit must be obtained for development on these lands. The Proposed Project is located in an MRZ-1 area. Further, it would not alter land use designations in San Joaquin County. Therefore, the Proposed Project would have no impact on the loss of available resources as delineated on local land use and general plans.

No Impact.

3.13 NOISE

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.13.1 ENVIRONMENTAL SETTING

The project involves noise-generating construction and demolition activities. Construction activities would take place during normal working hours. The San Joaquin County Noise Ordinance 9-1025.9 specifically exempts construction-related noise, provided that construction activities take place between the hours of 6:00 am and 9:00 pm. There are no airports in the vicinity of the Proposed Project.

Sensitive Noise Receptors

The nearest sensitive receptor to the Proposed Project Site is a single-family residence located approximately 1,500 feet south of the Proposed Project Site. There are no other sensitive receptors in the vicinity of the Project Site.

3.13.3 IMPACT DISCUSSION

Questions A and B

As noted above, construction noise is exempt from both San Joaquin County noise ordinance as long as construction occurs within the hours of 6:00 am and 9:00 pm. With the implementation of **Mitigation Measure NOI-1**, construction would be required to be conducted within the time frame ensuring the exemption is applicable to the Proposed Project during the entirety of construction.

Less-than-Significant Impact with Mitigation.

Post-construction operation would not expose persons to noise levels in excess of standards established in the local general plan nor would the project introduce new noise sources compared to the existing conditions. There would be no anticipated growth associated with the bridge and therefore no associated indirect increases to the ambient noise environment. Accordingly, ambient noise levels would be consistent with existing conditions.

Less-than-Significant Impact.

Question C

The Proposed Project Site is not located in the vicinity of an airport, and therefore is outside of any designated airport land use plans.

No Impact.

Mitigation Measures

NOI-1: Through contractual obligations, construction activities shall be conducted between the hours of 6:00 am and 9:00 pm in accordance with the San Joaquin County Noise Ordinance.

3.14 POPULATION AND HOUSING

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.14.1 ENVIRONMENTAL SETTING

As described in **Section 2.1.1 Existing Setting**, the Proposed Project is located near the community of Farmington, which has a population of roughly 175 people. The majority of this population lives east of the Proposed Project Site down US Highway 4. Two residential properties lie on Buckman Road, all southeast of the existing bridge.

3.14.2 IMPACT DISCUSSION

Questions A and B

As discussed in the **Section 2.0 Project Overview**, the new bridge would consist of a single ten-foot wide travel lane, with two six-foot shoulders, that would facilitate agricultural equipment crossing North Fork Duck Creek. The bridge replacement would not restrict or block access to any neighborhood or community. The bridge replacement would not result in an increase in residents or visitors in the area, as it does not involve additional development nor would it extend new infrastructure to an area that would result in future development. As discussed in **Section 2.2.1 Construction Activities**, a temporary low water crossing (culvert detour) would be placed approximately 20 feet west of the existing bridge (see **Figure 2-3**) to allow access to existing residences and agricultural field entrances during construction. The temporary water crossing would be removed upon completion of the new bridge. The Project would not require the demolition of any structures beyond the removal of the existing bridge. The Project would not require the demolition any residences and therefore would not result in the displacement of people.

Construction would be completed in approximately three months and would not require the construction of residences for construction workers. It is expected that construction workers would commute to the Project Site from nearby population centers for the duration of

construction. Therefore, the Proposed Project would have no impact on population growth, infrastructure use, or the need for housing to accommodate workers or displaced individuals.

No Impact.

3.15 PUBLIC SERVICES

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☒	☐
b) Police protection?	☐	☐	☒	☐
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

3.15.2 ENVIRONMENTAL SETTING

Farmington Fire Protection District (FFPD) is an Independent Special District in San Joaquin County. The FFPD is located in eastern rural San Joaquin County and responds to calls for fire protection and emergency medical services and covers a response area of 100 square miles. Station 4-1 is located at Highway 4 and Escalon Bellota (approximately 1.5 miles southeast of the Proposed Project Site) (FFPD, 2022a). The FFPD is staffed with 1 fire chief, 1 assistant fire chief, 1 captain, and 9 firefighters/paramedics (FFPD, 2022b). The County Fire Warden is responsible for recommending development standards and for ensuring that there is adequate staffing and equipment to respond to public demand. As indicate by the California Office of the State Fire Marshall, the Proposed Project Site is within a Local Responsibility Area (LRA) and is not located within a Very High Fire Hazard Severity Zone (VHFHSZ) (OSFM, 2008). As further indicated by the County, the Proposed Project Site is located in a Moderate Fire Hazard Area (SJCDD, 2019). As mentioned in **Section 3.4 Biological Resources**, habitat on the Proposed Project Site includes North Fork Duck Creek riparian creek bed and bank, which has seasonally flowing water. Habitat communities include agricultural, ruderal (disturbed), urban (developed), and riverine (North Fork Duck Creek). No buildings exist within the Proposed Project Site. Infrastructure includes one overhead utility line east of the existing bridge on Buckman Road.

The Proposed Project Site is served by the San Joaquin County Sheriff's Office (SJCSO). The SJCSO headquarters is located at 7000 Michael Canlis Boulevard, in the community of French Camp, approximately 17 miles west of the Proposed Project Site. Law enforcement services to the community are provided by the Patrol Division, which has 138 deputies. The departments are deployed onto 10 patrol teams on two days off sequences (i.e., 5 teams each day). The County is divided into 8 geographic areas or beats. These beat areas are staffed around the

clock, providing emergency and non-emergency responses to calls for service within the unincorporated areas of the County (SJCSO, 2022). The Proposed Project Site is located within Beat 7, Reporting District (RD)131 (SJCDD, 2019).

The Proposed Project Site is located within the Escalon Unified School District (EUSD) which includes four elementary schools (Collegeville Dual Language Immersion, Dent, Farmington and Van Allen), one middle school (El Portal), one comprehensive high school (Escalon High), one continuation high school (Vista) and one charter school (Escalon Charter Academy/Gateway Home School) (EUSD, 2022) (SJCDD, 2019). The nearest public school is Farmington Elementary, located at 25233-CA-4, in the community of Farmington, approximately 1.6 miles to the southwest of the Proposed Project Site.

There are no San Joaquin County parks or other public parks or recreation areas in the vicinity of the Proposed Project Site. The closest parks are located in Stockton, west of the Proposed Project Site. The closest Regional Park is the Regional Sport Complex, located at 7171 S. Highway 99, approximately 14 miles. The closest Non-Regional Parks are Garden Acres Park, located at 607 Bird Avenue, approximately 13 miles and Eastside Park, located at 5254 Ardelle Avenue, approximately 14 miles (SJCP, 2022).

3.15.2 IMPACT DISCUSSION

Question A

The Proposed Project would not result in an increase in the use of public services that would result in the need for new or physically altered government facilities. With the demolition of the existing Buckman Road Bridge, construction of a new bridge and approaches, and the installation and removal of provision of a temporary construction crossing detour, the Proposed Project would not cause significant impacts to service ratios, response times, or other performance objectives to fire protection, police protection, parks, or other public facilities in the area.

Demolition and construction-related impacts include the potential fire threat associated with equipment and vehicles coming into contact with vegetated areas. Construction vehicles and equipment may accidentally spark and ignite vegetation or building materials. The increased risks of fire during the demolition of the existing bridge, construction of the new bridge, and construct and removal of the temporary detour crossing, would be similar to that found at other construction sites. However, the Proposed Project Site is not located within a Very High Fire Hazard Severity Zone (OSFM, 2008) and construction workers would be required to comply with standard County construction and safety regulations.

Furthermore, the new bridge would replace a substandard, functionally obsolete bridge with a bridge that meets current design standards and would increase the width of the bridge from approximately 17 feet to 22 feet, thereby resulting in improved access to FFPD emergency response vehicles (County of San Joaquin, 2016). Upon completion, the Proposed Project Site would occasionally be occupied by workers for routine bridge maintenance and monitoring. These operations would be temporary and infrequent throughout the year and therefore would

not result in increased calls for FFPD services that would result in substantial effect on current service levels. In addition, as part of standard construction requirements, the County Fire Warden would review the proposed temporary detour crossing during the design phase to ensure adequate access to fire department equipment. Therefore, the Proposed Project would have a less-than-significant impact to fire protection services during construction and operation.

Less-Than-Significant Impact.

Question B

The Proposed Project would result in a negligible increase in demands on the SJCSO due to its limited size, duration, and scope. Calls for service would be similar to other small-scale construction and demolition operations in the region. The Proposed Project does not include the construction of habitable structures, which have the potential to increase demand for SJCSO services. Furthermore, the construction of the new bridge would increase roadway safety and improve access by replacing a substandard bridge with a wider bridge that meets current design standards. Therefore, the Proposed Project would not result in a substantial effect on current service levels within RD 131 or the SJCSO service area.

Less-Than-Significant Impact.

Question C

The Proposed Project does not involve the construction of residential buildings nor would construction or operation require an increased number of people residing in the vicinity of the Proposed Project Site. EUSD would not experience an increase in students as a result of the Proposed Project, since construction workers would likely be supplied from the local workforce. In addition, due to the limited number of residences that would be affected to the north of the Proposed Project, the provision of temporary access during construction, and the distance to the nearest school, there would be no disruption of commutes to schools. Therefore, there would be no impact to local or regional schools.

No Impact.

Question D

The Proposed Project does not involve the construction of residential buildings nor would construction or operation require an increased number of people residing in the vicinity of the Proposed Project Site. As described above, the closest parks are located approximately 14 miles to the west. Due to the distance of these facilities, type of project, and limited duration of construction activities, the Proposed Project would have no impact to nearby parks.

No Impact.

Question E

Development of the Proposed Project would not result in the increase in the unincorporated community's population and would therefore not result in an increased demand for public services such as public health services and library services, since no residential development is proposed and construction workers would likely be supplied from the local workforce. Other public facilities are located at a distance from the Project Site. Because the Proposed Project would not resulting in a population increase and not affect other public facilities, the Proposed Project would have no impact on other public facilities.

No Impact.

3.16 RECREATION

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.16.1 ENVIRONMENTAL SETTING

As discussed in **Section 2.1.1 Existing Setting**, the Proposed Project Site is located in eastern San Joaquin County on Buckman Road and crosses over North Fork Duck Creek. Surrounding land uses are agricultural. As described under **Section 3.15.1**, there are no San Joaquin County parks or recreation facilities in the vicinity of the Proposed Project Site. The closest parks are located in Stockton. The closest Regional Park is the Regional Sport Complex, located at 7171 S. Highway 99, approximately 14 miles to the west. The closest Non-Regional Parks are Garden Acres Park, located at 607 Bird Avenue, approximately 13 miles to the west and Eastside Park, located at 5254 Ardelle Avenue, approximately 14 miles to the west (SJCP, 2022). North Fork Duck Creek is ephemeral and is not used for public recreation.

3.16.2 IMPACT DISCUSSION

Questions A and B

The Proposed Project does not involve the construction of buildings nor would construction or operation of the new Buckman Road Bridge cause an increased number of residents or visitors in the vicinity of the Proposed Project Site. Due to the distance of the closest recreational facility (approximately 13 miles), type of project, and limited duration of construction activities, the Proposed Project would have no impact on the use or quality of recreational facilities.

No Impact.

3.17 TRANSPORTATION AND CIRCULATION

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

3.17.1 ENVIRONMENTAL SETTING

The Proposed Project Site is approximately 1.5-mile east of the unincorporated community of Farmington, which has a population of less than 200 people. The Proposed Project Site is approximately 4,000 feet down Buckman Road from State Highway 4 to the south. Site access occurs from the southern entrance of Buckman Road, where the highway intersection is stop-controlled. Buckman Road is a rural minor access road that ends just north of the Proposed Project location. Buckman Road Bridge has an Average Daily Traffic (ADT) of approximately 32 vehicles per day (as of 2016) and projected ADT of 42 vehicles per day in 2036 (Griffith, 2016). The current speed limit is 55 miles per hour (mph); however, the design speed is 35 mph.

3.17.2 REGULATORY SETTING

Each city in San Joaquin County has control over the land use and development decisions within its limits. The County coordinates and cooperates with cities in areas proposed for future annexation located within the unincorporated territory under County jurisdiction (CCG, 2017).

The Public Facilities and Services Element of the San Joaquin County General Plan (SJC, 2016a) addresses the location and extent of planned transportation routes and facilities and includes goals, objectives, and policies affecting the mobility of current and future residents, businesses, and visitors. Goals include maintaining a safe, efficient and effective roadway system and transportation network throughout the County. It also includes goals for improved alternative transportation routes, including safe and efficient bicycle and pedestrian networks;

use of emerging transportation technologies and services; maintaining a reliable public transportation system; and maintaining congestion management practices (SJC, 2016a).

3.17.3 IMPACT DISCUSSION

Question A

Construction of the Proposed Project would temporarily result in a negligible increase in traffic volume along Buckman Road. Vehicular trips from construction would consist of worker trips and deliveries of equipment and materials to and from the Proposed Project Site. The expected increase in traffic would occur weekdays between the hours of 6 am and 9 pm.

The Proposed Project does not entail a change in land use from surrounding agricultural, grazing, open space and rural residential. The Proposed Project would not introduce factors that would generate new or unanticipated long-term changes in ADT or vehicle miles traveled (VMT), such as residences and facilities. Therefore, no direct or cumulative population growth would occur that is not already incorporated in regional growth projections of County's General Plan and reflected in County policies and ordinances related to transportation. Further, the Proposed Project is intended to replace a structurally deficient bridge, improving visibility and access for users. No changes to access control of the highway intersecting with Buckman Road would occur as a result of the project. The Proposed Project supports goals of the San Joaquin County General Plan of improving safety, efficiency and effectiveness of transportation systems. Therefore, it would have a less-than-significant impact on programs, plans, ordinances and policies addressing the circulation system.

Less-Than-Significant Impact.

Question B

The Proposed Project does not entail a change in land use from surrounding agricultural, grazing, open space and rural residential. The Proposed Project also would not introduce factors that would generate new or unanticipated long-term changes in ADT or VMT, such as residences and facilities. Roadway capacity would be unaffected. Therefore, the Proposed Project would not conflict or be inconsistent with CEQA Guidelines § 15064.3(b)(2).

Less-Than-Significant Impact.

Questions C and D

As described in **Section 2.2**, a temporary low water crossing would be placed approximately 20 feet west of and adjacent to the existing bridge to allow access for residences and agricultural field entrances during construction. Therefore, the Proposed Project would have a less-than-significant impact on emergency access along Buckman Road.

The replacement bridge would be a single span reinforced concrete bridge consisting of one 10-foot lane and 6-foot shoulders to allow for the agricultural equipment that utilizes the bridge. The total outside width of the new structure would be 25 feet 6 inches, with a length of 43 feet

6 inches. From the end of the bridge, the County would transition the paved 22-foot clear width to match the existing 18-foot roadway. The southern approach transition would be approximately 232 feet while the northern approach would transition at approximately 110 feet. Work would also include the construction of approach guard railing with terminal end systems and appropriate approach road work at the ends of the bridge. In addition, rock slope protection would be placed in the channel to prevent further scour on the new structure. Therefore, the Proposed Project would have a less-than-significant impact on hazards due to geometric design features or compatible uses.

Less-Than-Significant Impact.

3.18 TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☒	☐	☐
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.18.1 ENVIRONMENTAL SETTING

California Native American prehistoric, historic, archaeological, cultural, and sacred places are essential elements in tribal cultural traditions, heritages, and identities. Because CEQA calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue are included in environmental assessments for projects that may have a significant impact on such tribal cultural resources (TCR). TCRs can only be identified by members of the Native American community, thus requiring consultation under CEQA.

3.18.2 REGULATORY CONTEXT

California Assembly Bill 52

Assembly Bill 52 (AB 52) mandates early tribal consultation prior to and during CEQA review for those tribes which have formally requested, in writing, notification on projects subject to AB 52, i.e., projects which have published NOPs for EIRs or Notices of Intent (NOI) to adopt Negative Declarations or Mitigated Negative Declarations since July 1, 2015. The bill establishes a new

category of Tribal Cultural Resources for which only tribes are experts; TCRs may include a site feature, place, cultural landscape, sacred place, or object, that is of cultural value to a Tribe. These resources may not necessarily be visible or archaeological, but could be religious or spiritual in nature. Significant impacts to a TCR are considered significant effects on the environment. Pursuant to PRC, Division 13, Section 21074, TCRs can be either:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either:

    a. Included or determined to be eligible for inclusion in the California Register of Historical Resources (California Register); or

    b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to the eligibility criteria for the California Register (PRC § 5024.1(c)). In applying these criteria, the lead agency must consider the significance of the resource to a California Native American Tribe.

Native American tribes traditionally and culturally affiliated with a geographic area may have expertise concerning their tribal cultural resources. In light of this, AB 52 requires that, within 14 days of a decision to undertake a project or determination that a project application is complete, a lead agency shall provide written notification to California Native American tribes that have previously requested placement on the agency's notice list. Notice to tribes shall include a brief project description, location, lead agency contact information, and the statement that the tribe has 30 days to request consultation. The lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a tribe.

Consultation

The Native American Heritage Commission was contacted on January 5, 2018, with a Sacred Land File (SLF) and Native American Contact List request for Township 1 North, Range 9 East, Section 15, San Joaquin, California. The SLF check was negative for cultural resources, and a list of tribes was provided who may have information about the study area or recommend others with specific knowledge.

A letter or email was sent to the provided list on February 6, 2018 and telephone calls were made in March 2018 to the individuals identified (Starkey, 2019). Groups/individuals contacted were:

- Rhonda Morningstar Pope, Chairperson Buena Vista Rancheria of Me-Wuk Indians
- California Valley Miwok Tribe
- Crystal Martinez-Alire, Chairperson Ione Band of Miwok Indians
- Randy Yonemura, Cultural Committee Chair, Ione Band of Miwok Indians

- Katherine Erolinda Perez, Chairperson Northern Valley Yokut Tribe
- Lois Martin, Chairperson Southern Sierra Miwuk Nation
- Gene Whitehouse, Chairperson United Auburn Indian Community (UAIC)
- Raymond Hitchcock, Wilton Rancheria

Responses were received from:

- Representative Tiger Polk from the Southern Sierra Miwuk Nation, who left a message for Ms. Starkey on February 9, 2018, that the tribe did not have any Project concerns and requested that the tribe be notified in the event of an unanticipated discovery of Native American artifacts or human remains.

- Katherine Perez of the Northern Valley Yokut Tribe emailed Ms. Starkey on March 3, 2018, stating that the proposed Project to replace both bridges in Farmington is a concern; and even though the record search was negative, it does not preclude the fact that the ground disturbances, which may include new widening area of undisturbed ground, could have inadvertent discovery. Ms. Perez recommended that a qualified archaeological firm and a Native American monitor be present during the ground disturbance.

A new round of contact letters was sent on August 23, 2022. These went to:

- Rhonda Morningstar Pope, Chairperson Buena Vista Rancheria of Me-Wuk Indians
- Silvia Burley, Chairperson California Valley Miwok Tribe
- Jereme Dutschke, Cultural Committee Chair, Ione Band of Miwok Indians
- Katherine Erolinda Perez, Chairperson Northern Valley Yokut Tribe
- Sandra Chapman, Chairperson Southern Sierra Miwuk Nation
- Gene Whitehouse, Chairperson UAIC
- Jesus Tarango, Chairperson Wilton Rancheria
- Lisa Martin, Regional Manager California Tribal TANF Partnership

On September 27, 2022, follow-up emails (where addresses were available) or telephone calls were used for the individuals listed above.

An email dated September 27, 2022 was received from Katherine Perez, Chairperson of the Northern Valley Yokut Tribe asking to consult on the project; the email was forwarded to the County immediately. An email dated September 29, 2022 was received from the UAIC Tribal Historic Preservation Department, deferring to the Northern Valley Yokuts and other neighboring tribes. There were no other responses.

In response to the request from the Northern Valley Yokut Tribe, an on-site meeting was held with Ms. Perez, representatives from the County, and MES on October 14, 2022. The County

discussed the details of the proposed construction, and a new archaeological survey was completed by Ms. Perez and MES (see **Section 3.6**).

During the course of 2018 consultation, Ms. Perez expressed concern over the project's potential to impact cultural resources and she requested that a tribal monitor be present for construction monitoring. This request was expressed again during the September 2022 field consultation. In addition, specific provisions to limit construction impacts were discussed and have been incorporated into mitigation below.

3.18.3 IMPACT DISCUSSION

Question A

No TCPs were identified during the 2018 consultation program, the 2018 or 2022 record searches. Two responses to the most recent mailing were received and an on-site consultation meeting concluded that there is an archaeological site on the south side of North Fork Duck Creek which may be impacted by Project construction. There is the possibility that additional discoveries of subsurface archaeological deposits or human remains may occur during construction. This is a potentially significant impact. The conclusion of consultation under Section 106 and AB 52 and the application of **Mitigation Measures TCR-1**, **CR-1**, and **CR-2** would reduce impacts to TCPs or TCRs to a less-than-significant level.

Less-Than-Significant Impact with Mitigation.

Mitigation Measures

TCR-1: A Native American monitor and qualified professional archaeologist shall be retained to monitor all ground disturbing activities associated with Project construction and demobilization. If additional prehistoric archaeological resources are discovered during ground-disturbing activities, all activities shall halt within 50 feet of the find until the professional archaeologist can evaluate the significance of the find in in consultation with the Tribal monitor, the County, and a Caltrans archaeologist. Construction shall not resume in the vicinity of the find until consultation is concluded or until a reasonable, good-faith effort has failed to provide a resolution to further impacts that is acceptable to the consulting parties.

3.19 UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☒	☐	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

3.19.1 ENVIRONMENTAL SETTING

The closest utilities located near the Proposed Project Site are overhead electric lines owned by PG&E and a communication line (fiberoptic cables) owned by Frontier, located east of the Buckman Road Bridge within the Buckman Road right-of-way. The utilities cross North Fork Duck Creek. No other utilities were observed in the vicinity of the Proposed Project Site (County of San Joaquin, 2016). No sewer district or storm district that provides service to the Proposed Project Site has been identified. The Proposed Project Site is within the service area of the Central San Joaquin Water Conservation District (CSJWCD) (CSJWCD, 2022a), which provides water used for irrigation of the surrounding agricultural uses (SJCDD, 2019). The CSJWCD provides supplemental surface water and has established a groundwater extraction fee to conserve and replenish the groundwater basin which is currently in overdraft (CSJWCD, 2022b).

Several landfills are located near the Proposed Project Site that accept construction and

demolition debris.

The Foothill Sanitary Landfill is located along the eastern border of San Joaquin County, in the community of Linden, approximately 6.5 miles northeast of the Proposed Project Site. It is the largest landfill site in the County, approximately 800 acres, and has an average daily volume of 952 tons (SJC, 2022a). This Landfill has a permitted disposal quantity of 1,500 tons per day and a remaining capacity of 125 million cubic yards (CalRecycle 2019a).

The Calaveras County Rock Creek Solid Waste Facility is located approximately 9.5 miles northeast of the Proposed Project Site in the community of Milton (CC, 2022). This facility is approximately 201 acres in size and accepts up to 500 tons of waste per day. It has a remaining capacity of 318,000 cubic yards (CalRecycle, 2019b).

The North County Recycling Center and Sanitary Landfill is located approximately 12 miles northwest in the City of Lodi, in San Joaquin County. It encompasses 320 acres and receives an average of 541 tons of waste daily, with a permitted disposal quantity of 1,200 tons per day (SJC, 2022b). It has a remaining capacity of 35.4 million cubic yards (CalRecycle, 2019c).

3.19.2 IMPACT DISCUSSION

Question A

The Proposed Project would include demolition of the existing bridge, construction of a temporary bridge crossing, and construction of a new bridge, which could impact the existing overhead utility lines located east of, and crossing the Buckman Road Bridge, within the Buckman Road right-of-way. Construction activities would include cranes, boom trucks or concrete pump trucks, which may come in contact with the existing overhead utility lines and therefore require that these lines be either temporarily relocated prior to construction to avoid disruption of service (County of San Joaquin, 2016). Therefore, **Mitigation Measure UT-1** is recommended to ensure coordination between San Joaquin County Department of Public Works, PG&E, and Frontier prior to construction. With implementation of **Mitigation Measure UT-1,** potential impacts on overhead electrical and communication lines would be reduced to less than significant with mitigation.

Although no other utilities were identified or observed in the vicinity of the Proposed Project Site, CSJWCD water lines are located in nearby agricultural areas, which have the potential to be impacted during grading and excavation activities. In addition, verification of the location of other utilities in the vicinity of the Proposed Project Site and coordination with other potentially affected utility providers is recommended to ensure that no relocation of other utilities or disruption of service would occur (County of San Joaquin, 2016). Therefore, with implementation of **Mitigation Measure UT-2** impacts on other utilities in the Project vicinity would be reduced to less than significant with mitigation.

Additionally, the Proposed Project would not require additional demand on water, wastewater treatment or stormwater drainage, natural gas, or telecommunications facilities. Therefore, there would be no need for the construction of new facilities.

Less-Than-Significant Impact with Mitigation.

Questions B and C

As previously stated, the Proposed Project would not require additional demand on water, wastewater treatment, or stormwater drainage facilities. Although the Proposed Project would require the construction of a temporary bridge crossing, which would include placing two 72-inch diameter corrugated metal pipes within North Fork Duck Creek, this temporary stream diversion would be restored to pre-construction conditions and would not constitute an expansion of wastewater infrastructure or stormwater drainage. No water services or wastewater services would be required for the proposed project. Therefore, the Proposed Project would have no impact on water or wastewater providers or services.

See also Section 3.10, Hydrology and Water Quality regarding drainage.

No Impact.

Questions D and E

Several landfills are present near the Proposed Project Site that may be used for disposal of construction and demolition debris, as described above. Demolition of the existing bridge, construction of the temporary bridge crossing, and construction of the new bridge, would generate a moderate amount of construction and demolition debris that would be recycled or disposed of in a regional landfill. The location of recycling or disposal facilities would be determined at the time of construction. In the event of disposal of residual construction waste, all three regional landfills have adequate daily disposal capacity to receive the solid waste generated by the Proposed Project. In addition, the County of San Joaquin Department of Public Works sponsors a construction and demolition recycling program at the North County Recycling Center and Sanitary Landfill. The Proposed Project would adhere to all federal, State, and County requirements regarding waste reduction, through reuse and recycling. Therefore, impacts to solid waste infrastructure, standards and regulations would be less than significant.

Less-Than-Significant Impact.

Mitigation Measures

UT-1: Prior to construction activities, the San Joaquin County Department of Public Works shall coordinate with a representative of PG&E and Frontier regarding the timing and location of construction activities, in order to facilitate the temporary relocation of existing overhead utility lines located to the east of the Project Site to avoid disruption of electrical and communication services.

UT-2: During the design phase of the Proposed Project, the location of other nearby utilities such as CSJWCD irrigation and water lines and PG&E natural gas lines, shall be identified by the San Joaquin County Department of Public Works. In addition, the San

Joaquin County Department of Public Works shall notify the CSJWCD and PG&E of construction activities associated with the Proposed Project.

3.20 WILDFIRE

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

3.20.1 ENVIRONMENTAL SETTING

The Proposed Project Site is located on the border of the State Responsibility Area (SRA) in an area with a Moderate Fire Hazard Severity Zone (FHSZ; CalFire, 2022). The Proposed Project Site is not within or near lands classified as a Very High FHSZ. The nearest Very High FHSZ is approximately 14 miles to the east of the Proposed Project Site. North Fork Duck Creek bisects the Proposed Project Site. Site and surrounding areas are relatively flat and consist of agricultural and rural residential properties.

3.20.2 REGULATORY SETTING

The County has an adopted Emergency Operations Plan (EOP) and Local Hazard Mitigation Plan (LHMPs; SJC, 2017; SJC, 2022c). These plans include evacuation routes, designation of emergency personnel, emergency preparation measures, emergency preventative measures, and comprehensive guidelines for emergency situations. The County's LHMP did not evaluate wildfire hazards, due to the majority of the County being in a low fire hazard zone.

The nearest rally point for evacuation is in Farmington, approximately 1.5 miles from the Proposed Project Site (SJC, 2018b).

3.20.3 IMPACT DISCUSSION

Question A

The County's EOP was recently updated in February 2022. The LHMP was revised in 2017; (SJC, 2017; SJC, 2022c). There are no designated evacuation routes on Buckman Road. The Proposed Project would not impair the implementation of these plans and would be developed consistently with any applicable policies contained therein.

No Impact.

Question B

The Proposed Project Site is located adjacent to agriculture lands and spans North Fork Duck Creek. The County overall is within a low FHSZ, and the Proposed Project Site is not located within a FHSZ designated as Very High (CalFire, 2022). The Proposed Project Site is located on the border of the SRA in an area designated as Moderate FHSZ. Due to construction and demolition activities, and close proximity to open lands in a Moderate FHSZ, the Proposed Project could, but is not likely to, increase the risk of fire and thereby expose nearby residents to resulting pollutants during the course of construction. The County has an EOP to aid residents located near the Proposed Project in the case of a wildfire is sparked from construction activities. Construction workers would also be required to abide by local regulations to minimize potential of fire hazards. While the Proposed Project would increase risk of fire during construction and demolition activities, by abiding by construction best practices and local regulations, the Proposed Project would have a less-than-significant impact on exposing workers and local residents to significant pollutant concentrations due to wildfire.

Less-Than-Significant Impact.

Question C

The Proposed Project's components are all located within the established Proposed Project Site and impacts related to the development of the Proposed Project are analyzed throughout this document. The Proposed Project would replace a bridge deemed "functionally obsolete" with one that complies with AASHTO standards. The bridge replacement is intended to increase safety for those crossing North Fork Duck Creek on Buckman Road. A temporary low water crossing would be placed adjacent to the existing bridge to allow access for residences and agricultural field entrances during construction. To accommodate construction, it's anticipated that overhead powerline and fiberoptic cables in the vicinity of the Project Site would need to be relocated. Normal roadway operations or evacuation routes in the surrounding area would not be significantly altered by the Proposed Project, nor would access to the nearest rally point in Farmington for evacuations. The relocation of utilities may potentially increase the risk of fire, but by following local regulations to minimize fire hazards (i.e., provisions within LHMP and OEP), the risk of fire would not be exacerbated by the Proposed Project.

Less-Than-Significant Impact.

Question D

The Proposed Project would require installation of a temporary low-water crossing, which would include placing two 72-inch diameter corrugated metal pipes covered with clean aggregate fill to a height above the ordinary high-water mark. This alteration is not anticipated to cause significant changes to drainage. Post-construction, the temporary stream diversion system would be removed and the streambed would be restored to a pre-construction condition. There are no occupants or residential structures on the Proposed Project Site. The nearest residence is north of the bridge crossing. As the Proposed Project Site and surrounding areas are relatively level, the Proposed Project would not result in significant changes to slope or topography that would expose people or structures to risk of flooding, slope instability, or drainage patterns. Therefore, people and infrastructure would have a less than significant risk of impact due to changes in runoff, post-fire slope instability, or drainage changes resulting from the Proposed Project.

Less-Than-Significant Impact.

3.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
Would the project:				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

3.21.1 IMPACT DISCUSSION

Question A

As discussed in the preceding sections, the Proposed Project has a potential to create short term impacts which could degrade the quality of the environment by adversely impacting biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, tribal cultural resources, and utilities. These provisions have been included as mitigation measures. For the other resources, with adherence to the applicable local, State and federal regulations, plans and policies identified within each section, potential impacts would be reduced to a less than significant level. The long-term effect of the Proposed Project would be an overall improvement in safety and access along Buckman Road, as well as decreased need for roadway and bridge maintenance in the vicinity of the Proposed Project Site, and a return to a more natural flow of Duck Creek with the removal of the emergency bypass culverts. The Proposed Project would have a less-than-significant impact with mitigation on potential to substantially degrade quality of the environment, habitat and species populations.

Less-Than-Significant Impact with Mitigation.

Question B

Potential adverse environmental impacts of the Proposed Project, in combination with the impacts of other past, present, and future projects, would not contribute to cumulatively significant effects on the environment with implementation of the mitigation measures presented within the resource sections. Conformance with General Plan policies, State standards, regional and local statues would ensure that potential impacts would be individually limited and not cumulatively considerable in the context of impacts associated with other pending and planned development projects. Project-related impacts would be typical of bridge replacement projects in the County's General Plan, and would be reduced to less than significant levels with mitigation through conformance with General Plan Policies, State standards, regional and local statutes.

Less-Than-Significant Impact with Mitigation.

Question C

After the implementation of design features, municipal code requirements, and standard conditions of approval, environmental effects of the Proposed Project would have a less than significant likelihood of causing a substantially adverse effect on human beings, either directly or indirectly.

Less-Than-Significant Impact.

SECTION 4.0: PREPARERS

Montrose Environmental

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APPENDIX A:

BIOLOGICAL ASSESSMENT

Buckman Road over North Fork Duck Creek Bridge Replacement Project

Biological Assessment

San Joaquin County, California
Farmington 7.5-Minute Quadrangle
Township 01N, Range 09E, Section 15
Caltrans District 10
BRLO 5929 (241)

September 2019

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Biological Assessment

San Joaquin County, California
Farmington 7.5-Minute Quadrangle
Township 01N, Range 09E, Section 15
Caltrans District 10
BRLO 5929 (241)

September 2019

STATE OF CALIFORNIA
Department of Transportation
San Joaquin County

Prepared By: _____ Date: 10/7/2019

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Approved By: _____ Date: 10/15/19

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Executive Summary

The purpose of this biological assessment is to provide technical information and to review the proposed Project in sufficient detail to determine to what extent the proposed Project may affect threatened, endangered, or proposed species. The California Department of Transportation (Department), as assigned by the Federal Highway Administration (FHWA), has prepared this biological assessment under its assumption of responsibility at 23 United States Code (USC) 327(a)(2)(A). The biological assessment is also prepared in accordance with 50 CFR 402, legal requirements found in Section 7 (a)(2) of the Endangered Species Act (16 U.S.C. 1536(c)) and with Federal Highway Administration and California Department of Transportation regulation, policy and guidance. The document presents technical information upon which later decisions regarding Project effects are developed.

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this Project is being, or has been, carried out by the California Department of Transportation (Caltrans) under its assumption of responsibility pursuant to National Environmental Policy Act (NEPA) Assignment MOU (23 USC 326).

The San Joaquin County Department of Public Works (County) is proposing to construct one replacement bridge along Buckman Road, Bridge No. 29C-0307 over North Fork (NF) Duck Creek. The proposed Project is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line along Buckman Road approximately north of SR 4 and approximately 1.5 miles northeast of the community of Farmington. Buckman Road services multiple agricultural field accesses as well as a couple of residences beyond the bridges.

The purpose of the proposed Project is to remove the existing structure, which has been determined to be functionally obsolete and reconstruct with a bridge that is consistent with appropriate design standards for roadway geometry, accessibility, hydraulics, and structural integrity. This project is needed to maintain safe, long-term access over the creeks for the public, surrounding property owners and others accessing farmland.

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List of Abbreviated Terms

AASHTO	American Association of State Highway and Transportation Officials
BA	Biological Assessment
BMPs	Best Management Practices
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
County	San Joaquin County Department of Public Works
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
CV	Central Valley
CWA	Clean Water Act
DOT	U.S. Department of Transportation
DPS	Distinct population segment
EFH	Essential fish habitat
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
GIS	Geographic Information System
GGS	Giant garter snake
GPS	Global Positioning System
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NWP	Nationwide Permit
OHWM	ordinary high water mark
Project	Buckman Road Bridge Replacement Project

RSP	rock slope protection
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SD	structurally deficient
sDPS	Southern distinct population segment
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Chapter 1. Introduction

The purpose of this Biological Assessment (BA) is to provide technical information and to review the Project in sufficient detail to determine the extent to which it may affect federally threatened, endangered, or proposed species listed under the federal Endangered Species Act (ESA) and under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). This BA has been prepared in accordance with legal requirements found in Section 7 (a)(2) of the ESA (16 U.S. C 1536(c)) and with Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) regulation, policy and guidance. This document presents technical information upon which later decisions regarding the Project effects are developed.

1.1. Purpose and Need of the Proposed Action

According to the Caltrans Bridge Inspection Report (BIR) dated November 14, 2012, the existing bridge has a Sufficiency Rating (SR) of 68.4 and is classified as Functionally Obsolete (FO). The FO classification is a result of insufficient deck geometry. In addition, the timber cap at Bent 3 has a check half its length along the neutral axis. The asphalt-concrete (AC) in the timber deck has cracks along each deck plank. The left wingwall at Abutment 1 has moved laterally. There is a large gap measuring 7 inches at the top of the wall between abutment and the left wingwall. A cable to help reduce the lateral movement was placed behind abutment #1 and is attached from the left to the right wingwall. The bridge railings have been removed without permission or otherwise damaged by wide agricultural equipment using the narrow bridge.

The purpose of the Project is to provide a new functional structure that is consistent with the American Association of State Highway and Transportation Officials (AASHTO) and Caltrans design standards for roadway geometry, accessibility, hydraulics, and structural integrity.

1.2. Listed and Proposed Species Potentially in the Biological Study Area

An updated species list was provided by U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) for the Action Area of this Project (see **Appendix A**). The following listed and proposed species and/or designated critical habitats were identified on the updated federal species list and were considered during this analysis:

- Giant garter snake (GGS; *Thamnophis gigas*) T

The following federally listed species were considered but excluded from this assessment based on a lack of suitable habitat in the Action Area, focused survey findings (in the case of

rare plants) or the determination that they were not present in the Action Area or immediate vicinity:

Flowering Plants

- Greene's tuctoria (*Tuctoria greenei*) E

Invertebrates

- Conservancy fairy shrimp (*Branchinecta conservatio*) E
- Vernal pool fairy shrimp (*Branchinecta lynchi*) T
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) T
- Vernal pool tadpole shrimp (*Lepidurus packardi*) E

Amphibians

- California tiger salamander (*Ambystoma californiense*) T
- California red-legged frog (*Rana draytonii*) T

Fishes

- Delta smelt (*Hypomesus transpacificus*) T
- Central Valley (CV) steelhead (*Oncorhynchus mykiss*) T

Designated Critical Habitat and Essential Fish Habitat (EFH)

- Chinook salmon EFH

It should be noted that while the NOAA Fisheries list (Appendix A) includes chinook salmon EFH, this is for the entire Farmington quadrangle and does not represent the Action Area wholly. Due to the intermittent hydrology of NF Duck Creek, and downstream barriers, habitat areas of particular concern (HAPCs) do not occur within the proposed Action Area. These constraints also preclude the presence of salmonids from the Action Area. **Table 1-1** shows the federally-listed species and the effect determination of the Project.

Table 1-1.
Federally-Listed Species and Effect Determination

Common Name	Scientific Name	Status	Determination
Flowering Plants			
Greene's tuctoria	*Tuctoria greenei*	Endangered	***No effect***
Invertebrates			
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	***No effect***
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	***No effect***
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	***No effect***
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	***No effect***
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	***No effect***
California red-legged frog	*Rana draytonii*	Threatened	***No effect***

Table 1-1. Federally-Listed Species and Effect Determination			
Common Name	**Scientific Name**	**Status**	**Determination**
Fish			
Delta smelt	*Hypomesus transpacificus*	Threatened	***No effect***
CV steelhead	*Oncorhynchus mykiss*	Threatened	***No effect***
Reptiles			
Giant garter snake	*Thamnophis gigas*	Threatened	***May affect but is not likely to adversely affect***
Essential Fish Habitat			
Chinook salmon	--	--	***No effect***

1.3. Consultation History

There has been no formal or informal consultation to date between Caltrans and USFWS for the Project.

1.4. Description of Proposed Action

1.4.1. Project Summary

Buckman Road Bridge over NF Duck Creek

The replacement bridge will be a clear span, one lane bridge with one 10-foot lane and 6-foot shoulders to allow for the agricultural equipment that utilizes the bridge.

Utility Relocation

Overhead utility lines are present on both sides of the proposed project. Bridge Engineering will coordinate with utility companies regarding any necessary relocation. If relocation is required, it will be coordinated with the utility companies.

Right-of-Way

The County does not propose to acquire any right-of-way; however, a total of 0.98 acres will act as a temporary construction easement (TCE). The TCE is also from three separate parcels; APN: 187-310-09 (west of Buckman Road) is 0.93 acre, APN: 187-310-15 (south of North Fork Duck Creek and east of Buckman Road) is 0.027 acres, and APN: 187-310-16 (northeast of the project site) is 0.026 acres.

Construction Access

A temporary low water crossing will be placed west of and adjacent to the existing bridge to allow access for residences and agricultural field entrances. The detour would include placing two 36-inch corrugated metal pipes within NF Duck Creek which will be covered with clean gravel fill to a height above the ordinary high water mark. Geotextile fabric would be placed over the gravel and earth fill will be placed on the fabric to minimize migration of soil into the

creek. The temporary stream diversion system would be removed once the new bridge is constructed. All in-channel work will be limited to the active season for GGS (May-October).

Demolition and Construction Staging

Demolition of the existing bridge will be performed in accordance with the Caltrans Standard Specifications modified to meet environmental permit requirements. Prior to construction, the contractor will be required to prepare and submit for approval a bridge demolition plan, including creek diversions/bypass details, that are in conformance with the agency permits from California Department of Fish and Wildlife (CDFW), Army Corps of Engineers (Corps), and the Regional Water Quality Control Board (RWQCB). All concrete and other debris resulting from bridge demolition will be removed from the Project site and disposed of by the contractor. The construction contractor will prepare a bridge demolition plan.

The construction staging area would be located on the southwest side of Buckman Road within a temporary construction easement.

1.4.2. Authorities and Discretion

The Project is being proposed by the County with approval from Caltrans Structures Local Assistance to replace the bridge. Caltrans is the Lead Agency under which Section 7 consultation with the USFWS will be conducted. The County will be responsible for the implementation and maintenance of the Project. In addition, the following federal and state agencies will be responsible for regulating the Project: US Army Corps of Engineers (Corps), USFWS, RWQCB, and CDFW.

1.4.3. Location of Proposed Action

The Proposed Action is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line (**Figure 1-1**) along Buckman Road north of State Route 4 and cross over NF Duck Creek and Duck Creek (**Figure 1-2**). The Proposed Action is on the Farmington CA USGS 7.5' Quadrangle within Township 1 North, Range 9 East, Section 15.

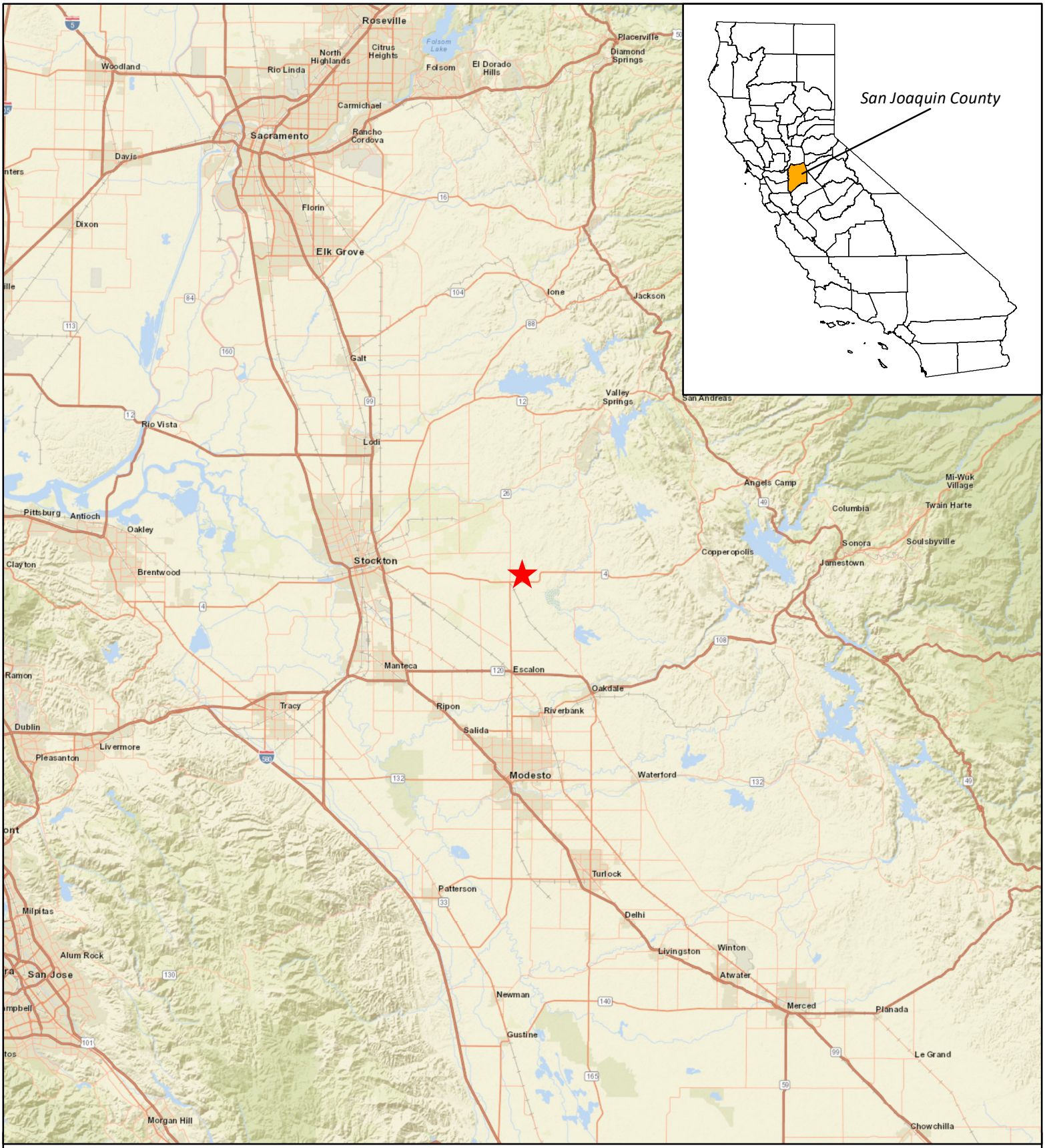
1.4.4. Define Action Area

For the purpose of this BA, the Action Area – the area that could potentially be directly or indirectly affected during Project construction – is defined as the areas affected by demolition of the existing bridge, construction of the new bridge, the roadway approach work, the temporary detour crossing, and the staging areas (**Figures 1-3**).

1.4.5. Conservation Measures

1.4.5.1 Project Design Modifications for Avoidance and Minimization

The Proposed Action has been designed to avoid and minimize impacts to special-status species to the maximum extent possible. Prior to construction activities, surveys will be conducted to ensure GGS are not utilizing the construction area.



★ Project Location: Buckman Road Bridge

0 4 8 16 Miles

Source: ESRI Online Basemap, World Street Map, San Joaquin County;
Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Regional Location Map

Figure 1-1

★ Project Location: Buckman Road Bridge

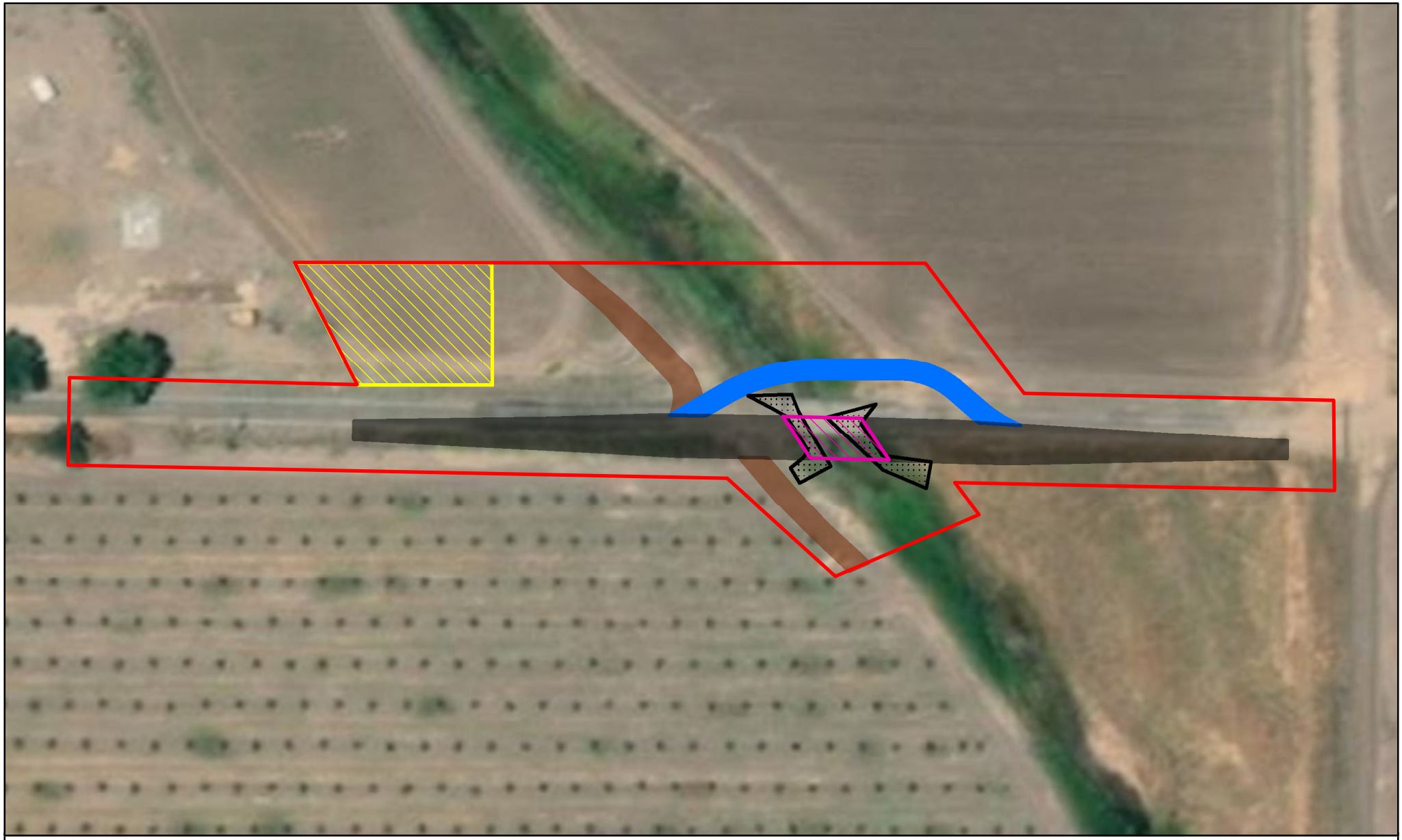
0 187.5 375 750 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Project Location Map

Figure 1-2



Legend

- Project Impact Area
- Proposed Bridge
- Proposed Roadway
- Proposed RSP
- Temporary Detour Crossing
- Proposed Staging Areas
- Proposed Access Roads

0 30 60 120 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Impact Area and Project Details

Figure 1-3

Exclusion fencing shall be placed along the limits of work and staging areas, as well as access routes, to prevent GGS from entering the construction site during the snake's active period, and construction areas shall be located outside of potential dispersal habitat to the maximum extent practicable.

1.4.5.2 Species Specific Avoidance/Minimization Measures or BMPs from the USFWS/NOAA Fisheries BA Checklists

Avoidance and minimization measures would be incorporated into the Proposed Action to reduce the potential for impacts to GGS potentially occurring in the Action Area during construction. These measures include but are not limited to the following: installing high-visibility fencing around the construction area; conducting pre-construction surveys, and providing Worker Environmental Awareness Program training to construction personnel; pipes or similar structures will be capped if stored overnight; excavated holes and trenches will have escape ramps; and ensuring a qualified biologist is on site during ground disturbing activities.

1.4.5.3 Conservation Measures

Project-related construction activities would result in the permanent loss of upland and aquatic dispersal habitat and temporary disturbance to upland and aquatic dispersal habitat. Impacts will be mitigated in accordance with agency requirements to ensure no net loss of acreage or value to dispersal habitat which will include restoring temporarily impacted areas to pre-Project condition. In addition, to compensate for permanent impacts on dispersal habitat, the County will purchase credits from a Corps and/or CDFW approved mitigation bank at a minimum 1:1 ratio (one acre of habitat replaced for every one acre filled). Based on the preliminary Project design, the Project will permanently affect 0.004 acres of intermittent stream.

1.4.6. Interrelated and Interdependent Actions

The assessment of potential effects of a Proposed Action on a listed species can be comprised of one or more types of effects. This includes interrelated and interdependent actions, as defined in the FHWA Section 7 BA instructions, SER Volume 3, Chapter 3, and the Endangered Species Consultation Handbook (National Marine Fisheries Service [NOAA Fisheries] and USFWS, 1998) and summarized below:

Interrelated actions - actions that are part of a larger action and depend on the larger action for their justification [50 CFR §402.02](i.e., this Project would not occur "but for" a larger Project). Interrelated actions are typically associated with the proposed action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification.

Interdependent actions - actions having no independent utility apart from the proposed action. [50 CFR §402.02]. Interdependent actions are those that have no independent utility apart from the action under consideration.

There are no additional activities associated with the Proposed Action that would be considered interrelated or interdependent. Therefore, there are no effects from interrelated and interdependent actions on GGS in the Action Area. There are no other known projects that would be expected to occur within the Action Area that would not be subject to federal action. Any work within NF Duck Creek would involve a permit from the U.S. Army Corps of Engineers, a federal agency, and would be subject to federal consultation.

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Chapter 2. Study Methods

This section describes the methods used in the preparation of this BA report and includes a list of resources reviewed, field survey dates and personnel, and problems and limitations encountered during the study that may influence the conclusions reached in this report.

2.1. Summary

Prior to conducting the field survey, a list of special-status plants and wildlife known to potentially occur within the vicinity of the Project was reviewed. Sources consulted in preparation of the list of special-status species included a USFWS list of potentially affected federally threatened and endangered species, and the NOAA Fisheries ESA species list (**Appendix A**). In addition, the USFWS Critical Habitat Mapper and the NOAA Fisheries Essential Fish Habitat Mapper were reviewed. These lists were then used to focus the botanical and wildlife field investigations on the targeted species and the habitats known to support these species.

Field reconnaissance was conducted by walking the entire Action Area where accessible. The primary focus of the survey was to evaluate the potential for regionally occurring sensitive habitats and special-status species to occur within the Action Area. Plant communities and habitats were recorded onto a rectified aerial photograph, and plant species were identified and recorded. These habitat features were digitized with geographic information system (GIS) software (Arc Map 10.3) to provide digital habitat data for quantitative analysis.

NF Duck Creek was assessed for the potential to support aquatic and semi-aquatic species which include fish, amphibians, and reptiles. During the stream assessment the biologists documented stream characteristics including: substrate composition, channel geomorphology, aquatic vegetation, emergent vegetation, riparian canopy and understory vegetation. In addition, the adjacent upland habitat was traversed in order to identify any potential burrows that may potentially support GGS aestivation.

2.2 Personnel and Survey Dates

DHA fisheries and wildlife biologist, Lindsay Tisch, conducted a focused biological survey, botanical survey, and fieldwork for the wetland delineation on March 19, 2018.

Lindsay Tisch is a fisheries and wildlife biologist with particular experience in conducting habitat assessments for threatened and sensitive species including Swainson's hawk, burrowing owl, CTS, California red-legged frog, western spadefoot, western pond turtle, giant garter snake, and valley elderberry longhorn beetle. In addition to electro shocking, she is knowledgeable in setting hoop nets and PIT tagging fish. She has 8 years of professional

experience working with a variety of flora and fauna species throughout California and an additional 7 working throughout the northeastern U.S and British Columbia.

Table 2-1 below summarizes personnel qualifications and the dates that surveys were performed.

Table 2-1
Biological Surveys Conducted for the Project

Survey Dates	Type of Survey	Personnel		
		Name	Education	Years' Experience
March 19, 2018	Wildlife survey, vegetation survey, mapping of waters and wetlands of the U.S. and state	Lindsay Tisch	B.S., Fisheries and Wildlife Management	17

2.3 Resource Agency Coordination and Professional Contacts

U.S. Fish and Wildlife Service

An online list of threatened and endangered species that may occur in the proposed project location, and/or may be affected by the proposed project was obtained from the USFWS website.

NOAA Fisheries

An online list of ESA fish species that may occur within the Farmington USGS 7.5-minute quadrangle was obtained from the NOAA Fisheries website. This list is included in Appendix A.

2.4 Limitations and Assumptions that May Influence Results

No limitations, assumptions or problems were encountered during fieldwork and preparation of this BA report.

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Chapter 3. Environmental Baseline

The Environmental Baseline describes the setting in which the Project will occur and includes the effects from past and present Federal, State, private actions; proposed Federal projects with completed section 7 consultations; and contemporaneous State or private actions with consultation in progress. The environmental baseline also considers non-permitted actions (i.e., other nonfederal actions occurring within the Action Area).

3.1. Habitat Conditions in the Action Area

The Action Areas are located in the Central Valley, an area characterized by vast agricultural regions, and dotted with numerous population centers, including the small community of Farmington, the closest unincorporated community approximately 1.5 miles southwest of the Action Area.

Topography is generally flat. The Action Area is at an elevation of approximately 122 feet above sea level. NF Duck Creek is the primary aquatic feature within the Action Area and are surrounded by ruderal (disturbed), agriculture, and urban (developed) habitat types. There is no critical habitat or EFH within the Action Area.

NF Duck Creek does not provide suitable spawning or rearing habitat for salmonids; the creek is heavily vegetated, has intermittent hydrology, no riparian corridor, and there is an unscreened diversion along French Camp Slough, approximately 4 miles southwest of the Action Area (CalFish 2017). Since NF Duck Creek is a tributary to French Camp Slough, it would not provide a migration corridor for salmonids. The creek is earthen-lined and functions as an irrigation canal for the surrounding agriculture. Large patches of cattail (*Typha* spp.) were observed within the channel of NF Duck Creek; substrate consisted primarily of a sandy silt loam.

Aquatic habitat conditions for GGS in NF Duck Creek, and the surrounding upland habitat conditions are marginal; however, the creek may be used as aquatic dispersal habitat while the ruderal (disturbed) areas may be used as upland dispersal habitat for the species. Land uses surrounding the creek are primarily comprised of access roads and agricultural fields consisting of upland grain and row crops, which, unlike rice fields, do not provide suitable habitat for GGS. The ruderal areas are highly disturbed and vegetated with non-native weedy species and burrows were not observed within these areas. Thus, while GGS could use the creek as a dispersal corridor to more suitable foraging habitat, it is not anticipated that the Action Area would be used for active breeding, aestivation, or foraging, as it lacks important habitat elements, including a perennial source of water, nearby rice fields, or adequate escape cover or refugia.

3.2. Summary of Environmental Baseline

Prior to conducting the field survey, a list of special-status plants and wildlife known to potentially occur within the vicinity of the Project was reviewed. Sources consulted in preparation of the list of special-status species included the USFWS list of potentially affected federally threatened and endangered species, and the NOAA Fisheries ESA species list (Appendix A). In addition, the USFWS Critical Habitat Mapper and the NOAA Fisheries Essential Fish Habitat Mapper were reviewed. The list was then used to focus the botanical and wildlife field investigations on the targeted species and the habitats known to support these species.

Following a review of the resources listed above and a review of aerial photography of the Action Area, it was determined that field surveys were required to assess the Action Area for sensitive biological resources including plants and wildlife.

Due to the lack of riparian habitat, which provides adequate cover and shading and keeps temperatures constant and relatively cool, and the lack of suitable substrate (i.e. gravel) combined with the unscreened diversion on French Camp Slough, NF Duck Creek is not suitable for spawning, rearing, and migrating salmonids.

Aquatic habitat conditions for GGS in NF Duck Creek is not suitable for breeding, and the surrounding upland habitat conditions are marginal and not likely suitable for aestivation; however, the creek may be used as an aquatic dispersal habitat while the ruderal (disturbed) areas may be used as upland dispersal habitat for the species.

3.3. Describe the Action Area

3.3.1. Physical Conditions

The Action Area is located on the Farmington CA USGS 7.5-minute Quadrangle (T01N, R09E, Section 15) and is within the Hardpan Terraces ecological subsection, an area consisting of very gently to gently sloping terraces and small areas of floodplain and alluvial fans along streams that cross from mountains to reach the Sacramento and San Joaquin Rivers. The subsection elevation range is from 100 to about 400 feet. Fluvial erosion is the main geomorphic processes. Streams in this subsection drain to the Sacramento or San Joaquin Rivers or to closed basins in the San Joaquin Valley. All but the larger streams are generally dry during the summer. There are no lakes, but there is temporary ponding in vernal pools on Pleistocene terraces. The Hardpan Terraces is characterized by needlegrass grasslands, and northern hardpan vernal pools are common within the undeveloped grasslands. The annual average precipitation at the National Climatic Data Center Stockton Metro Airport weather station (048558) is 13.76 inches (WRCC, 2018). Precipitation occurs primarily from November through March. Elevation of the Action Area ranges between 115 to 120 feet above mean sea level (msl).

The Action Area drains towards NF Duck Creek. Soils in the Buckman Road over NF Duck Creek Action Area consist of Hicksville loam, 0 to 2 percent slopes, occasionally flooded. The Hicksville soil units is listed as hydric or as having hydric inclusions (**Figures 3-1**; NRCS 2018).

3.3.2. Aquatic Resources

NF Duck Creek is an intermittent drainage on the Farmington CA USGS 7.5-minute Quadrangle and is classified as a palustrine, emergent, persistent, seasonally flooded (PEM1C) feature on the current NWI map (USFWS 2018). NF Duck Creek flows in a northeast to southwest direction through the Action Area, under Buckman Road, and empties into Duck Creek, approximately 0.6 river miles southwest of the Action Area. Duck Creek empties into Walker Slough, a tributary to French Camp Slough which is a tributary to the San Joaquin River.

The Action Area is within the Rock Creek – French Camp Slough (HUC 18040051) within the San Joaquin River Basin. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The Rock Creek – French Camp Slough watershed covers approximately 472.8 square miles (302,576 acres or 9,130 square kilometers) and includes San Joaquin, Stanislaus, and Calaveras counties.

3.3.3. Natural Communities

Natural communities are assemblages of plants and animals found in particular environments that vary based on soils, hydrology, rainfall, humidity, soil and water salinities, wind exposure, and altitude. Natural communities form distinct habitats that are used by an associated suite of plant and animal species. Wildlife species may use multiple habitats, or may use different habitats seasonally or for different life functions, while others may be restricted to a single habitat for their entire life cycle. The natural community classification presented herein is based on field observations and the standard List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (CDFW, 2003). Plant communities generally correlate with wildlife habitat types; wildlife habitats were classified and evaluated using *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988).

Terrestrial habitat types in the Action Area includes agriculture, ruderal (disturbed), and urban (developed). Aquatic habitat types in the Action Area include riverine (intermittent drainages). Terrestrial and aquatic habitat types are discussed below.

A habitat map of the Action Area is included in **Figure 3-2** and a summary of habitat types within the Action Area is shown in **Table 3-1**.

Legend

Action Area

Soil Map Units

170: Hicksville loam, 0 to 2 percent slopes, occasionally flooded

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
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Soil Map Units within the Action Area

Figure 3-1

A list of plant and wildlife species observed during field surveys is included in **Appendix B** and representative photographs of the Action Area are provided in **Appendix C**.

Table 3-1. Habitat Types within the Action Area

Habitat Type	Acres within Action Area	Percent Composition of Action Area
Upland Communities		
Agriculture	0.48	35
Ruderal (Disturbed)	0.31	23
Urban (Developed)	0.50	37
Aquatic Communities		
Riverine – Intermittent	0.07	5
Total	**1.36**	**100%**

AGRICULTURE

Agricultural fields are present in the southern portion of the Action Area. The fields appeared to have been recently disked. Agricultural fields, such as hay fields and row crops like those in the Action Areas, have high foraging habitat value for wildlife species. Red-tailed hawks (*Buteo jamaicensis*) and Swainson's hawks (*Buteo swainsonii*) were observed flying over the agricultural fields within and adjacent to the Action Area during the March 2018 field survey.

RUDERAL (DISTURBED)

Ruderal (disturbed) habitat is present along the banks of NF Duck Creek, along the shoulders of Buckman Road, and the parcel of land in the northeast corner of the Action Area. This vegetation type is subjected to ongoing or past disturbances (e.g., vehicle use, mowing, herbicide application, etc.).

Due to the disturbance regime, assemblages of non-native and introduced weedy species become established. The majority of plant species that occur in ruderal areas are various annual grasses and forbs of Eurasian origin. Some of the common plants observed in the ruderal community within the Action Area include Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), ripgut brome (*Bromus diandrus*), pigweed (*Amaranthus* sp,), yellow star-thistle (*Centaurea solstitialis*), long-beaked filaree (*Erodium botrus*), common mallow (*Malva neglecta*), prickly lettuce (*Lactuca serriola*), doveweed (*Croton setigerus*), milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), and bristly ox-tongue (*Helminthotheca echioides*).

Species observed in these habitats during the site visit included house sparrow (*Passer domesticus*), brown-headed cowbird (*Molothrus ater*), American robin (*Turdus migratorius*), white-crowned sparrow (*Zonotrichia leucophrys*), and northern mockingbird (*Mimus polyglottos*).

Legend

Action Area

Habitat Type

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Habitat Types within the Action Area

Figure 3-2

URBAN (DEVELOPED)

Within the Action Area, urban areas are landscaped with ornamental species, paved, or otherwise developed and generally lack natural vegetation. Habitats associated with urban areas include ruderal grassland and disturbed areas. Urban areas within the Action Area include Buckman Road and the unpaved agricultural access roads, where sparse patches of doveweed, and smooth cat's ear (*Hypochaeris glabra*) grow along the shoulders. Urban environments generally provide limited habitat for common wildlife species such as rock pigeon, house sparrow, American crow (*Corvus brachyrhynchos*), house mouse (*Mus musculus*), and opossum (*Didelphis virginiana*).

RIVERINE

Riverine habitats are distinguished by intermittent or continually running water, and occur in association with a variety of terrestrial habitats. Within the Action Area, NF Duck Creek comprises the riverine habitat. Riverine habitat provides water and a migration corridor for a variety of amphibians, reptiles, and fish species.

NF Duck Creek has a well-defined bed and bank. The slopes of the banks were gentle and low and were primarily vegetated with poison hemlock and Himalayan blackberry. Substrate within NF Duck Creek consisted primarily of vegetated sandy silt. NF Duck Creek had approximately 2 to 4 feet of slow-moving water at the time of the survey with large patches of cattail (*Typha* spp.) growing within the channel. Red-winged blackbirds (*Agelaius phoeniceus*) were observed perching on the cattails within the channel.

3.3.4. Movement Corridors

Wildlife movement corridors link areas of suitable wildlife habitat that may otherwise be separated by rugged terrain, changes in vegetation, and/or areas of human disturbance or urban development. Topography and other natural factors, in combination with urbanization, can fragment or separate large open-space areas. The fragmentation of natural habitat creates isolated "islands" of habitat that may not provide sufficient area to accommodate sustainable populations and can adversely impact genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange between separate populations.

NF Duck Creek provides a movement corridor for areas between the Bay-Delta region and the Sierra Nevada foothills. The creek allows aquatic and terrestrial wildlife species to safely disperse back and forth between suitable habitats to the east and west of the Action Area. Highways and roads can present an impassable barrier to many wildlife species and are hazardous for wildlife to cross. Relatively unimpeded waterways such as NF Duck Creek provides an important movement corridor, which allows dispersal and subsequent gene flow

between wildlife populations separated by roads and populated areas. The proposed Project would not remove, degrade or otherwise interfere substantially with the structure or function of these wildlife movement corridors, though some temporary disruption of wildlife movement would occur during the construction period.

3.3.5. Invasive Species

Plant species observed in the Action Area were compared to the invasive plant list maintained by the California Invasive Plant Council (Cal-IPC) (Cal-IPC 2016) and the list of noxious weeds maintained by the California Department of Food and Agriculture (CDFA) (CDFA 2015). Several invasive and noxious weed species occur in the Action Area. CDFA List "A" species are subject to state enforced action involving eradication, quarantine, regulation, containment, rejection, or other holding action. CDFA List "B" species warrant eradication, containment, control, or other holding action at the discretion of the commissioner. CDFA List "C" species warrant state endorsed holding action and eradication only when found in a nursery; actions to retard spread outside of nurseries at the discretion of the commissioner; and rejection only when found in a crop seed for planting or at the discretion of the commissioner. In addition, the Cal-IPC categorizes plants as "High", "Moderate", or "Limited", reflecting the level of each species' negative ecological impact in California. Each plant on the list received an overall rating based on the following evaluation criteria:

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Poison-hemlock (*Conium maculatum*)

Poison-hemlock has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. Poison-hemlock has spread throughout California in areas below 5,000 feet elevation, excluding the Great Basin and Desert provinces and is commonly found in dense patches along roadsides and fields. It also thrives in meadows and pastures and is occasionally found in riparian forests and flood plains but prefers disturbed areas. All parts of poison-hemlock are toxic to humans and animals when

ingested; handling plants can cause contact dermatitis in some people. Poison-hemlock can spread quickly after the rainy season in areas that have been cleared or disturbed. Once established, it is highly competitive and prevents establishment of native plants by over-shading. Poison-hemlock occurs along the banks of NF Duck Creek and within a parcel of land in the southeast corner of the Action Area.

Yellow star-thistle (*Centaurea solstitialis*)

Yellow star-thistle has a rating of "high" on the Cal-IPC Invasive Plant Inventory (2018) and it is on the CDFA (2015) Category "C" list. Yellow star-thistle is a bushy winter annual (family Asteraceae) that invades 12 million acres in California. Yellow star-thistle inhabits open hills, grasslands, open woodlands, fields, roadsides, and rangelands, and it is considered one of the most serious rangeland weeds in the state. It propagates rapidly by seed, and a large plant can produce nearly 75,000 seeds. Several insects from the Mediterranean region, including weevils and flies, have been employed as biocontrol agents for yellow star-thistle with minor success. Yellow star-thistle occurs along Buckman Road within the ruderal (disturbed) habitat.

Milk thistle (*Silybum marianum*)

Milk thistle has a rating of "limited" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. Milk thistle is a winter annual or biennial with prickly leaves (family Asteraceae). It is widely spread throughout California in overgrazed pastures and along fence lines and other disturbed areas. Milk thistle produces tall, dense stands that outcompete native species. Milk thistle is found throughout the ruderal (disturbed) areas in the Action Area.

Ripgut brome (*Bromus diandrus*)

Ripgut brome has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is an exotic, invasive species found throughout California, interfering with the establishment and survival of native vegetation. Ripgut brome is found throughout the ruderal (disturbed) areas in the Action Area.

Wild oat (*Avena fatua*)

Wild oat has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is a winter annual grass that is a common agricultural weed. It occurs in most grassland areas in California, particularly in poor soils and along road edges. Wild oat has taken over grassland areas and displaced native grasses throughout much of California. Wild oat is found throughout the ruderal (disturbed) areas in the Action Area.

Himalayan blackberry (*Rubus armeniacus*)

Himalayan blackberry has a rating of "high" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is an exotic, invasive species found in wetland-riparian areas along the Coast Ranges, Central Valley, and Sierra Nevada where it rapidly outcompetes and displaces native plant species. Himalayan blackberry forms dense

thickets that severely limit light availability for other understory plants. This species also commonly occurs in disturbed areas and roadsides up to 1,600 meters (5,249 feet) in elevation (Cal-IPC, 2018). Himalayan blackberry dominates the banks of NF Duck Creek.

Chapter 4. Federally-Listed/Proposed Species and Designated Critical Habitat within the Action Area

This section describes the status, distribution, and biology of the federally-listed species as well as the results of the field survey conducted on March 19, 2018.

4.1. Federally Listed/Proposed Species

After completion of the field surveys and a review of existing information on federally listed wildlife in the project region, the following federally listed special-status wildlife species were determined to have the potential to occur within the Action Areas or be affected by construction activities: GGS.

Discussion of Giant Garter Snake

Status

California listed GGS as threatened in 1971 while the USFWS listed GGS as a threatened species on October 20, 1993. A revised recovery plan for GGS was drafted in 2015 (USFWS, 2015). Designated critical habitat does not occur in the Action Area (USFWS, 2017).

Description

GGS is one of the largest garter snakes, reaching a total length of at least 5 feet (160 centimeters). Females tend to be slightly longer and stouter than males. The weight of adult female GGS is typically 1.1-1.5 pounds (500-700 grams). Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light colored lateral stripes. Background coloration and prominence of black checkered pattern and the three yellow stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own.

Distribution

Giant garter snakes are endemic to California's Central Valley (Fitch 1940; Hansen and Brode 1980; Rossman and Stewart 1987). Historically, giant garter snakes inhabited the Sacramento and San Joaquin Valleys from the vicinity of Chico, in Butte County southward to Buena Vista

Lake, near Bakersfield in Kern County, California. The eastern and western boundaries of the giant garter snake range from the foothills occurring along each side of the Central Valley - the Coast Range to the west and the Sierra Nevada to the east. Observations of individual giant garter snakes range in elevation from 10 to 40 feet (3 to 12 meters) in the southern Sacramento Valley. Although the boundaries of the giant garter snake's original distribution are undetermined, occurrence records coincide with the historical distribution of the large flood-basins, freshwater wetlands, and tributary streams of the Central Valley's Sacramento and San Joaquin watersheds (G. Hansen and Brode 1980).

Though the abundance of giant garter snakes in the Sacramento Valley has declined, the distribution of giant garter snakes in its northern range may still reflect its historical distribution. Giant garter snakes in the San Joaquin Valley, however, have suffered an extensive reduction in their abundance and distribution compared to historical times (Hansen 1980; Paquin et al. 2006; Wylie and Amarello 2007; Hansen 2008). Giant garter snakes historically inhabited the extensive wetlands of the Tulare and Buena Vista lakes in the southern San Joaquin Valley and appear to have once been fairly abundant in this part of the San Joaquin Valley (Hansen and Brode 1980). Conversely, giant garter snakes have not been found in the northern reach of the San Joaquin Valley up to the Delta area. Here, the floodplain of the San Joaquin River and its associated wetland habitat constricts to a geologically narrow trough. The length of this 62-mile (100-kilometer) constriction is presumed to have historically separated the giant garter snake populations in Merced County from those of the eastern Sacramento/San Joaquin River Delta (Delta) in San Joaquin County (Hansen and Brode 1980). It is believed that the extensive historical wetlands of the Delta were suitable for giant garter snakes and that they historically occupied this area (Hansen 1986, 1988).

Habitat Requirements

Endemic to wetlands in the Sacramento and San Joaquin valleys, GGS inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields. GGS feed on small fishes, tadpoles, and frogs (Fitch 1941, Hansen 1980, Hansen 1988). Habitat requirements consist of: (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter (Hansen 1980).

GGS are typically absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1980, Rossman and Stewart 1987, Brode 1988, Hansen 1988). Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1980). The GGS inhabits small mammal burrows and

other soil crevices above prevailing flood elevations throughout its winter dormancy period (i.e., November to mid-March) but have also been known to use burrows as refuge from extreme heat during their active period. GGS typically select burrows with sunny exposure along south and west facing slopes.

Population Trends

Prior to listing in 1971, GGS were known from 16 localities, representing nine distinct populations based on available literature and museum records (Hansen and Brode 1980, USFWS 1993). Range-wide status surveys of GGS conducted during the mid-1970s and 1980s indicate that they have been extirpated from the San Joaquin Valley south of Mendota in Fresno County, an area comprising as one-third of the snake's former range (Fitch 1940, Hansen and Brode 1980, Rossman and Stewart 1987, Stebbins 2003). Once plentiful in areas such as Mendota, Los Banos, and Volta, GGS are now known from only a small number of localities in the southern aspect of their range (USFWS 1999, Dickert 2003, Hansen 2007). Only a few occurrences of GGS have been documented from Burrell in Fresno County northward to Stockton since 1980 and the snake now appears to be most abundant in regions of the northern Sacramento Valley that are dominated by rice agriculture (USFWS 1993, 1999).

The current stronghold for this species is in the Sacramento-American River Basin of Sutter and Sacramento counties, which provides some of the species' most important remaining habitat (Sutter County 2011). In recent years, surveys have shown a severe decline in populations south of Stockton, California (USFWS 1999). The reasons for this decline are unknown, but may include loss of habitat, changes in water management, and predation by non-native species.

4.2. Survey Results

There is one recorded occurrence of GGS within 5 miles of the Action Areas. The occurrence was recorded in 1987, approximately 4.46 miles west of the Action Area, along Farmington Road 1.2 miles east of the junction at Drais Road and south of Duck Creek. Habitat consisted of a small marsh along the creek where one juvenile was observed. The remains of a valley garter snake (*Thamnophis sirtalis fitchi*) and a gopher snake (*Pituophis catenifer*) were also observed.

Aquatic habitat conditions for GGS in NF Duck Creek and the surrounding upland habitat conditions are marginal; however, the channel may be used as aquatic dispersal habitat while the ruderal (disturbed) areas may be used as upland dispersal habitat for the species. Land uses surrounding the segments of NF Duck Creek that flows through the Action Area are primarily comprised of access roads and agricultural fields consisting of upland grain, orchards, and row crops, which, unlike rice fields, do not provide suitable habitat for GGS. The ruderal areas are highly disturbed and vegetated with non-native weedy species and burrows were not observed within these areas. Thus, while GGS could use the Action Area

as a dispersal corridor to more suitable foraging habitat, it is not anticipated that they would be used for active breeding or foraging, as they lack important habitat elements, including nearby rice fields, or adequate escape cover.

4.3. Status of Designated Critical Habitat in the Action Area

Critical habitat has not been designated for GGS.

Chapter 5. Effects of the Project on the Action Area

5.1. Deconstruct Action

The following Project activities have the potential to cause direct effects on listed species: construction schedule; vegetation removal; demolition of the existing bridge; construction of new bridge foundations; and the staging areas.

An evaluation of the potential direct and indirect effects on federally listed species and their critical habitat from the above-mentioned Project activities is discussed in the following sections. **Figure 5-1** and **Table 5-1** summarizes temporary and permanent impacts on these habitats.

Table 5-1
Summary of Temporary and Permanent Effects by Habitat Type

Habitat Community	Permanent (acres)	Temporary (acres)	Totals (acres)
Agriculture	0.04	0.14	0.18
Ruderal (Disturbed)	0.03	0.01	0.04
Urban (Developed)	0.19	0.02	0.21
Riverine (NF Duck Creek)	0.004	0.04	0.044
Total	**0.26**	**0.21**	**0.47**

5.1.1. Construction Scenario (summary)

Construction will consist of the following activities in this general order:

Installing construction area and detour signs

Sufficiently in advance of construction operations, detour signs will be installed identifying the road closure and detour routes. Signs will remain in place throughout the duration of construction.

Relocating utilities (if required)

Existing overhead utilities which conflict with equipment required to install piling will be temporarily relocated. At the completion of construction, overhead utilities will be restored to the current location.

Clearing, grubbing, and tree removals

Remove portions of vegetation in conflict with new construction. The areas around the work site will be cleared of vegetation and existing fencing which conflicts with proposed construction.

Legend

Action Area

Permanent Impacts

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

Temporary Impacts

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

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Impacts to Habitat Types

Figure 5-1

Creek Diversion

It is anticipated that construction will occur when the creek beds are dry. However, if water is present during construction, temporary cofferdams will be installed upstream and downstream of the construction site. A temporary culvert will be installed between the cofferdams to carry water through the work area. The work area will then be dewatered by pumping. The temporary cofferdams and culvert will be removed after the completion of foundation and abutment construction and after placement of rock slope protection (RSP). All in-channel work will be limited to the active season for GGS (May-October)..

Temporary Culvert Detour

The detour would include placing two, 36-inch corrugated metal pipes within NF Duck Creek which will be covered with clean gravel fill to a height above the ordinary high-water mark. Geotextile fabric would be placed over the gravel and earth fill will be placed on the fabric to minimize migration of soil into the creek. The temporary stream diversion system would be removed once the new bridge is constructed. All work within the channel will be contained within the approved area of disturbance. The operational timeline for in-channel work will be defined in the Project permits from the resource agencies.

Demolition

Existing bridge, abutment retaining walls, asphalt, etc. identified to be removed will be demolished and properly disposed of offsite. The creek below the bridge will be protected from contamination and all debris generated by the demolition. Heavy equipment will be required to demolish and remove such features. Drainage features will be protected from contamination and all debris generated by the demolition will be removed from the site.

New Bridge Construction

New bridge construction will involve placement of precast, prestressed concrete slabs with a cast in place concrete overlay. Traffic rated barriers will be placed at the edge of deck, and Midwest Guardrail Systems will be installed on both approaches to the bridge.

New Approach Roadway Construction

New bridge construction will involve placement of precast, prestressed concrete slabs with a cast in place concrete overlay. Traffic rated barriers will be placed at the edge of deck, and Midwest Guardrail Systems will be installed on both approaches to the bridge.

Table 5-2 provides a description of the type of equipment likely to be used during the construction of the Proposed Action.

Table 5-2. Construction Equipment

Equipment	Construction Purpose
Hydraulic Hammer	Demolition
Hoe ram	Demolition
Jack Hammer	Demolition
Water Truck	Earthwork construction + dust control

Equipment	Construction Purpose
Bulldozer / Loader	Earthwork construction + clearing and grubbing
Haul Truck	Earthwork construction + clearing and grubbing
Front-End Loader	Dirt or gravel manipulation
Grader	Ground grading and leveling
Dump Truck	Fill material delivery
Bobcat	Fill distribution
Excavator	Soil manipulation and placement of rock slope protection
Compaction Equipment	Earthwork
Roller / Compactor	Earthwork and asphalt concrete construction
Backhoe	Soil manipulation + drainage work
Drill Rig	Construction of drilled or driven pile foundations
Holding tanks	Slurry storage for pile installation
Crane	Placement of false work beams
Concrete Truck and Pump	Placing concrete
Paver	Asphalt concrete construction
Truck with seed sprayer	Erosion control landscaping
Generators	Power Hand Tools

5.1.2. Sequencing and Schedule

Construction of the proposed Project is anticipated to take approximately 3 months to complete, pending a final construction plan. Construction is anticipated to start in May 2021 and as determined appropriate by the irrigation needs of its customers, as well as the USFWS, CDFW, and the Central Valley RWQCB. All work within the creek would be conducted during the dry season.

5.1.3. Impacts Discussion

The Proposed Action has the potential to directly impact GGS by causing physical harm to individuals if they are present in the Action Area during construction. As shown in Table 5-1, the proposed Project will result in permanent and temporary impacts to potential aquatic and upland dispersal habitat.

Construction is scheduled to begin during the GGS active period (i.e. May 1 to October 1). Potential impacts include direct harm to GGS that could potentially come into contact with construction personnel and/or equipment, temporarily inhibiting movement of GGS through the Action Area, and increased chance of predation or physical harm if they were to become trapped in the construction area as well as within the dewatered portion of NF Duck Creek.

5.1.4. Stressors from Project Actions

Stressors induce an adverse response in an organism by any physical, chemical, or biological alteration of the environment (or resource) that can lead to a response from the individual. Stressors can act directly on an individual, or indirectly through effects to a resource.

Stressors to GGS include injury from vehicular movement in upland areas, temporary loss of dispersal habitat, propagated dust and increased chance of predation or physical harm if they were to become trapped in the construction area.

Fuel or oil spills from construction equipment into dispersal habitat could also cause illness and trenches left open overnight could trap snakes moving through the construction area during the early morning hours. Noise and vibrations from construction equipment, and presence of human activity during construction activities may also disturb GGS if present within the Action Areas.

5.1.5. Project Operation and Maintenance

Once Project construction is complete, normal operation of the bridge and roadway will resume and will not result in any effects to listed species. Revegetation of the impacted areas will result in a higher quality habitat in the upland areas due to the removal of invasive species and the establishment of native species. County maintenance crews may have to access the area intermittently to ensure normal function and operation of the bridge however work will be confined to the already disturbed areas within the County right-of-way.

5.2. Exposure to Stressors from the Action

Exposures are defined as the interaction of the species, their resources, and the stressors that result from the Project action.

Although unlikely, there is the potential this species may be dispersing through the creek and/or seeking refuge within the ruderal (disturbed) areas. Potential exposure to stressors could result from GGS potentially coming into contact with construction personnel and/or equipment.

5.3. Response to the Exposure

It is unlikely GGS will be present and exposed to these stressors, however if GGS did encounter a stressor, the most likely response would be to disperse away from the stressor. With implementation of avoidance and minimization measures such as installing exclusion fencing prior to construction, worker training, monitoring, work windows, and reporting, the likelihood of GGS being adversely affected when responding to the exposure is further reduced.

5.4. Effects of the Action

Effect is a description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effect (50 CFR 402.02). The effect of the action is the consequence (behavioral, physical, or physiological) of a response to a stressor. Based on the analysis conducted in this BA, and the proposed avoidance and minimization measures, these effects are not likely to adversely affect GGS as they are not expected to reside within the Action Area.

Ground Disturbance and Construction - Ground disturbance and construction activities associated with the Project may result in temporary or negligible permanent loss of water bodies utilized by the species, and also result in loss of upland habitat used for dispersal, refugia, and foraging. GGS dispersing through the Action Area may be injured from inadvertent trampling by workers from foot traffic and operation of construction equipment during construction activities. Construction activities may result in harassment from noise, vibration, and night-lighting and may disturb GGS causing them to leave their upland resting areas and increase their exposure to desiccation and predation. GGS may also become trapped in open excavations or construction trenches, making them vulnerable to desiccation, starvation, and predation.

Exposure to Contaminants - The construction of bridges and roadways, as well as the repair and use of this infrastructure, and the use of agricultural chemicals next to GGS habitat can expose this species to chemical contaminants. Substances used in road materials or to recondition roads or for agricultural purposes can drift or wash off into nearby aquatic and upland habitat. Vehicle exhaust emissions can include hazardous substances which may concentrate in soils and in the air along roads (Trombulak and Frissell 2000), and include organic pollutants (i.e. dioxins, polychlorinated biphenyls) (Benfenati et. al 1992), and elevated ozone levels in the air (Trombulak and Frissell 2000). Vehicles may leak hazardous substances such as motor oil and antifreeze. A variety of substances could be introduced during accidental spills of materials. Spills can result from leaks in vehicles, small containers falling off vehicles, or from accidents resulting in whole loads being spilled. Large spills may be partially or completely mitigated by clean-up efforts, depending on the substance. GGS could be exposed to contaminants though inhalation, dermal contact and absorption, direct ingestion of contaminated soil or plants, or consumption of contaminated prey. Exposure to contaminants may cause short- or long-term morbidity. Contaminants may also have a negative effect on GGS prey diversity and abundance, and diminish the local carrying capacity for the listed species.

Invasive Species - Construction of roads can facilitate the invasion and establishment by species not native to the area. Disturbance and alteration of habitat adjacent to roads may create favorable conditions for nonnative plants and animals. Non-native plants can spread along roadsides and then into adjacent habitat (Gelbard and Harrison 2003). American

bullfrogs and other non-native animals may use modified habitats adjacent to road to disperse into GGS habitat. These exotic animals could compete for resources such as food or refugia, or directly injure them. Nonnative plants and animals may reduce habitat quality for GGS or its prey, and reduce the local carrying capacity.

5.5. Conservation Measures and Compensation Proposal

This section presents the conservation measures that will be adopted or incorporated into the Project to avoid, minimize, or otherwise reduce potential adverse effects (i.e., the amount or extent of take) of the Project on GGS. In addition, general conservation measures for further protecting habitat will be implemented to further reduce potential adverse effects.

5.5.1. Conservation Measures

Water Quality

The County shall comply with NPDES requirements either by acquiring a Small Construction Rainfall Erosivity Waiver, or preparing a Notice of Intent to support a General Construction Permit. If a waiver is obtained, the County shall require preparation and approval of a Water Pollution Control Plan, and that BMP's be fully implemented in compliance with the Municipal Regional Permit. If a waiver is not obtained, a Stormwater Pollution Prevention Plan (SWPPP) shall be implemented to minimize potential water quality impacts during construction.

The County or its contractor shall file permit registration documents with the Central Valley RWQCB, which include at a minimum, a Notice of Intent (NOI), site maps, drawings, a SWPPP, and contact information. The SWPPP must be prepared by a Qualified Stormwater Developer (QSD) and SWPPP implementation during construction of the Project shall be overseen by a Qualified Stormwater Practitioner (QSP). The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge, and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action shall be consistent with the appropriate risk level requirements for linear underground/overhead projects (LUP) of the Construction General Permit (Order 2009-0009-DWQ and the current amendments), and would include the implementation, at a minimum, of the following elements:

- Good site management "housekeeping" requirements for construction materials, waste management, vehicle storage and maintenance, landscape materials (if applicable), and other potential pollutant sources. These would typically include proper management of construction site materials and equipment; covering and/or stabilization of loose soils and stockpiles; tracking controls; proper use, containment and management of portable toilets and other sanitation facilities; development of a spill response plan and containment of potentially hazardous materials; and prevention of oil, grease, or fuel leaks in to the ground, storm drains or surface waters.

- Non-stormwater management, which includes washing vehicles and cleaning streets in a manner that prevents non-storm water discharges from reaching surface water or municipal drainage systems.
- Erosion controls, which include measures to protect the site from wind erosion and requirements for soil covers for inactive areas and all finished slopes, open space, utility backfill, and completed lots. Stabilization techniques shall include mulching and installing silt fences, when necessary to prevent erosion of stockpiled soils.
- Sediment controls, which typically require establishing perimeters (e.g. hay bales, sand bag dikes, or straw waddles) around work areas and stabilizing all construction entrances and exits.
- Run-on and runoff controls.
- Periodic site BMP inspection, maintenance and repairs by a QSP or a person trained by a QSP/QSD.

Giant Garter Snake

Implementation of the following avoidance and minimization efforts will ensure that no take of GGS occurs as a result of the Project:

- Temporary fencing (or similar devices which lack openings which might cause the GGS to become stranded or otherwise become entangled) shall be installed at the upstream and downstream limits of the construction area, to deter GGS from entering the Action Area and being harmed by construction activities. The fencing shall be installed prior to the start of construction to ensure that GGS do not enter the construction zone.
- Construction personnel shall participate in a USFWS-approved worker environmental awareness program prior to the onset of construction activities. A qualified biologist shall inform all construction personnel about the life history of GGS; how to identify species and their habitats; what to do if a GGS is encountered during construction activities; and explain the state and federal laws pertaining to GGS.
- A qualified biologist shall conduct a pre-construction survey for GGS, no more than 24 hours prior to the start of construction activities (site preparation and grading). If construction activities stop for a period of two or more weeks, a new GGS survey shall be completed no more than 24 hours prior to the reinitiating of construction activities. The biologist shall monitor the site during de-watering activities; if a GGS is encountered during the construction period after the completion of these de-watering activities, the monitoring biologist shall be notified and shall have the authority to stop localized construction activities until corrective measures have been taken to avoid harm to GGS.
- Any vegetation or ground clearing shall be confined to the minimal area necessary within 200 feet of aquatic habitat to facilitate construction activities. To ensure that construction equipment and personnel do not affect upland and aquatic habitat for GGS outside of the Action Area, exclusionary fencing shall be erected to clearly define the GGS habitat

to be avoided. This will delineate the environmentally sensitive areas within the Action Area. The installation techniques and location of the exclusionary fencing shall be coordinated with a qualified wildlife biologist, who shall inspect and approve the fencing prior to commencement of construction.

- Upon completion of construction, disturbed sections of NF Duck Creek shall be hydro seeded to stabilize disturbed areas.
- If a live GGS is encountered during construction activities, the project biological monitor and the USFWS shall be immediately notified. The biological monitor shall do the following:
    - Stop all construction activity in the vicinity of the GGS. Monitor the GGS and allow the GGS to leave on its own. The monitor will remain in the area for the remainder of the workday to make sure the GGS is not harmed or if it leaves the site and does not return. Escape routes for GGS will be determined in advance of construction. If the GGS does not leave on its own within one working day, further consultation with USFWS will be conducted.
    - Upon locating dead, injured or sick GGS, Caltrans shall notify the USFWS Division of Law Enforcement or the Sacramento Fish and Wildlife Office within one working day. Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.
- No plastic, monofilament, jute, or similar erosion control matting that could entangle GGS will be employed. Possible substitutions include coconut coir matting, tactified hydro seeding compounds, or other material approved by the USFWS.
- Standard construction BMPs shall be implemented throughout construction, in order to avoid and minimize adverse effects to the water quality within the Action Area. These BMPs shall be inspected daily to ensure their effectiveness. They shall be installed per the BMP installation specifications. BMPs deemed to be ineffective shall be maintained or replaced as necessary.

5.5.2. Compensation

The County will apply for any necessary permits from the Corps, CDFW, and RWQCB for permanent loss of riverine habitat. Impacts will be mitigated in accordance with agency requirements to ensure no net loss of acreage or value to waters of the U.S which will include restoring temporarily impacted areas to pre-Project condition. In addition, to compensate for permanent impacts on jurisdictional waters, the County will purchase credits from a Corps and/or CDFW approved mitigation bank at a minimum 1:1 ratio (one acre of habitat replaced for every one acre filled). Based on the preliminary Project design, the Project will permanently affect 0.004 acres of intermittent stream. Compensation for permanent impacts on jurisdictional waters may benefit GGS aquatic dispersal habitat.

5.6. Effects of Interrelated and Interdependent Actions / Conclusions and Determination

The assessment of potential effects of a Proposed Action on a listed species can be comprised of one or more types of effects. This includes interrelated and interdependent actions, as defined in the *FHWA Section 7 BA instructions, SER Volume 3, Chapter 3, and the Endangered Species Consultation Handbook* (National Marine Fisheries Service [NOAA Fisheries] and USFWS, 1998) and summarized below:

> **Interrelated actions** - actions that are part of a larger action and depend on the larger action for their justification [50 CFR §402.02](i.e., this Project would not occur "but for" a larger project). Interrelated actions are typically associated with the proposed action. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification.
>
> **Interdependent actions -** actions having no independent utility apart from the proposed action. [50 CFR §402.02]. Interdependent actions are those that have no independent utility apart from the action under consideration.

There are no additional activities associated with the Project that would be considered interrelated or interdependent. Therefore, there are no effects from interrelated and interdependent actions on GGS in the Action Area. There are no other known projects that would be expected to occur within the Action Area that would not be subject to federal action. Any work within NF Duck Creek would involve a permit from the Corps, a federal agency, and would be subject to federal consultation.

5.7. Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the Action Area described in this biological assessment. Future federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

The Proposed Action is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Action Area. Cumulative impacts to the NF Duck Creek would not result from the construction of both bridges concurrently as they are located on separate waterways. In regard to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Proposed Action. While future development within the watershed could result in water quality, erosion, and drainage impacts to the NF Duck Creek and surrounding waterways, the incremental effects of the Proposed Action are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to

implement BMPs to reduce water quality impacts to the extent practicable. Therefore, no adverse cumulative impacts are expected. Furthermore, conservation measures, as described in Sections 5.5.1 and 5.5.2, Conservation Measures and Compensation, would reduce potential adverse effects of the Project to this species.

5.8. Determination

The USFWS and NOAA Fisheries has defined the different determination statements that can be reached through consultation under the FESA. To assess the magnitude of the potential effect, the anticipated change that could occur is compared against the evaluation criteria to ascertain whether the Proposed Action would result in a determination of "*no effect*," "*may affect, but is not likely to adversely affect*," or "*may affect, and is likely to adversely affect.*" In most instances, where a potential adverse effect may occur, conservation measures are available to reduce the magnitude of the effect. The determination statements for potential effects are defined below (NOAA Fisheries and USFWS, 1998).

> **"*No effect*"** is the appropriate conclusion when the action agency determines its Proposed Action will not affect a listed species or designated critical habitat.
>
> "***May affect, but is not likely to adversely affect***" is the appropriate conclusion when effects on listed species or critical habitat are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the effect and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
>
> **"*May affect, and is likely to adversely affect*"** is the appropriate conclusion if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the Proposed Action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial. In the event the overall effect of the Proposed Action is beneficial to the listed species, but is also likely to cause some adverse effects, then the Proposed Action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the Proposed Action, an "is likely to adversely affect" determination should be made.

5.8.1. Species and Critical Habitat Determination

1.) No Effect

A no effect determination was made for the following species, critical habitat, and EFH. No consultation is required.

- Greene's tuctoria (*Tuctoria greenei*) E

- Conservancy fairy shrimp (*Branchinecta conservatio*) E
- Vernal pool fairy shrimp (*Branchinecta lynchi*) T
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) T
- Vernal pool tadpole shrimp (*Lepidurus packardi*) E
- California tiger salamander (*Ambystoma californiense*) T
- California red-legged frog (*Rana draytonii*) T
- Delta smelt (*Hypomesus transpacificus*) T
- Central Valley (CV) steelhead (*Oncorhynchus mykiss*) T
- Chinook salmon EFH

2.) May Affect-Not Likely to Adversely Affect

A may affect but is not is likely to adversely affect determination was made for the following species. Informal consultation is required.

- Giant garter snake (*Thamnophis gigas*) T

5.8.2. Discussion Supporting Determination

While critical habitat is not currently designated for GGS, the Action Area is within the current and historic range of this species. The Action Area provides potentially suitable aquatic and upland dispersal habitat; and while unlikely, there is the potential for GGS to utilize the Action Areas during normal dispersal activities. As a result of grubbing and clearing, equipment staging, and the widening of Buckman Road to accommodate a wider bridge structure, temporary and permanent impacts to marginal quality aquatic and upland dispersal habitat, are expected to occur.

The Project has been designed to avoid and minimize impacts to special-status species to the maximum extent possible. The in-water work windows will be limited to the dry season and as determined appropriate by the regulatory agencies. Brightly colored ESA fencing shall be placed along the limits of work to protect adjacent vegetation and staging areas, access routes, and construction areas shall be located outside of suitable dispersal areas to the maximum extent practicable.

Given the Action Area does not contain critical habitat or suitable aquatic breeding and upland refugia habitat, but does provide potentially suitable upland and aquatic dispersal habitat which will be permanently impacted, the Project ***may affect, but is not likely to adversely affect*** GGS.

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Appendix A. Species Lists (USFWS, and NOAA Fisheries)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: August 09, 2019
Consultation Code: 08ESMF00-2018-SLI-1600
Event Code: 08ESMF00-2019-E-08671
Project Name: Buckman Road over North Fork Duck Creek Bridge Replacement Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2018-SLI-1600

Event Code: 08ESMF00-2019-E-08671

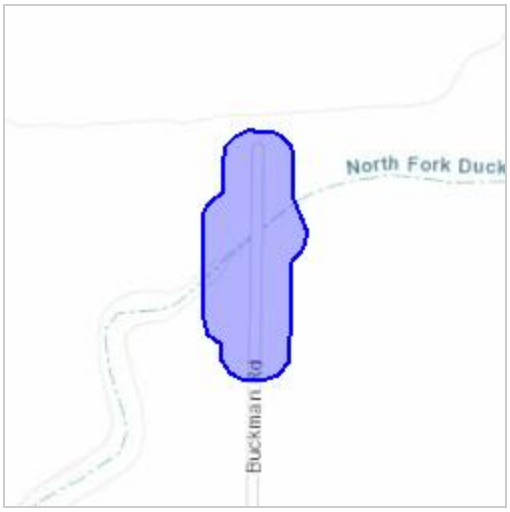
Project Name: Buckman Road over North Fork Duck Creek Bridge Replacement Project

Project Type: BRIDGE CONSTRUCTION / MAINTENANCE

Project Description: The San Joaquin County Department of Public Works (County) is proposing to construct a replacement bridge along Buckman Road (Bridge No. 29C-0307) over North Fork (NF) Duck Creek due to its functionally obsolete status, as determined by the Federal Highway Administration (FHWA) criteria. The proposed Project is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line along Buckman Road approximately 0.8 miles north of SR 4 and crosses over NF Duck Creek. The bridge was constructed in 1931 and consists of timber deck planks on timber stringers on Douglas fir caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and post bents on PCC pedestal footings. The abutment foundation is unknown. This segment of Buckman Road is a single lane local roadway ending approximately 750−feet north of the existing bridge. The road services multiple agricultural field accesses as well as a couple of residences beyond the bridge.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.94155918895899N120.97713222227665W



Counties: San Joaquin, CA

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/321

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/7850
Habitat assessment guidelines:
https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8246

Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/498

Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2246

Flowering Plants

NAME	STATUS
Greene's Tuctoria *Tuctoria greenei*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/1573

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Lindsay Tisch

From: Lindsay Tisch
Sent: Friday, August 9, 2019 2:30 PM
To: 'nmfswcrca.specieslist@noaa.gov'
Subject: Caltrans D10 Buckman Road Bridge Replacement BRLO 5929(241)

Good afternoon

Federal Agency: Federal Highway Administration – California Division

Federal agency address: 650 Capitol Mall, Suite 4-100, Sacramento, CA 95814-4708

Non-federal agency representative (if any): California Department of Transportation District 10

Non-federal agency representative (if any)address: 1976 E Charter Way, Stockton, CA 95205

Project title: Buckman Road Bridge Replacement BRLO 5929(241)

Quad Name **Farmington**
Quad Number **37120-H8**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) - **X**
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -

CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office
562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Thanks!

Lindsay Tisch | Biologist – Environmental Planner | Drake Haglan & Associates
11060 White Rock Road, Suite 200 | Rancho Cordova, CA 95670 | Main Office: 916.363.4210
Direct Dial: 916.822.3983 | Fax: 916.363.4230 | Email: ltisch@drakehaglan.com

Appendix B. Lists of Vascular Plants and Wildlife Observed at the Buckman Road Project Site

Plant and Animal List at Buckman Road over NF Duck Creek

Survey Date: 03/19/2018
Surveyors: DHA biologist Lindsay Tisch

Plant Species Observed:

Avena barbata	slender wild oat
Avena fatua	common wild oat
Bromus diandrus	ripgut brome
Centaurea solstitialis	yellow star-thistle
Conium maculatum	poison hemlock
Croton setigerus	turkey mullein
Erodium botrys	filaree
Galium aparine	cleavers
Helminthotheca echioides	bristly ox-tongue
Hordeum murinum	hare barley
Hypochaeris glabra	smooth cat's-ear
Lactuca serriola	prickly lettuce
Raphanus raphanistrum	wild radish
Rubus armeniacus	Himalayan blackberry
Silybum marinum	milk thistle
Typha spp.	cattail
Vicia sativa	spring vetch

Animal Species Observed:

Agelaius phoeniceus	Red-winged blackbird
Aphelocoma californica	western scrub-jay
Buteo jamaicensis	red-tailed hawk
Buteo swainsonii	Swainson's hawk
Mimus polyglottos	northern mockingbird
Molothrus ater	brown-headed cowbird
Passer domesticus	house sparrow
Petrochelidon pyrrhonota	cliff swallow
Sayornis nigricans	black phoebe
Turdus migratorius	American robin
Zonotrichia leucophrys	white-crowned sparrow

Plant and Animal List at Buckman Road over Duck Creek

Survey Date: 03/19/2018
Surveyors: DHA biologist Lindsay Tisch

Plant Species Observed:

Avena barbata	slender wild oat
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Erodium botrys	filaree
Galium aparine	cleavers
Helminthotheca echioides	bristly ox-tongue
Hordeum murinum	hare barley
Hypochaeris glabra	smooth cat's-ear
Lactuca serriola	prickly lettuce
Raphanus raphanistrum	wild radish
Rubus armeniacus	Himalayan blackberry
Salix exigua	narrowleaf willow
Scirpus spp.	bulrush
Silybum marinum	milk thistle
Vicia sativa	spring vetch

Animal Species Observed:

Agelaius phoeniceus	Red-winged blackbird
Aphelocoma californica	western scrub-jay
Buteo jamaicensis	red-tailed hawk
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Petrochelidon pyrrhonota	cliff swallow
Sayornis nigricans	black phoebe
Turdus migratorius	American robin
Zonotrichia leucophrys	white-crowned sparrow

Appendix C. Photographs of the Project Site

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-1

Representative photo of upstream NF Duck Creek (Top) and downstream NF Duck Creek (Bottom).
Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-2

Representative photo of agriculture habitat (Top) and ruderal (disturbed) habitat (Bottom) within the Action Area.
Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-3

Representative photo of downstream Duck Creek (Top) and upstream Duck Creek (Bottom). Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-4

Representative photo of agriculture habitat (Top) and ruderal (disturbed) habitat along the banks of Duck Creek (Bottom) within the Action Area.
Photo date: March 19, 2018

APPENDIX B:

PRELIMINARY DELINEATION OF JURISDICTIONAL WATERS

Buckman Road Bridge Replacement Project

Preliminary Delineation of Jurisdictional Waters

Buckman Road Bridge Replacement Project
San Joaquin County

March 2018

Prepared for:
San Joaquin County Department of Public Works
E Hazelton Avenue
Stockton, CA 95205

Prepared by:
Drake Haglan & Associates
11060 White Rock Road, Suite 200
Rancho Cordova, CA 95670

TABLE OF CONTENTS

Buckman Road Bridge (29C-0307) Replacement Project Wetland Delineation

CHAPTER 1.0
Introduction

On behalf of the San Joaquin County Department of Public Works (County), Drake Haglan and Associates (DHA) investigated the extent of potentially jurisdictional wetlands and other waters of the U.S. occurring at the Buckman Road Bridge Replacement Project site, hereafter the "study area." The study area encompasses a total of approximately 1.36 acres of land located in eastern San Joaquin County along Buckman Road, where it crosses North Fork (NF) Duck Creek, approximately 1.5 miles northeast of the community of Farmington. The investigation was conducted in March 2018, and concludes that there are approximately 0.07 acres of potentially jurisdictional waters of the U.S in the study area.

This report documents wetland and channel boundary delineation using the best professional judgment of DHA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the U.S. Army Corps of Engineers (Corps).

1.1 Responsible Parties

The applicant's contact information is:

Don Rodgers, EIT, Bridge Engineering Division
(209) 468-3040
San Joaquin County Dept. of Public Works
1810 E. Hazelton Avenue
Stockton, CA 95201

1.2 Directions to Site

Directions to the site from Sacramento:

- Take I-80 BUS E/US-50 E/Reno/Placerville/Fresno/CA-99 S ramp
- Keep right at fork, follow signs for CA-99 S and merge onto CA-99 S
- Take exit 252B for Golden Gate Ave
- Turn left onto CA-4 E/S Golden Gate Ave
- Turn left onto Buckman Road

1.3 Purpose of Assessment

The purpose of this investigation is to describe and delineate all wetlands and other waters of the U.S. within the Buckman Road Bridge Replacement Project wetland delineation study area that may be subject to Section 404 of the Clean Water Act (CWA). If necessary, information from this report may be used in preparing permit applications for future actions proposed in the study area. This report will be reviewed by the Corps to verify their jurisdiction over wetlands and other waters of the U.S.

SECTION 2.0
Setting

2.1 Delineation Study Area

The proposed Project is located in the eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line (**Figure 2-1**) along Buckman Road approximately 0.8 miles north of SR 4 and crosses over NF Duck Creek (**Figure 2-2**). The proposed Project is on the Farmington CA USGS 7.5' Quadrangle within Township 1 North, Range 9 East, Section 15 (**Figure 2-3**).

The study area lies within the Hardpan Terraces ecological subsection, an area consisting of very gently to gently sloping terraces and small areas of floodplain and alluvial fans along streams that cross from mountains to reach the Sacramento and San Joaquin Rivers. The subsection elevation range is from 100 to about 400 feet. Fluvial erosion is the main geomorphic processes. Streams in this subsection drain to the Sacramento or San Joaquin Rivers or to closed basins in the San Joaquin Valley. All but the larger streams are generally dry during the summer. There are no lakes, but there is temporary ponding in vernal pools on Pleistocene terraces. The Hardpan Terraces is characterized by needlegrass grasslands, and northern hardpan vernal pools are common within the undeveloped grasslands. The annual average precipitation at the National Climatic Data Center Stockton Metro Airport weather station (048558) is 13.76 inches (WRCC, 2018). Precipitation occurs primarily from November through March. Elevation of the study area ranges between 115 to 120 feet above mean sea level (msl).

2.2 Soils

The *Custom Soil Resource Report for San Joaquin, California* (Natural Resource Conservation Service [NRCS], 2018a – **Appendix C**) (**Table 2-1** and **Figure 2-4)** shows one soil unit occurring within the study area. The soil unit has a minor component listed on the national hydric soils list for San Joaquin County, California (NRCS, 2018b).

TABLE 2-1
STUDY AREA SOIL UNITS

Soil Map Unit Name	Hydric Status	Landforms
170: Hicksville loam, 0 to 2 percent slopes, occasionally flooded	Non-hydric with hydric inclusions.	Stream terraces

SOURCE: NRCS, 2018

★ Project Location: Buckman Road Bridge

0 3.5 7 14 Miles

Source: ESRI Online Basemap, World Street Map, San Joaquin County;
Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Regional Location Map

Figure 2-1

★ Project Location: Buckman Road Bridge

0 187.5 375 750 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Location Map

Figure 2-2

Legend

Project Study Area

0 250 500 1,000 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project Farmington, CA

Project Study Area

Figure 2-3

Legend

Project Study Area

Soil Map Units

170: Hicksville loam, 0 to 2 percent slopes, occassionally flooded

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Soil Map Units

Figure 2-4

- **Hicksville loam, 0 to 2 percent slopes, occasionally flooded**, is listed as non-hydric; however, the minor component, Yellowlark, is considered hydric (NRCS 2018b). The map unit composition is 85 percent Hicksville and similar soils, and 15 percent minor components. The Hicksville map unit consists of moderately well drained loams over alluvium derived from mixed rock sources. Mapped areas are on stream terraces. Included in this map unit are minor components of unnamed, reddish clayey subsoil and rock outcrops.

2.3 Hydrology

Regional Hydrology

NF Duck Creek belongs to the Rock Creek – French Camp Slough (HUC 18040051) within the San Joaquin River Basin. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The Rock Creek – French Camp Slough watershed covers approximately 472.8 square miles (302,576 acres or 9,130 square kilometers) and includes San Joaquin, Stanislaus, and Calaveras counties.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

Local Hydrology

NF Duck Creek is an intermittent stream which flows in a northeast to southwest direction, beginning northeast of the Project site, before draining into Duck Creek approximately 0.5 miles southwest of the Project site. It is approximately 13 miles long and is within the Upper Duck Creek watershed (HUC 180400510401) which drains an area of approximately 28 square miles (73 square kilometers). Based on a review of historical aerial photographs on Google Earth, it appears the creek carries water until late April or early May. In addition, it is mapped as a palustrine emergent, persistent, seasonally flooded feature on the National Wetlands Inventory Mapper and as an intermittent stream on the Farmington CA USGS 7.5-minute Quadrangle.

2.4 Wildlife Habitats and Vegetation Alliances

Wildlife habitats are generally described in terms of dominant plant species and plant communities along with landform, disturbance regime, and other unique environmental characteristics. The wildlife habitats described in this section are based on the California Department of Fish and Wildlife's (CDFW) A Guide to Wildlife Habitats (Mayer and Laudenslayer, 1988) that is used in CDFW's California Wildlife Habitat Relationships System.

Within CDFW's current vegetation classification system, vegetation alliances are the scientifically derived hierarchical class that corresponds best with plant communities and are designed to be the unit for conservation of rare or threatened plant communities (Sawyer et al., 2009). Vegetation alliances typically represent a much finer scale of vegetation description than wildlife habitats but correspond appropriately with one or several wildlife habitat types. CDFW provides crosswalks to help correlate vegetation alliances with wildlife habitats and the descriptions below make use of the crosswalk. A description of each habitat type is presented below. Related vegetation alliances are listed following the wildlife habitat description and are based on the alliance descriptions presented by Sawyer et al. (2009). **Appendix A** includes the list of species observed and the wetland indicator status of each.

Agriculture

Agricultural fields are present in the southern portion of the BSA and appeared to have been recently disked. Agricultural fields, such as hay fields and row crops, have high foraging habitat value for wildlife species. Red-tailed hawks (*Buteo jamaicensis*) and Swainson's hawks (*Buteo swainsonii*) were observed flying over the agricultural fields within and adjacent to the BSA during the March 2018 field survey.

Ruderal (Disturbed)

Ruderal (disturbed) habitat is present along the banks of NF Duck Creek, along the southern shoulder of Buckman Road, and the parcel of land in the southeast corner of the BSA. This vegetation type is subjected to ongoing or past disturbances (e.g., vehicle use, mowing, herbicide application, etc.). Due to the disturbance regime, assemblages of non-native and introduced weedy species become established. The majority of plant species that occur in ruderal areas are various annual grasses and forbs of Eurasian origin. Some of the common plants observed in the ruderal community within the BSA include Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), yellow star-thistle (*Centaurea solstitialis*), ripgut brome (*Bromus diandrus*), pigweed (*Amaranthus* sp,), long-beaked filaree (*Erodium botrus*), common mallow (*Malva neglecta*), prickly lettuce (*Lactuca serriola*), doveweed (*Croton setigerus*), milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), and bristly ox-tongue (*Helminthotheca echioides*).

Urban (Developed)

Within the study area, urban areas are landscaped with ornamental species, paved, or otherwise developed and generally lack natural vegetation. Habitats associated with urban areas include ruderal grassland and disturbed areas. Urban areas within the study area include Buckman Road and the unpaved agricultural access roads, where sparse patches of doveweed, and smooth cat's ear (*Hypochaeris glabra*) grow along the shoulders.

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SECTION 3
Methodology

3.1 Definition of "Waters of the U.S."

The federal government defines "Waters of the United States" in 33 CFR (Code of Federal Regulations) 328.3 as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of the above waters;
6. The territorial seas;
7. Wetlands adjacent to the above waters (other than waters that are themselves wetlands). Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.
8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the EPA.

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Under normal circumstances, the definition of wetlands requires three wetland identification parameters be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands may include freshwater marsh, seasonal wetlands, and vernal pool complexes that are adjacent to perennial waters of the U.S.

"Other waters of the U.S." refers to those hydric features that are regulated by the CWA but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high water mark. The term "ordinary high water mark" refers to that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. Examples of other waters of the U.S. may include rivers, creeks, ponds, and lakes.

In January 2001, the U.S. Supreme Court issued a decision in the case of the *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* that altered the Corps' regulatory authority over wetlands that are isolated from navigable waters[1]. On June 5, 2007, the EPA and the Corps released guidance on the definitions of jurisdictional waters of the U.S. in response to *Rapanos v. United States* and *Carabell v. United States*. According to this guidance the Corps and the EPA will take jurisdiction over the following waters:

1. Traditional navigable waters, which is defined as all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. Wetlands adjacent to traditional navigable waters; including adjacent wetlands that do not have a continuous surface connection to traditional navigable waters;
3. Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months);
4. Wetlands adjacent to non-navigable tributaries as defined above; that have a continuous surface connection to such tributaries (e.g. they are not separated by uplands, a berm, dike, or similar feature).

[1] Since the SWANCC decision, waters covered solely by this definition by virtue of their use as habitat by migratory birds are no longer considered "waters of the United States." The Supreme Court's opinion did not specifically address what other connections with interstate commerce might support the assertion of CWA jurisdiction over "nonnavigable, isolated, intrastate waters" under this definition, and the Corps is recommending case by case consideration. A factor that may be relevant to this consideration includes, but is not limited to, the following: Jurisdiction of isolated, intrastate, and nonnavigable waters may be possible if their use, degradation, or destruction could affect other "waters of the United States," thus establishing a significant nexus between the water in question and other "waters of the United States" (Corps, undated memorandum).

5. The EPA and the Corps decide jurisdiction over the following waters, based on a fact-specific analysis to determine if there is a significant nexus, as defined below, to a traditional navigable water (TNW):

    a. Non-navigable tributaries that are not relatively permanent;

    b. Wetlands adjacent to non-navigable tributaries that are not relatively permanent;

    c. Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

The EPA and the Corps generally do not assert jurisdiction over the following features:

1. Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow);

2. Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The EPA and the Corps have defined the significant nexus standard as follows:

1. A significant nexus analysis assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters;

2. Significant nexus includes consideration of hydrologic and ecologic factors including:

    a. Volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary,

    b. Proximity to the traditional navigable water,

    c. Size of the watershed,

    d. Average annual rainfall,

    e. Average annual winter snow pack,

    f. Potential of tributaries to carry pollutants and flood waters to traditional navigable waters,

    g. Provision of aquatic habitat that supports a traditional navigable water,

    h. Potential of wetlands to trap and filter pollutants or store flood waters, and

    i. Maintenance of water quality in traditional navigable waters.

In April 2011, the EPA and the Corps released draft guidance to clarify protection of waters under the Clean Water Act and further clarify how they will implement the Supreme Court's decisions on this topic (SWANCC and Rapanos). Because the guidance is still in draft form and has not yet been finalized, it is not a rule, and hence it is not binding and lacks the force of law. Although the

guidance does not have the force of law, it is currently being used by Federal agencies to explain and clarify their understandings of existing requirements. Therefore, this wetland delineation report follows the April 2011 draft guidance. The guidance is focused on protection of streams that flow long distances before reaching traditionally navigable waters, small streams, streams that flow for only part of the year, and many wetlands and ponds that cumulatively affect the health of the nation's navigable waters. The guidance does not extend federal protection to any waters not historically protected under the Clean Water Act and will be fully consistent with the law, including decisions of the Supreme Court. The guidance also maintains all of the existing exemptions for agricultural discharges and waters. The guidance gives specific direction on the jurisdictional status of non-tidal ditches (including roadside and agricultural ditches). According to this guidance the Corps and the EPA will take jurisdiction over the following non-tidal ditches:

- Non-tidal ditches that have a bed, bank, and ordinary high water mark; connect directly or indirectly to a traditional navigable or interstate water; and have one of the following five characteristics:
    - Natural streams that have been altered (e.g. channelized, straightened or relocated);
    - Ditches that have been excavated in waters of the U.S., including wetlands;
    - Ditches that have relatively permanent flowing or standing water;
    - Ditches that connect two or more jurisdictional waters of the U.S.; or
    - Ditches that drain natural water bodies (including wetlands) into the tributary system of a traditional navigable or interstate water.

The scope of waters of the U.S. does not include all waters. EPA and the Corps previously have described in preambles to CWA regulations waters that the agencies generally do not consider to be waters of the U.S. The categories of waters generally not waters of the U.S. include:

- Wet areas that are not tributaries or open waters and do not meet the regulatory definition of wetlands.
- Waterbodies excluded from coverage under the CWA by existing regulations.
- Waters that lack a significant nexus when one is required for jurisdiction.
- Artificially irrigated areas which would revert to upland if the irrigation ceased.
- Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
- Artificial reflecting pools or swimming pools excavated in uplands.
- Small ornamental bodies of water created by excavating and/or diking dry land to retain water primarily for aesthetic reasons.
- Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the

construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the U.S.

- Groundwater drained through subsurface drainage systems.
- Erosional features (gullies and rills), and swales and ditches that are not tributaries or wetlands.

3.2 Pre-field Review

Prior to conducting the field investigation, the following background tasks were conducted:

- Review of USGS 7.5 minute topographic quadrangle for Farmington, CA (USGS 1968);
- Review of color aerial photography for vegetative, topographic, and hydrologic signatures;
- Review of the *Custom Soil Resource Report for San Joaquin County, California* (NRCS, 2018a), for information about soils and geomorphology;
- Review of the National Hydric Soils List for California, San Joaquin County (NRCS, 2018b) to determine if any soils mapped within the study area are considered hydric at the level of soil series;
- Review of the National Wetlands Inventory (USFWS, 2018).

3.3 Field Investigation

A delineation of wetlands and other waters of the U.S. was conducted within the study area by DHA biologist Lindsay Tisch on March 19, 2018. The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps, 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed.

Three positive wetland parameters must normally be present for an area to be wetland: 1) a dominance of wetland vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. Presence or absence of positive indicators for wetland vegetation, soils, and hydrology was assessed per the 1987 Manual and Arid West Supplement guidelines. No wetlands were identified within the study area therefore no data points were collected.

For "other waters of the U.S." to be considered jurisdictional, these features must exhibit a defined bed and bank and an OHWM. Drainages with obvious bed and banks and OHWM were characterized by noting vegetation, geomorphology (e.g., incision) and hydrologic characteristics, and by measuring representative channel bank cross-sections to obtain average bankfull width (i.e., ordinary high water mark). Representative channel cross-section

average bankfull width was recorded in the field and used to map stream channels in GIS, along with high-resolution aerial photographs and detailed topographic data.

Representative photographs were taken throughout the study area, a selection of which is contained in **Appendix B**.

3.4 Mapping and Acreage Calculations

Within the study area, boundaries of potentially jurisdictional waters of the U.S. were recorded in the field on color aerial photo base maps at a scale of 1 inch = 50 feet. Field mapping was digitized onto the aerial base maps using ArcGIS 10.3 software. The acreages of potential jurisdictional features were calculated with ArcGIS, based on the portion of each feature contained within the study area.

SECTION 4.0
Results

4.1 Results

This wetland delineation identified approximately 0.07 acres of potentially jurisdictional features within the study area which consist of other waters of the U.S. Potentially jurisdictional features within the study area include NF Duck Creek. Aquatic communities and habitats were classified using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The locations and extent of jurisdictional features are depicted in **Figure 4-1**, with a summary also provided in **Table 4-1**. Section 4.1.1 (below) describes the other waters of the US in greater detail.

TABLE 4-1
POTENTIALLY JURISDICTIONAL FEATURES WITHIN THE PROJECT STUDY AREA

Map ID	Wetland Type – Cowardin Classification	Average Width of OHWM (feet)	Length (feet)	Acres
Other Waters				
NF Duck Creek	Creek – Riverine Intermittent	16	200	0.07
Total Area of Potentially Jurisdictional Features:		**16**	**200**	**0.07**

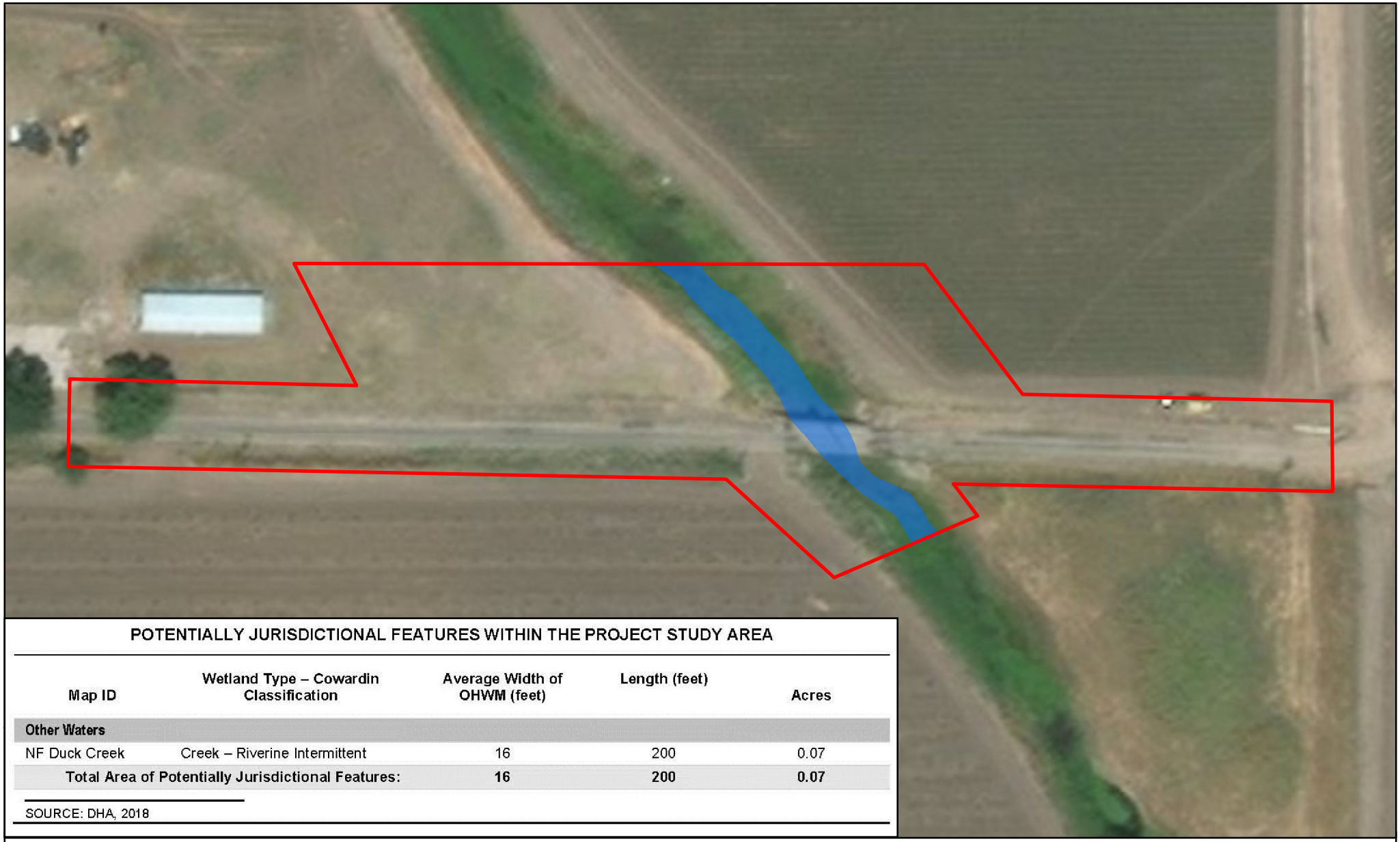
SOURCE: DHA, 2018

4.1.1 Potentially Jurisdictional Waters of the U.S.

NF Duck Creek (*Riverine Intermittent*)

Within the study area, NF Duck Creek is classified as "riverine intermittent" using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et. al, 1979). An intermittent channel has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

NF Duck Creek is mapped as an intermittent stream on the USGS Farmington quad map and based on a review of historical aerial photographs on Google Earth, it appears the creek typically carries water from late fall (October/November) to mid-spring (April/May), however during years of high precipitation the creek has visible pools, and likely a small amount of flow, into June. NF Duck Creek is classified as a palustrine, emergent, persistent, seasonally flooded (PEM1C) feature on the current NWI map (USFWS 2018c). NF Duck Creek is tributary to Duck



POTENTIALLY JURISDICTIONAL FEATURES WITHIN THE PROJECT STUDY AREA

Map ID	Wetland Type – Cowardin Classification	Average Width of OHWM (feet)	Length (feet)	Acres
Other Waters				
NF Duck Creek	Creek – Riverine Intermittent	16	200	0.07
Total Area of Potentially Jurisdictional Features:		**16**	**200**	**0.07**

SOURCE: DHA, 2018

Legend

Project Study Area

Potentially Jurisdictional Waters of the U.S

Riverine - Intermittent

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Potentially Jurisdictional Waters of the U.S

Figure 4-1

Creek and occupies approximately 0.07 acres in the study area with a total length of 200 feet. The average width of the OHWM of NF Duck Creek in the study area is approximately 16 feet. NF Duck Creek had approximately 2 to 4 feet of slow-moving water. The banks are gently sloping and vegetated primarily with non-native invasive species (i.e. Himalayan blackberry and poison hemlock). Concrete blocks of rip-rap line the banks. The bed of NF Duck Creek is sandy silt with patches of hydrophytic vegetation (cattails) growing within the channel.

The OHWM determination was based on scour, wracking, destruction of terrestrial vegetation, and deposition. When water is flowing, it appears that the majority of the creek in the study area consists of a mix of shallow and deep glides and pools. The deepest pools in the creek appear to obtain a maximum depth of approximately four feet during high spring flows.

NF Duck Creek was mapped as a polygon feature based on field data, topographic data, and aerial photos. The total extent was calculated in GIS.

4.1.2 Jurisdictional Analysis

Jurisdictional Features

The Corps and EPA issued guidance related to the Rapanos decision on June 5, 2007. The *Rapanos-Carabell* consolidated decisions addressed several issues, including the question of jurisdiction in relation to waters that are relatively permanent (RPW) or are not relatively permanent (non-RPW). It was concluded that non-RPWs that have a "significant ecological nexus" with a TNW, including non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally; wetlands adjacent to such tributaries; and wetlands adjacent to but that do not directly abut permanent, non-navigable tributary, may be considered waters of the U.S. A significant nexus can be determined to be present if the tributary, in combination with any adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical, and biological integrity of a TNW. Key considerations when evaluating a significant nexus include volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to the TNW, plus hydrologic, ecologic, and other functions related to the tributary and all of its adjacent wetlands.

NF Duck Creek is hydrologically connected to the San Joaquin River, a TNW, by surface water (**Figure 4-2**). In a typical year, NF Duck Creek would have continuous flows seasonally for at least three months; therefore, NF Duck Creek should be considered an RPW that is a non-navigable tributary to a TNW and should be considered as a regulated feature under the CWA.

4.2 Conclusions

A total of 0.07 acres of potentially jurisdictional features occur within the 1.36-acre study area consisting of other waters of the U.S. This report documents the wetland boundary delineation and best professional judgment of DHA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the Corps.

Legend

- Project Study Area
- Direction of Flow
- NF Duck Creek
- Duck Creek
- Walker Slough
- French Camp Slough
- San Joaquin River

0 0.75 1.5 3 Miles

drake haglan AND ASSOCIATES

Source: ESRI Online Basemap, USGS Topo Maps; CDFW 2017; San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Route to Traditional Navigable Waterway

Figure 4-2

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SECTION 5.0
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APPENDIX A
Plant Species Observed within the Study Area

TABLE A-1
VASCULAR FLORA RECORDED FROM THE STUDY AREA

Scientific Name*	Common Name	Wetland Indicator Status
Avena barbata	slender wild oat	NL
Avena fatua	common wild oat	NL
Bromus diandrus	ripgut brome	NL
Centaurea solstitialis	yellow star-thistle	NL
Conium maculatum	poison hemlock	FACW
Croton setigerus	doveweed	NL
Erodium botrys	filaree	FACU
Galium aparine	cleavers	FACU
Geranium molle	geranium	NL
Helminthotheca echioides	bristly ox-tongue	FAC
Hordeum murinum	hare barley	FAC
Hypochaeris glabra	smooth cat's-ear	NL
Lactuca serriola	prickly lettuce	FACU
Pastinaca sativa	wild parsnip	NL
Raphanus raphanistrum	wild radish	NL
Rubus armeniacus	Himalayan blackberry	FAC
Silybum marinum	milk thistle	NL
Typha spp.	cattail	OBL
Vicia sativa	spring vetch	UPL
Xanthium strumarium	rough cocklebur	FAC

NOTES: * National List of Plant Species that Occur in Wetlands: California Region 0 (Lichvar et al,2016).
Plant taxonomy follows the Jepson Manual (Baldwin et al., 2012)

Wetland Indicator Status Notes:

OBL	=	Obligate Wetland; occur almost always (estimated probability >99%) under natural conditions in wetlands.
FACW	=	Facultative Wetland; usually occur in wetlands (estimated probability 67–99%), but occasionally found in non-wetlands.
FAC	=	Facultative; equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%).
FACU	=	Facultative Upland; usually occur in nonwetlands (estimated probability 67–99%), but occasionally found in wetlands.
UPL	=	Obligate Upland; occur almost always (estimated probability >99%) under natural conditions in nonwetlands within this region.
NL	=	Not listed
--	=	Species unidentified in field

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APPENDIX B
Site Photos

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure B-1

Representative photo of upstream NF Duck Creek (Top) and downstream NF Duck Creek (Bottom). Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure B-2

Representative photo of agriculture habitat (Top) and ruderal (disturbed) habitat (Bottom) within the study area.
Photo date: March 19, 2018

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APPENDIX C
NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Joaquin County, California

Buckman Road over NF Duck Creek

June 19, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

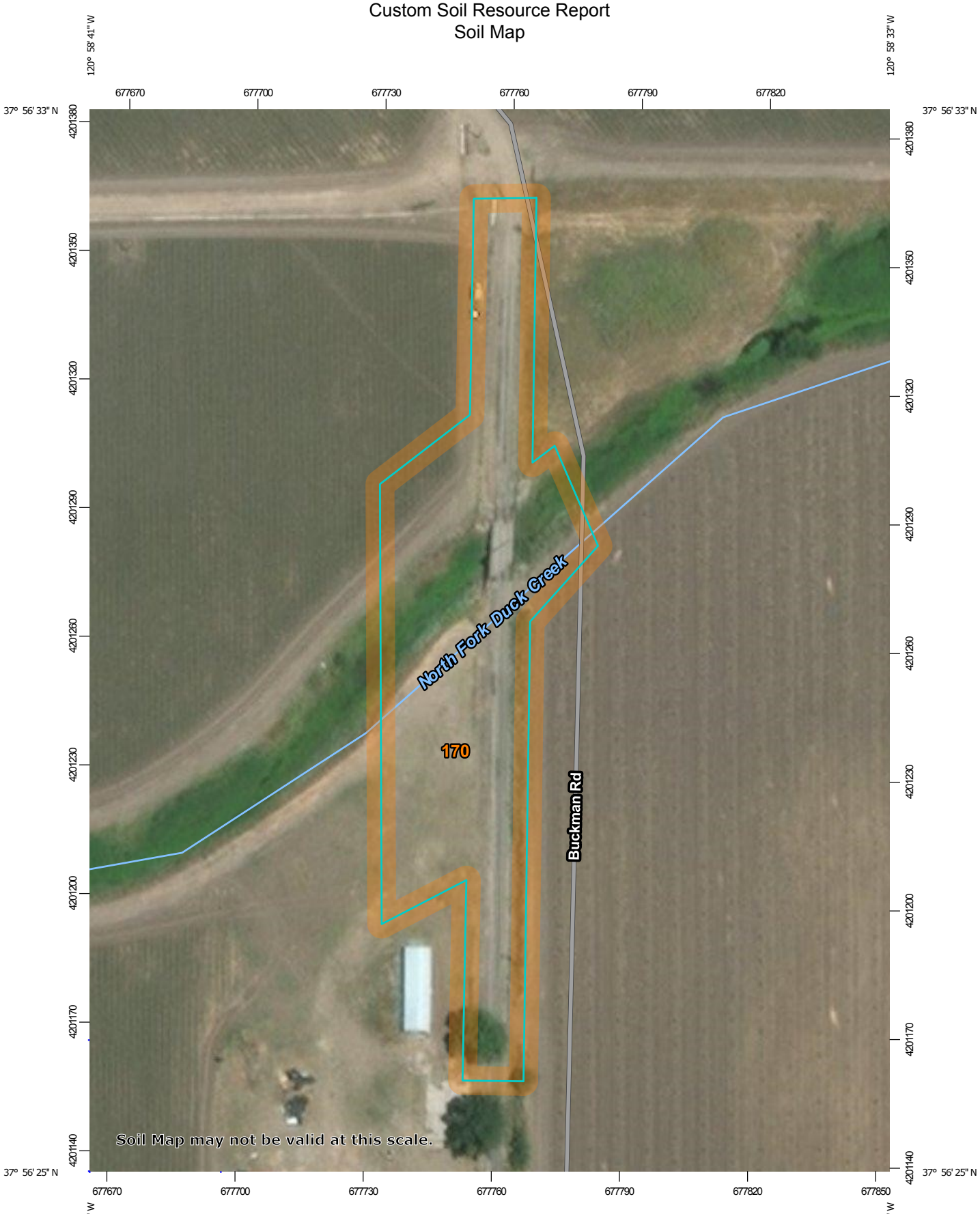
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: San Joaquin County, California
Survey Area Data: Version 11, Oct 6, 2017

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

Date(s) aerial images were photographed: Mar 16, 2016—Oct 3, 2016

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
170	Hicksville loam, 0 to 2 percent slopes, occasionally flooded	1.4	100.0%
Totals for Area of Interest		**1.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Joaquin County, California

170—Hicksville loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: hht7
Elevation: 100 to 140 feet
Mean annual precipitation: 17 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hicksville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hicksville

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed rock sources

Typical profile

A - 0 to 15 inches: loam
Bt - 15 to 36 inches: clay loam
2Bt - 36 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 60 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: LOAMY STREAM TERRACE (R017XE103CA)
Hydric soil rating: No

Minor Components

Yellowlark
Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed, gravelly subsoil
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, clayey textures
Percent of map unit: 3 percent
Hydric soil rating: No

Pentz
Percent of map unit: 2 percent
Hydric soil rating: No

Redding
Percent of map unit: 2 percent
Hydric soil rating: No

Rocklin
Percent of map unit: 2 percent
Hydric soil rating: No

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APPENDIX C:

NATURAL ENVIRONMENT STUDY

Buckman Road Bridge Replacement Project

Natural Environment Study

San Joaquin County, California
Farmington 7.5-Minute Quadrangle,
Township 01N, Range 09E, Section 15
Caltrans District 10
BRLO 5929(241)

January 2020

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Natural Environment Study

STATE OF CALIFORNIA
Department of Transportation
and San Joaquin County

Prepared By: _____ Date: 1/9/2020

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Summary

The San Joaquin County Department of Public Works (County) is proposing to construct a replacement bridge along Buckman Road (Bridge No. 29C-0307) over North Fork (NF) Duck Creek due to the bridge's functionally obsolete status, as determined by the Federal Highway Administration (FHWA) criteria. The proposed Project is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line along Buckman Road approximately 0.8 miles north of State Route (SR) 4 and crosses over NF Duck Creek. The bridge was constructed in 1931 and consists of timber deck planks on timber stringers on Douglas fir caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and post bents on PCC pedestal footings. The abutment foundation is unknown. This segment of Buckman Road is a single-lane local roadway ending approximately 750-feet north of the existing bridge. The road services multiple agricultural field accesses as well as a couple of residences beyond the bridge.

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this Project is being, or has been, carried out by the California Department of Transportation (Caltrans) under its assumption of responsibility pursuant to National Environmental Policy Act (NEPA) Assignment MOU (23 USC 326).

The purpose of the proposed Project is to remove the existing structure, which has been determined to be functionally obsolete, and reconstruct with a bridge that is consistent with appropriate design standards for roadway geometry, accessibility, hydraulics, and structural integrity. This project is needed to maintain safe, long-term access over the creek for the public, surrounding property owners and others accessing farmland.

Project Impact Area

The Project Impact Area (PIA) refers to areas that will be temporarily or permanently impacted by the Project (i.e., construction-related activities). The Biological Study Area (BSA) includes the PIA and a 100-foot radius around the Project limits. The PIA includes all areas affected by demolition of the existing bridge, construction of the new bridge, roadway approach work, and the staging areas. The construction staging area will be located within the existing County right-of-way.

Habitat Impacts

Habitat types and vegetation communities in the BSA include riverine (one intermittent channel), annual grassland, agriculture, and urban (developed) land. The majority of the BSA is comprised of agriculture. A summary of potential impacts (both permanent and temporary) to terrestrial and aquatic habitats is provided in **Table S-1**.

Table S-1. Potential Impacts to Terrestrial and Aquatic Habitats within the BSA

Habitat Type	Acres within BSA	Acres Impacted (Impact Type)	Percent Impacted
Terrestrial			
Agriculture	3.33	0.04 (Permanent) 0.14 (Temporary)	5
Ruderal (Disturbed)	0.98	0.03 (Permanent) 0.01 (Temporary)	4
Urban (Developed)	1.22	0.19 (Permanent) 0.02 (Temporary)	17
Aquatic			
Riverine (NF Duck Creek) - Intermittent	0.16	0.004 (Permanent) 0.07 (Temporary)	47
Total	**5.52**	**0.26 (Permanent) 0.24 (Temporary)**	**73**

Special-Status Species Impacts

There will be no effect to any species on the NOAA Fisheries and USFWS species lists. There is no essential fish habitat or designated critical habitat within the project location, therefore the Project will not adversely modify EFH or critical habitat.

The PIA provides potential habitat for the following state-listed species and species of concern: western spadefoot (*Spea hammondii*), western pond turtle (*Emys marmorata*), tricolored blackbird (*Aeglaius tricolor*), Swainson's hawk (*Buteo swainsonii*), and burrowing owl (*Athene cunicularia*).

Avoidance and minimization measures would be incorporated into the proposed Project to reduce the potential for impacts to hardhead, western spadefoot, western pond turtle, tricolored blackbird, Swainson's hawk, and burrowing owl.

Invasive Species

Several invasive and noxious weed species occur in the PIA. In compliance with Executive Order 13112 (Invasive Species), and subsequent guidance from the FHWA, the landscaping and erosion control measures incorporated into the proposed Project will not use species listed as noxious weeds. Precautions will be taken to prevent the further spread of invasive species.

Wetlands and Other Waters of the U.S.

Features such as wetlands and other waters of the U.S. that may fall under the jurisdictional purview of the U.S. Army Corps of Engineers (Corps) were delineated in the Project area. Aquatic features in the PIA that are considered potentially jurisdictional consist of NF Duck Creek. Based on the preliminary Project design, rock slope protection (RSP) will be installed on the banks of NF Duck Creek and will result in permanent impacts

of approximately 0.004 acres. The Project will temporarily impact approximately 0.07 acres of NF Duck Creek.

Permits, approvals, and concurrences related to biological resource issues will be required from the following agencies:

- U.S. Army Corps of Engineers – Clean Water Act, Section 404, Nationwide Permit #14 (Linear Transportation Projects).
- California Department of Fish and Wildlife – California Endangered Species Act Section 1600-1602 Streambed Alteration Agreement.
- Regional Water Quality Control Board - Clean Water Act, Section 401 Water Quality Certification.

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List of Abbreviated Terms

AASHTO	American Association of State Highway and Transportation Officials
ADT	Average daily traffic
BA	Biological Assessment
BIR	Bridge Inspection Report
BMPs	Best Management Practices
BSA	Biological Study Area
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
County	San Joaquin County Department of Public Works
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
CTS	California tiger salamander
CV	Central Valley
CWA	Clean Water Act
DGL	diameter at ground level
DOT	U.S. Department of Transportation
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FO	Functionally obsolete
GIS	Geographic Information System
GGS	Giant garter snake
GPS	Global Positioning System
HBP	Highway Bridge Program
LCCA	Life Cycle Cost Analysis
MBTA	Migratory Bird Treaty Act
mph	miles per hour

NEPA	National Environmental Policy Act
NES	Natural Environment Study
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
OHWM	ordinary high water mark
PIA	Project Impact Area
Project	Buckman Road Bridge Replacement Project
RSP	rock slope protection
RWQCB	Regional Water Quality Control Board
SJMSCP	San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
SJCOG	San Joaquin Council of Governments
SR	sufficiency rating
SWPPP	Storm Water Pollution Plan
SWRCB	State Water Resources Control Board
TPZ	Tree Protection Zone
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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Chapter 1. Introduction

This Natural Environment Study (NES) report was prepared for the Buckman Road Bridge Replacement Project (Project). The San Joaquin County Department of Public Works (County) is proposing to replace the existing functionally obsolete Buckman Road bridge over North Fork (NF) Duck Creek as well as to realign Buckman Road to eliminate the existing tight curve just north of the existing bridge and facilitate the construction of the replacement bridge.

The County is the lead agency for the Project pursuant to the California Environmental Quality Act (CEQA). Because federal funding is involved, the Project requires review under the National Environmental Policy Act (NEPA). Caltrans is acting as NEPA lead agency pursuant to their NEPA responsibilities delegated under Memorandum of Understanding with the U.S. Department of Transportation (DOT). The Project is located on a local roadway and is being processed through the California Department of Transportation (Caltrans) Local Assistance Program.

1.1. Project History

According to the Caltrans Bridge Inspection Report (BIR) dated November 14, 2012, the existing bridge has a Sufficiency Rating (SR) of 68.4 and is classified as Functionally Obsolete (FO). The FO classification is a result of insufficient deck geometry. In addition, the timber cap at Bent 3 has a check half its length along the neutral axis. The asphalt construction (AC) in the timber deck has cracks along each deck plank. The left wingwall at Abutment 1 has moved laterally. There is a large gap measuring 7 inches at the top of the wall between the abutment and the left wingwall. A cable to help reduce the lateral movement was placed behind abutment #1 and is attached from the left to the right wingwall. The bridge railings have been removed without permission or otherwise damaged by wide agricultural equipment using the narrow bridge.

1.1.1. Purpose and Need

The purpose of the Project is to remove the existing structure, which has been determined to be functionally obsolete, and reconstruct with a bridge that is consistent with appropriate design standards for roadway geometry, accessibility, hydraulics, and structural integrity. This Project is needed to maintain safe, long-term access over the creek for the public, surrounding property owners and others accessing farmland.

1.2. Project Description

The Project is located in the eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line (**Figure 1-1**) along Buckman Road approximately 0.8 miles north of SR 4 and crosses over NF Duck Creek (**Figure 1-2**).

★ Project Location: Buckman Road Bridge

0 3.75 7.5 15 Miles

Source: ESRI Online Basemap, World Street Map, San Joaquin County;
Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Regional Location Map

Figure 1-1

★ Project Location: Buckman Road Bridge

0 187.5 375 750 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Project Location Map

Figure 1-2

The Project is on the Farmington CA USGS 7.5' Quadrangle within Township 1 North, Range 9 East, Section 15.

The replacement bridge will be a single span reinforced concrete bridge. The new bridge will consist of one 10-foot lane and 6-foot shoulders to allow for the agricultural equipment that utilizes the bridge. The total width of the new structure will be 25 feet 6 inches. From the end of the bridge, the County will transition the paved 22-foot clear width to match the existing 18-foot roadway. The southern approach transition will be approximately 236 feet while the northern approach will transition at approximately 220 feet. Pile driving will occur up to 80 feet deep for the bridge footings. Work will also include the construction of approach railing with terminal systems and appropriate approach road work at the ends of the bridge. In addition, rock slope protection will be placed in the channel to prevent future scour on the new structure.

1.2.1. Utility Relocation

Overhead utility lines are present on both sides of the proposed Project. Bridge Engineering will coordinate with utility companies regarding any necessary relocation. If relocation is required, it will be coordinated with the utility companies.

1.2.2. Right-of-Way

The County does not propose to acquire any right-of-way; however, a total of 0.98 acres will act as a temporary construction easement (TCE). The TCE is also from three separate parcels: APN 187-310-09 (west of Buckman Road) is 0.93 acres, APN 187-310-15 (south of North Fork Duck Creek and east of Buckman Road) is 0.027 acres, and APN 187-310-16 (northeast of the Project site) is 0.026 acres.

1.2.3. Construction Access

A temporary low water crossing will be placed west of and adjacent to the existing bridge to allow access for residences and agricultural field entrances. The detour would include placing two 36-inch corrugated metal pipes within NF Duck Creek which will be covered with clean gravel fill to a height above the ordinary high-water mark. Geotextile fabric would be placed over the gravel and earth fill will be placed on the fabric to minimize migration of soil into the creek. The temporary stream diversion system would be removed once the new bridge is constructed. All in-channel work will be limited to the dry season (June-October).

1.2.4. Demolition and Construction Staging

Demolition of the existing bridge will be performed in accordance with the Caltrans Standard Specifications modified to meet environmental permit requirements. Prior to construction, the contractor will be required to prepare and submit for approval a bridge demolition plan, including creek diversions/bypass details, that are in conformance with the agency permits from California Department of Fish and Wildlife (CDFW), U.S. Army

Corps of Engineers (Corps), and the Regional Water Quality Control Board (RWQCB). All concrete and other debris resulting from bridge demolition will be removed from the Project site and disposed of by the contractor. The construction contractor will prepare a bridge demolition plan.

The construction staging area would be located on the southwest side of Buckman Road within a TCE.

1.2.5. Construction Guidelines

Construction will consist of the following activities:

- Installing construction area and detour signs
    - Sufficiently in advance of construction operations, detour signs will be installed identifying the road closure and detour routes. Signs will remain in place throughout the duration of construction.
- Relocating utilities (if required)
    - Existing overhead utilities which conflict with equipment required to install piling will be temporarily relocated. At the completion of construction, overhead utilities will be restored to the current location.
- Clearing and grubbing
    - Remove portions of vegetation in conflict with new construction. The areas around the work site will be cleared of vegetation and existing fencing which conflicts with proposed construction.
- Installing temporary culvert detour
    - The detour would include placing two, 36-inch corrugated metal pipes within NF Duck Creek which will be covered with clean gravel fill to a height above the ordinary high-water mark. Geotextile fabric would be placed over the gravel and earth fill will be placed on the fabric to minimize migration of soil into the creek. The temporary stream diversion system would be removed once the new bridge is constructed. All work within the channel will be contained within the approved area of disturbance. The operational timeline for in-channel work will be defined in the Project permits from the resource agencies.
- Existing bridge, abutment retaining walls, asphalt, etc., identified to be removed will be demolished and properly disposed of offsite. The creek below the bridge will be protected from contamination and all debris generated by the demolition. Heavy equipment will be required to demolish and remove such features. Drainage features will be protected from contamination and all debris generated by the demolition will be removed from the site.
- Constructing the new bridge and approaches.

Table 1-1 provides a description of the type of equipment likely to be used during the construction of the proposed Project.

Table 1-1. Construction Equipment

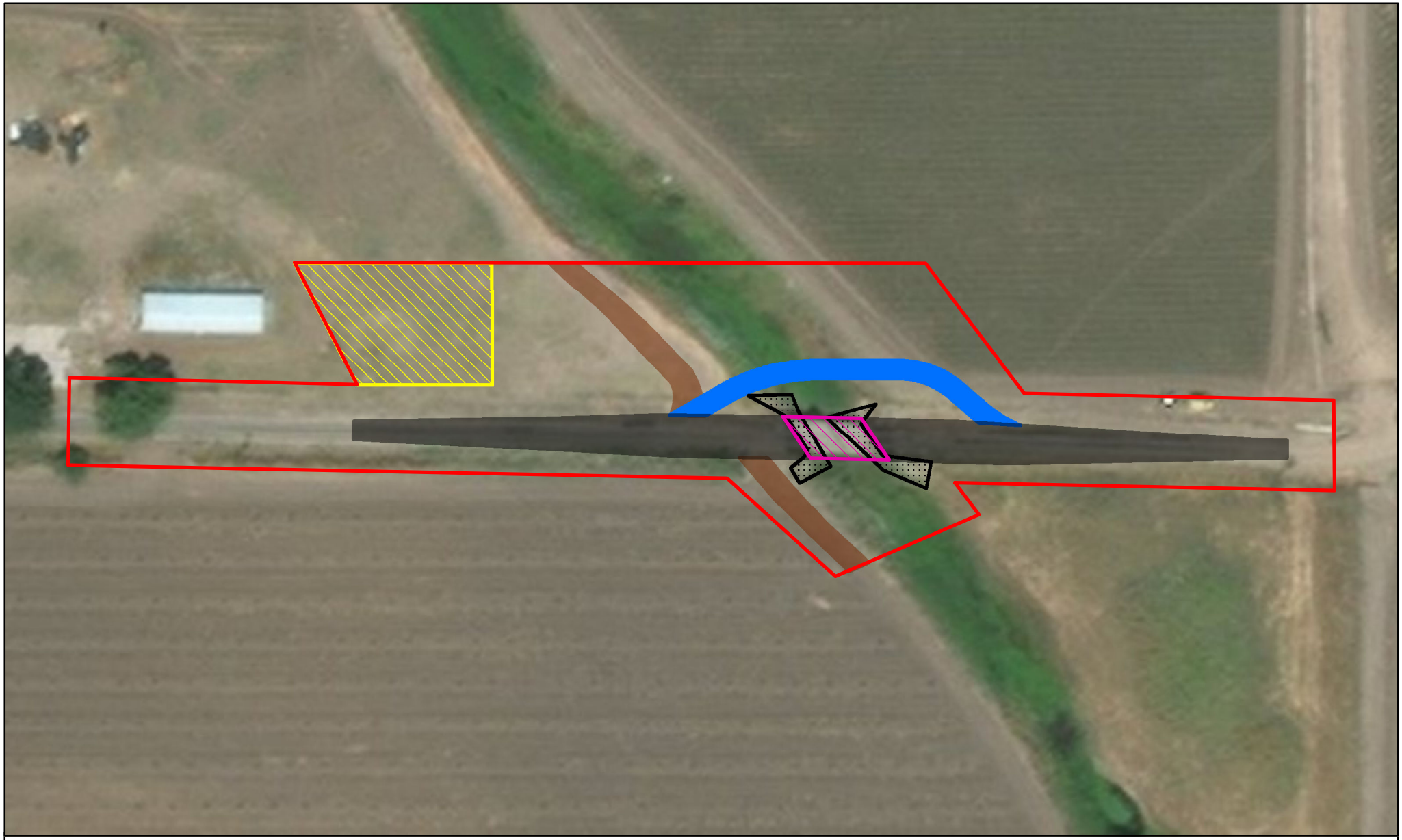
Equipment	Construction Purpose
Hydraulic Hammer	Demolition
Hoe Ram	Demolition
Jack Hammer	Demolition
Water Truck	Earthwork construction + dust control
Bulldozer / Loader	Earthwork construction + clearing and grubbing
Haul Truck	Earthwork construction + clearing and grubbing
Front-End Loader	Dirt or gravel manipulation

1.2.6. Construction Schedule and Timing

Construction of the proposed Project is anticipated to take approximately three months to complete, pending a final construction plan. Construction is anticipated to start in May 2021 and as determined appropriate by the irrigation needs of its customers, as well as by CDFW, and the Central Valley RWQCB. Since NF Duck Creek does not provide suitable habitat for any fish species, the operational timeline for the creek diversion would likely be May 1 to October 1, depending on the regulatory permit mitigation measures.

1.2.7. Project Impact Area (PIA)

The Project Impact Area (PIA) refers to areas that will be temporarily or permanently impacted by the Project (i.e., construction-related activities). The PIA includes all areas affected by demolition of the existing bridge, construction of the new bridge, the widening of roadway approaches, and the staging areas (**Figure 1-3**).



Legend

- Project Impact Area
- Proposed Bridge
- Proposed Roadway
- Proposed RSP
- Temporary Detour Crossing
- Proposed Staging Areas
- Proposed Access Roads

0 30 60 120 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Impact Area and Project Details

Figure 1-3

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Chapter 2. Study Methods

This section describes the methods used in the preparation of this NES report and includes a list of resources reviewed, field survey dates and personnel, and problems and limitations encountered during the study that may influence the conclusions reached in this report.

2.1. Regulatory Requirements

This section summarizes the federal and state regulations that protect special-status species; waters of the U.S. and state including wetlands; and sensitive habitats. This section also discusses pertinent San Joaquin County General Plan goals, ordinances, and policies relating to the protection and preservation of biological resources.

2.1.1. Special-status Species Protection

The following regulations pertain to special-status species or habitats within and adjacent to the BSA.

2.1.1.1. FEDERAL ENDANGERED SPECIES ACT

Under the federal Endangered Species Act (ESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 United States Code [USC] Section 1533[c]). Pursuant to the requirements of the ESA, an agency reviewing a proposed Project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the Project site and determine whether the Project will result in "take" of any such species. In addition, the agency is required to determine whether the Project is likely to jeopardize the continued existence of any species proposed to be listed under the ESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC Section 1536[3], [4]).

Section 7 of the ESA provides a means for authorizing incidental take of federally endangered or threatened species that result from federally conducted, permitted, or funded Projects. Similarly, Section 10 authorizes incidental take of federally endangered or threatened species that result from non-federal Projects.

2.1.1.2. FEDERAL MIGRATORY BIRD TREATY ACT

The federal Migratory Bird Treaty Act (MBTA) (16 USC, Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, bird nests, and eggs. The MBTA is administered by the USFWS and special permits

from the agency are generally required for the take of any migratory birds. This act applies to all persons and agencies in the U.S., including federal agencies.

2.1.1.3. CALIFORNIA ENDANGERED SPECIES ACT

Under the California Endangered Species Act (CESA), CDFW has the responsibility for maintaining a list of threatened and endangered species designated under state law (California Department of Fish and Game Code (CFGC) Section 2070). Pursuant to the requirements of CESA, an agency reviewing a proposed Project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the Project site and determine whether the proposed Project will result in take of any such species. Under CESA, "take" is defined as the action of or attempt to "pursue, hunt, shoot, capture, collect, or kill." The CDFW may authorize the incidental take of a state-listed species under Section 2081 of the CFGC. For species that are listed as threatened or endangered under both the ESA and CESA, and for which an incidental take permit has been issued in accordance with Section 10 of the ESA, CDFW may authorize take after certifying that the incidental take permit is consistent with CESA, pursuant to Section 2080.1 of the CFGC.

2.1.1.4. CALIFORNIA DEPARTMENT OF FISH AND GAME CODE

The CDFW provides protection from take for state-listed and non-listed species. The CFGC defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CFGC Section 2080 prohibits take of a species listed as endangered or threatened under the CESA and CFGC Section 2081 allows CDFW to issue an incidental take permit in accordance with Title 14 California Code of Regulations (CCR) Sections 783.4(a) and (b), and CFGC Section 2081(b). Eggs and nests of all birds are protected from take under CFGC Section 3503. Raptors and raptor nests or eggs are protected from take under CFGC Section 3503.5. Migratory birds are expressly prohibited from take under CFGC Section 3513 and species designated by CDFW as fully protected species are protected from take under CFGC Sections 3511, 4700, 5050, and 5515.

2.1.2. Regulation of Activities in Waters of the U.S. and State

The following federal and state regulations pertain to waters of the U.S., including wetlands, found within and adjacent to the BSA.

2.1.2.1. FEDERAL REGULATION

The U.S. Army Corps of Engineers (Corps) has primary federal responsibility for administering regulations that concern waters of the U.S., including wetlands and drainages. The Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters of the U.S.," and the Clean Water Act (CWA) Section 404, which governs specified activities in waters of the U.S. The Corps requires that a permit be obtained if a Project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill

material into waters of the U.S., including wetlands. The Environmental Protection Agency (EPA), USFWS, and several other agencies provide comment on Corps permit applications.

2.1.2.2. EXECUTIVE ORDER 11990 – PROTECTION OF WETLANDS

Executive Order (E.O.) 11990 established a national policy to avoid adverse impacts on wetlands whenever there is a practicable alternative. The DOT promulgated DOT Order 5660.1A in 1978 to comply with this direction. On federally-funded Projects, impacts to wetlands must be identified and alternatives that avoid wetlands must be considered. If wetland impacts cannot be avoided, then all practicable measures to minimize impacts must be included. This must be documented in a specific Wetlands Only Practicable Alternative Finding.

An additional requirement is to provide early public involvement in Projects affecting wetlands. The Federal Highway Administration (FHWA) provides technical assistance (Technical Advisory 6640.8A) and reviews environmental documents for compliance.

2.1.2.3. STATE REGULATION

The State's authority in regulating activities in waters of the U.S., including wetlands, resides primarily with the State Water Resources Control Board (SWRCB). SWRCB, acting through Regional Water Quality Control Board (RWQCB), must certify that a Corps permit action meets state water quality objectives under Section 401 of the CWA. RWQCB jurisdiction over waters of the state is extended through the Porter-Cologne Act, which defines waters of the state as any surface water or groundwater, including saline waters, within the boundaries of the state (California Water Code Section 13050[e]). In the absence of CWA Section 404 jurisdiction over isolated waters or other waters of the state, California retains authority to regulate discharges of wastes into any waters of the state. The Porter-Cologne Act provides a comprehensive framework to protect water quality in California. It requires any entity that plans to discharge waste where it might adversely affect waters of the state to first notify the RWQCB, which may impose requirements to protect water quality.

Under the CFGC Sections 1600–1607, CDFW may develop mitigation measures and enter into Streambed Alteration Agreements with applicants who propose projects that would obstruct the flow of, or alter the bed, channel, or bank of, a river, stream, or lake in which there is a fish or wildlife resource, including seasonal drainages.

2.1.3. California Public Resources Code 21083.4: Impacts to Oak Woodlands

Counties are required to evaluate impacts to oak woodlands as part of the environmental analysis conducted in compliance with CEQA. If a county determines that there may be a significant effect to oak woodlands, the county shall require one or more of the following

oak woodlands mitigation alternatives to mitigate the significant effect of the conversion of oak woodlands:

1. Conserve oak woodlands, through the use of conservation easements.

2. (A) Plant an appropriate number of trees, including maintaining plantings and replacing dead or diseased trees.

   (B) The requirement to maintain trees pursuant to this paragraph terminates seven years after the trees are planted.

   (C) Mitigation pursuant to this paragraph shall not fulfill more than one-half of the mitigation requirement for the project.

   (D) The requirements imposed pursuant to this paragraph also may be used to restore former oak woodlands.

3. Contribute funds to the Oak Woodlands Conservation Fund, as established under subdivision (a) of Section 1363 of the CFGC, for the purpose of purchasing oak woodlands conservation easements, as specified under paragraph (1) of subdivision (d) of that section and the guidelines and criteria of the Wildlife Conservation Board. A project applicant that contributes funds under this paragraph shall not receive a grant from the Oak Woodlands Conservation Fund as part of the mitigation for the Project.

2.1.4. Executive Order 13112 – Invasive Species

E.O. 13112 requires federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999, directs the use of the state’s invasive species list, maintained by the California Invasive Species Council to define the invasive plants that must be considered as part of NEPA analysis for a proposed project.

Under the E.O., federal agencies cannot authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless all reasonable measures to minimize risk of harm have been analyzed and considered.

2.1.5. Local Plans and Policies

The following local planning documents contain plans and policies applicable to biological resources in the BSA.

2.1.5.1. SAN JOAQUIN COUNTY GENERAL PLAN POLICY DOCUMENT

The following goals and policies from the 2035 County Wide General Plan are relevant to biological resources. These policies guide the location, design, and quality of development to protect biological resources such as wildlife habitat, open space corridors, and ecosystems. The unincorporated lands of the County fall under the jurisdiction of the County.

2.1.5.2. SAN JOAQUIN COUNTY MULTI-SPECIES HABITAT CONSERVATION AND OPEN SPACE PLAN

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) was developed by the San Joaquin Council of Governments (SJCOG) and adopted by the County and the County's cities in 2000 to offset biological impacts created by projects within the County. The SJMSCP covers all of the County except for Federally-owned land such as Lawrence Livermore National Laboratory's 'Site 300' south of Tracy. The stated purpose of the SJMSCP is to provide a strategy for balancing a need to conserve open space with a need to convert open space to other uses, while protecting the area's agricultural economy, preserving landowner rights, accommodating a growing population, and providing for long-term management of special status species. One of the primary goals of the SJMSCP is to obtain permits from state and federal agencies that would cover projects over a period of 50 years. To this end, the USFWS and CDFW have issued incidental take permits in conformance with FESA and CESA. Activities impacting anadromous fish and waters of the U.S. are subject to NOAA Fisheries and the Corps regulations, respectively, and are not covered under the SJMSCP. These activities must be permitted directly through NOAA Fisheries and the Corps. Generally, the direct take of species is not covered under the SJMSCP; only take of suitable habitat is allowed based on appropriate compensation and implementation of avoidance and minimization measures. Additionally, some special status species are not covered under the SJMSCP and impacts to these species require direct permitting through the appropriate agency.

2.2. Studies Required

Prior to conducting the field survey, a list of special-status plants and wildlife known to potentially occur within the vicinity of the Project was reviewed. Sources consulted in preparation of the list of special-status species included the California Natural Diversity Database (CNDDB) (CDFW, 2018), a USFWS list of potentially affected federally threatened and endangered species (USFWS, 2018a), and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants (CNPS, 2018) (**Appendix A**). In addition, the USFWS Critical Habitat Mapper (USFWS, 2018b) and the National Wetland Inventory Wetlands Mapper (USFWS, 2018c) were reviewed. The list was then used to focus the botanical and wildlife field investigations on the targeted species and the habitats known to support these species.

Following a review of the resources listed above, it was determined that field surveys were required to assess the BSA for sensitive biological resources including plants and wildlife.

2.2.1. Biological Study Area

The BSA includes all areas that could potentially be impacted by the Project and a buffer to accommodate any changes to Project limits and design that may occur during Project development. For the purposes of this NES report, the BSA includes the Project site where ground disturbance will occur and the surrounding 100-foot buffer.

2.2.2. Survey Methods

Field reconnaissance was conducted by walking the entire BSA where accessible. The primary focus of the survey was to evaluate the potential for regionally-occurring sensitive habitats (including potentially jurisdictional waters of the U.S.) and special-status species to occur within the PIA and surrounding BSA. Plant communities and habitats were recorded onto a rectified aerial photograph, and plant species were identified and recorded. These habitat features (including potentially jurisdictional waters of the U.S.) were digitized with geographic information system (GIS) software (Arc Map 10.3) to provide digital habitat data for quantitative analysis. Additionally, a delineation of wetlands and waters of the U.S. was performed for the PIA and areas accessible outside of the PIA and within the BSA and is included in **Appendix B**.

Potentially jurisdictional wetlands and other waters of the U.S. were delineated in the PIA and surrounding BSA according to methods outlined in the *Corps of Engineers Wetland Delineation Manual* (Corps, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0*) (Corps, 2008). Corps regulations were used to determine the presence of jurisdictional waters of the U.S. other than wetlands. The entire study area was assessed in such a manner as to view all areas to the degree necessary to determine the presence or absence of jurisdictional features. Plant nomenclature follows The Jepson Manual: Vascular Plants of California (Second Edition) (Baldwin et al., 2012). The *Arid West 2014 Regional Wetland Plant List* (Lichvar, 2014) was used to determine the wetland indicator status of observed plants.

Within the BSA, boundaries of other “waters of the U.S.” were recorded in the field on color aerial photo base maps at a scale of 1 inch = 400 feet. Field mapping was digitized onto the aerial base maps using ArcGIS 10.1 software. The linear feet and areas of potential jurisdictional features were calculated with ArcGIS, based on the portion of each feature contained within the BSA.

NF Duck Creek was also assessed for its potential to support aquatic and semi-aquatic species including CV steelhead (*Oncorhynchus mykiss*), California tiger salamander (CTS; *Ambystoma californiense*), giant garter snake (GGS, *Thamnophis gigas*), and western pond turtle (*Emys marmorata*). During the stream assessment, the biologists documented stream

characteristics including: substrate composition, channel geomorphology, aquatic vegetation, emergent vegetation, riparian canopy and understory vegetation.

2.3. Personnel and Survey Dates

DHA fisheries and wildlife biologist, Lindsay Tisch, conducted a focused biological survey, botanical survey, CTS habitat assessment, and fieldwork for the wetland delineation on March 19, 2018.

Lindsay Tisch is a fisheries and wildlife biologist with particular experience in conducting habitat assessments for threatened and sensitive species including Swainson's hawk, burrowing owl, CTS, California red-legged frog, western spadefoot, western pond turtle, GGS, and valley elderberry longhorn beetle. In addition to electro shocking, she is knowledgeable in setting hoop nets and PIT tagging fish. She has 10 years of professional experience working with a variety of flora and fauna species throughout California and an additional seven years working throughout the northeastern U.S and British Columbia.

Table 2-1 below summarizes personnel qualifications and the dates that surveys were performed.

Table 2-1. Biological Surveys Conducted for the Project

Survey Dates	Type of Survey	Personnel		
		Name	Education	Years' Experience
March 19, 2018	Wildlife survey, vegetation survey, CTS habitat assessment, mapping of waters and wetlands of the U.S. and state	Lindsay Tisch	B.S., Fisheries and Wildlife Management	17

2.4. Agency Coordination and Professional Contacts

2.4.1. U.S. Fish and Wildlife Service

An online list of threatened and endangered species that may occur in the proposed Project location and/or may be affected by the proposed Project was obtained from the USFWS website and is included in **Appendix A**.

Caltrans Biologist (David Moore) and USFWS Senior Biologist (Timothy Ludwick) discussed, via telephone, the determination of GGS habitat presence in the BSA, on November 19, 2019. An email obtained by Caltrans from USFWS states that the Service does not believe this area harbors appropriate habitat for GGS, dated 12/9/2019. See **Appendix B**.

2.4.2. NOAA Fisheries

An online list of ESA fish species that may occur within the Farmington CA USGS 7.5' Quadrangle was obtained from the NOAA Fisheries website. This list is included in Appendix A.

2.4.3. California Department of Fish and Wildlife

An online list of federal and state listed threatened and endangered species, as well as state species of concern, that may occur in the proposed Project location and/or may be affected by the proposed Project was obtained from CDFW's CNDDB website and is included in Appendix A.

2.5. Limitations that May Influence Results

No problems or limitations were encountered that may have influenced the results.

Chapter 3. Results: Environmental Setting

This section describes the region in which the proposed Project is located as well as the specific biological conditions with the BSA. The region's topography, soils, vegetation, watercourses, and level of human or natural disturbance are discussed.

3.1. Description of the Existing Biological and Physical Conditions

3.1.1. Biological Study Area

A BSA comprised of a 100-foot radius around the PIA was determined sufficient after considering the environmental setting and special-status species potentially occurring in the vicinity of the BSA (**Figure 3-1**). The BSA is located in an area dominated by agriculture.

3.1.2. Physical Conditions

The BSA is located in the Central Valley, an area characterized by vast agricultural regions and dotted with numerous population centers, including the small community of Farmington, the closest unincorporated community approximately 1.5 miles southwest of the BSA. Topography is generally flat. The BSA is at an elevation of approximately 122 feet above sea level. NF Duck Creek is the primary aquatic feature within the BSA.

The BSA is located on the Farmington CA USGS 7.5' Quadrangle (T1N, R9E, Section 15) and is in the Rock Creek-French Camp Slough Hydrologic Unit (hydrologic unit code 18040051). The entire BSA drains to NF Duck Creek which flows in a northeast to southwest direction before draining into Walker Slough, a tributary to French Camp Slough. French Camp Slough then drains into the San Joaquin River. Soils in the BSA consist of Hicksville loam, 0 to 2 percent slopes, occasionally flooded, and Hollenbeck silty clay, 0 to 2 percent slopes. These soil units are listed as hydric or as having hydric inclusions (**Figure 3-2**; NRCS 2016). More detailed soil information is in the Preliminary Wetland Delineation Report in **Appendix C**.

3.1.3. Biological Conditions in the Biological Study Area

Wildlife habitats are generally described in terms of dominant plant species and plant communities along with landform, disturbance regime, and other unique environmental characteristics. The wildlife habitats described in this section are based on the CDFW's A Guide to Wildlife Habitats (Mayer and Laudenslayer, 1988) that is used in CDFW's California Wildlife Habitat Relationships System.

Legend

Project Impact Area

Biological Study Area

0 45 90 180 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Impact Area and Biological Study Area

Figure 3-1

Legend

Biological Study Area

Soil Map Units

170: Hicksville loam, 0 to 2 percent slopes, occasionally flooded

173: Hollenbeck silty clay, 0 to 2 percent slopes

0 37.5 75 150 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Soil Map Units

Figure 3-2

Within CDFW's current vegetation classification system, vegetation alliances are the scientifically derived hierarchical class that corresponds best with plant communities and are designed to be the unit for conservation of rare or threatened plant communities (Sawyer et al., 2009). Vegetation alliances typically represent a much finer scale of vegetation description than wildlife habitats but correspond appropriately with one or several wildlife habitat types. CDFW provides crosswalks to help correlate vegetation alliances with wildlife habitats and the descriptions below make use of the crosswalk. A description of each habitat type is presented below. Related vegetation alliances are listed following the wildlife habitat description and are based on the alliance descriptions presented by Sawyer et al. (2009).

Terrestrial habitat types in the BSA include agriculture, annual grassland, and urban (developed). Aquatic habitat types in the BSA include riverine (intermittent drainages). Terrestrial and aquatic habitat types are discussed below. A habitat map of the BSA is included in **Figure 3-3** and a summary of habitat types within the BSA is shown in **Table 3-1**. Photographs of the BSA are provided in **Appendix D** and a list of plant and wildlife species observed during the field surveys conducted is included in **Appendix E**.

Table 3-1. Habitat Types within the BSA

Habitat Type	Acres within BSA	Percent Composition of BSA
Upland Communities		
Agriculture	3.33	59
Ruderal (Disturbed)	0.98	17
Urban (Developed)	1.22	21
Aquatic Communities		
Riverine (NF Duck Creek) - Intermittent	0.16	3
Total	**5.69**	**100%**

3.1.3.1. AGRICULTURE

Agricultural fields are present in the southern portion of the BSA and appeared to have been recently disked. Agricultural fields, such as hay fields and row crops, have high foraging habitat value for wildlife species. Red-tailed hawks (*Buteo jamaicensis*) and Swainson's hawks (*Buteo swainsonii*) were observed flying over the agricultural fields within and adjacent to the BSA during the March 2018 field survey.

3.1.3.2. RUDERAL (DISTURBED)

Ruderal (disturbed) habitat is present along the banks of NF Duck Creek, along the southern shoulder of Buckman Road, and the parcel of land in the southeast corner of the BSA. This vegetation type is subjected to ongoing or past disturbances (e.g., vehicle use, mowing, herbicide application, etc.). Due to the disturbance regime, assemblages of non-native and introduced weedy species become established. The majority of plant

Legend

Biological Study Area

Habitat Type

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

0 37.5 75 150 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Habitat Types within the Biological Study Area

Figure 3-3

species that occur in ruderal areas are various annual grasses and forbs of Eurasian origin. Some of the common plants observed in the ruderal community within the BSA include Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), ripgut brome (*Bromus diandrus*), pigweed (*Amaranthus* sp,), yellow star-thistle (*Centaurea solstitialis*), long-beaked filaree (*Erodium botrus*), common mallow (*Malva neglecta*), prickly lettuce (*Lactuca serriola*), doveweed (*Croton setigerus*), milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), and bristly ox-tongue (*Helminthotheca echioides*).

Species observed in these habitats during the site visit included house sparrow (*Passer domesticus*), brown-headed cowbird (*Molothrus ater*), American robin (*Turdus migratorius*), white-crowned sparrow (*Zonotrichia leucophrys*), and northern mockingbird (*Mimus polyglottos*).

3.1.3.3. URBAN (DEVELOPED)

Within the BSA, urban areas are landscaped with ornamental species, paved, or otherwise developed and generally lack natural vegetation. Habitats associated with urban areas include ruderal grassland and disturbed areas. Urban areas within the BSA include Buckman Road and the unpaved agricultural access roads, where sparse patches of doveweed and smooth cat's ear (*Hypochaeris glabra*) grow along the shoulders. Urban environments generally provide limited habitat for common wildlife species such as rock pigeon, house sparrow, American crow (*Corvus brachyrhynchos*), house mouse (*Mus musculus*), and opossum (*Didelphis virginiana*).

3.1.3.4. RIVERINE (NF DUCK CREEK)

Riverine habitats are distinguished by intermittent or continually running water, and occur in association with a variety of terrestrial habitats. Within the BSA, NF Duck Creek comprises the riverine habitat. Riverine habitat provides water and a migration corridor for a variety of amphibians, reptiles, and fish species.

NF Duck Creek has a well-defined bed and bank. The slopes of the banks were gentle and low and were primarily vegetated with poison hemlock and Himalayan blackberry. Substrate within NF Duck Creek consisted primarily of vegetated sandy silt. NF Duck Creek had approximately 2 to 4 feet of slow-moving water at the time of the survey with large patches of cattail (*Typha* spp.) growing within the channel. Red-winged blackbirds (*Agelaius phoeniceus*) were observed perching on the cattails within the channel.

3.1.4. Movement Corridors

Wildlife movement corridors link areas of suitable wildlife habitat that may otherwise be separated by rugged terrain, changes in vegetation, and/or areas of human disturbance or urban development. Topography and other natural factors, in combination with urbanization,

can fragment or separate large open-space areas. The fragmentation of natural habitat creates isolated “islands” of habitat that may not provide sufficient area to accommodate sustainable populations and can adversely impact genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange between separate populations.

NF Duck Creek provides a movement corridor for areas between the Bay-Delta region and the Sierra Nevada foothills. The creek allows aquatic and terrestrial wildlife species to safely disperse back and forth between suitable habitats to the east and west of the BSA. Highways and roads can present an impassable barrier to many wildlife species and are hazardous for wildlife to cross. Relatively unimpeded waterways such as NF Duck Creek provide important movement corridors, which allow dispersal and subsequent gene flow between wildlife populations separated by roads and populated areas. The proposed Project would not remove, degrade, or otherwise interfere substantially with the structure or function of these wildlife movement corridors, though some temporary disruption of wildlife movement would occur during the construction period.

3.1.5. Invasive Species

Plant species observed in the BSA were compared to the invasive plant list maintained by the California Invasive Plant Council (Cal-IPC) (Cal-IPC 2016) and the list of noxious weeds maintained by the California Department of Food and Agriculture (CDFA) (CDFA 2015). Several invasive and noxious weed species occur in the BSA. CDFA List “A” species are subject to state enforced action involving eradication, quarantine, regulation, containment, rejection, or other holding action. CDFA List “B” species warrant eradication, containment, control, or other holding action at the discretion of the commissioner. CDFA List “C” species warrant state endorsed holding action and eradication only when found in a nursery, actions to retard spread outside of nurseries at the discretion of the commissioner, and rejection only when found in a crop seed for planting or at the discretion of the commissioner. In addition, the Cal-IPC categorizes plants as “High”, “Moderate”, or “Limited”, reflecting the level of each species' negative ecological impact in California. Each plant on the list received an overall rating based on the following evaluation criteria:

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent

upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Poison-hemlock (*Conium maculatum*)

Poison-hemlock has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. Poison-hemlock has spread throughout California in areas below 5,000 feet elevation, excluding the Great Basin and Desert provinces, and is commonly found in dense patches along roadsides and fields. It also thrives in meadows and pastures and is occasionally found in riparian forests and flood plains, but prefers disturbed areas. All parts of poison-hemlock are toxic to humans and animals when ingested; handling plants can cause contact dermatitis in some people. Poison-hemlock can spread quickly after the rainy season in areas that have been cleared or disturbed. Once established, it is highly competitive and prevents establishment of native plants by over-shading. Poison-hemlock occurs along the banks of NF Duck Creek and within a parcel of land in the southeast corner of the BSA.

Yellow star-thistle (*Centaurea solstitialis*)

Yellow star-thistle has a rating of "high" on the Cal-IPC Invasive Plant Inventory (2018) and it is on the CDFA (2015) Category "C" list. Yellow star-thistle is a bushy winter annual (family Asteraceae) that invades 12 million acres in California. Yellow star-thistle inhabits open hills, grasslands, open woodlands, fields, roadsides, and rangelands; and it is considered one of the most serious rangeland weeds in the state. It propagates rapidly by seed, and a large plant can produce nearly 75,000 seeds. Several insects from the Mediterranean region, including weevils and flies, have been employed as biocontrol agents for yellow star-thistle with minor success. Yellow star-thistle occurs along Buckman Road within the ruderal (disturbed) habitat.

Milk thistle (*Silybum marianum*)

Milk thistle has a rating of "limited" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. Milk thistle is a winter annual or biennial with prickly leaves (family Asteraceae). It is widely spread throughout California in overgrazed pastures and along fence lines and other disturbed areas. Milk thistle produces tall, dense stands that outcompete native species. Milk thistle is found throughout the ruderal (disturbed) areas in the BSA.

Ripgut brome (*Bromus diandrus*)

Ripgut brome has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is an exotic, invasive species

found throughout California, interfering with the establishment and survival of native vegetation. Ripgut brome is found throughout the ruderal (disturbed) areas in the BSA.

Wild oat (*Avena fatua*)

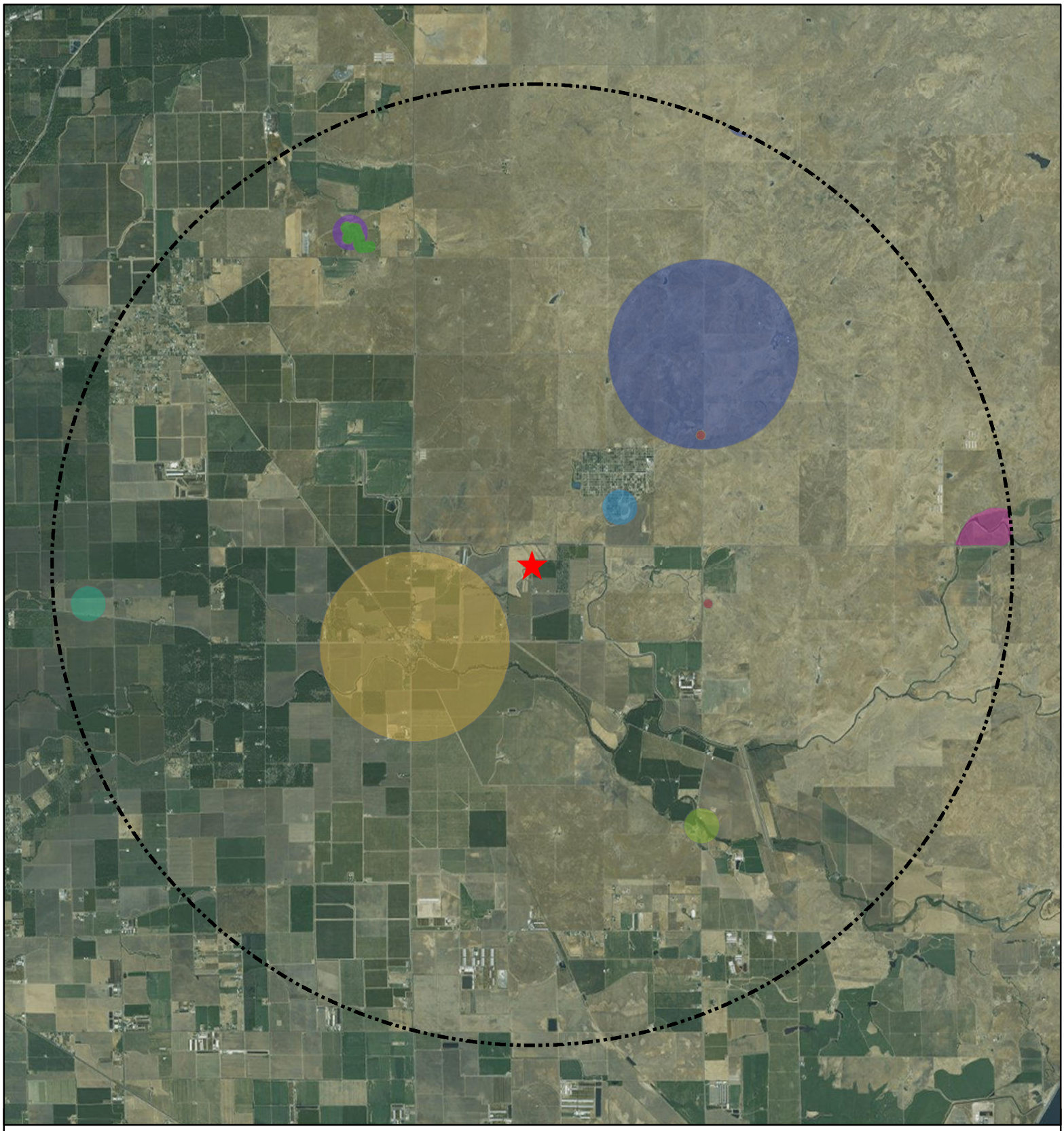
Wild oat has a rating of "moderate" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is a winter annual grass that is a common agricultural weed. It occurs in most grassland areas in California, particularly in poor soils and along road edges. Wild oat has taken over grassland areas and displaced native grasses throughout much of California. Wild oat is found throughout the ruderal (disturbed) areas in the BSA.

Himalayan blackberry (*Rubus armeniacus*)

Himalayan blackberry has a rating of "high" on the Cal-IPC Invasive Plant Inventory (2018) but is not listed on the CDFA (2015) noxious weed list. It is an exotic, invasive species found in wetland-riparian areas along the Coast Ranges, Central Valley, and Sierra Nevada where it rapidly outcompetes and displaces native plant species. Himalayan blackberry forms dense thickets that severely limit light availability for other understory plants. This species also commonly occurs in disturbed areas and roadsides up to 1,600 meters (5,249 feet) in elevation (Cal-IPC, 2018). Himalayan blackberry dominates the banks of NF Duck Creek.

3.2. Regional Species and Habitats of Concern

Data received from USFWS, CNDDB and CNPS records were used to compile a table of regional species and habitats of concern (**Table 3-2** and **Table 3-3**). Table 3-2 provides a general habitat description for each plant species and a rationale as to why regional species and habitats of concern are either potentially present or absent from the BSA. Table 3-3 provides the same information for the wildlife species. A CNDDB five-mile radius map was prepared to illustrate the location of special-status species recorded within five miles of the BSA (see **Figure 3-4**).



Legend

Project Location: Buckman Road Bridge

5-Mile Buffer

Special-Status Species Occurrences

- California tiger salamander
- Greene's tuctoria
- Swainson's hawk
- burrowing owl
- giant gartersnake
- pallid bat
- tricolored blackbird
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- western spadefoot

0 0.375 0.75 1.5 Miles

Source: ESRI Online Basemap, World Imagery Map; CDFW 2017
San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

CNDDB 5-Mile Radius Map

Figure 3-4

Table 3-2. Special-status Plant Species with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1] Federal/State /CNPS	Lifeform	Distribution	Habitat Association	Identification Period	Habitat Present/ Absent[2]	Rationale[3]
Tuolumne button-celery *Eryngium pinnatisectum*	--/--/1B.2	Annual / perennial herb	Amador, Calaveras, Sacramento, Sonoma, and Tuolumne counties	Mesic vernal pools in cismontane woodland and lower montane coniferous forest 231 – 3,020 feet	May - August	A	No suitable habitat present in the BSA (i.e., no vernal pools)
Delta button-celery *Eryngium racemosum*	--/SE/1B.1	Annual / perennial herb	Calaveras, Contra Costa, Merced, San Joaquin[4], and Stanislaus counties	Vernally mesic clay depressions in riparian scrub 9 – 990 feet	June - October	A	No suitable habitat present in the BSA (i.e., no vernal pools)
Ahart's dwarf rush *Juncus leiospermus* var. *ahartii*	--/--/1B.2	Annual herb	Butte, Calaveras, Placer, Sacramento, Tehama, and Yuba county	Mesic valley and foothill grasslands 99 – 756 feet	March – May	A	No suitable habitat present in the BSA (i.e., no pools within the grassland areas)
Legenere *Legenere limosa*	--/--/1B.1	Annual herb	Alameda, Lake, Monterey, Napa, Placer, Sacramento Santa Clara, Shasta, San Joaquin, San Mateo, Solano, Sonoma, Stanislaus[4], Tehama, and Yuba counties	Vernal pools 3 – 2,904 feet	April - June	A	No suitable habitat present in the BSA (i.e., no vernal pools)
Pincushion navarretia *Navarretia myersii*	--/--/1B.1	Annual herb	Amador, Calaveras, Merced, Placer, and Sacramento counties	Vernal pools with acidic soils 66 – 1,089 feet	April - May	A	No suitable habitat present in the BSA (i.e., no vernal pools)
Colusa grass *Neostapfia colusana*	FT/SE/1B.1	Annual herb	Colusa[4], Glenn, Merced, Solano Stanislaus, and Yolo counties	Large adobe vernal pools 17 – 660 feet	May – August	A	No suitable habitat present in the BSA (i.e., no vernal pools)

Table 3-2. Special-status Plant Species with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1] Federal/State /CNPS	Lifeform	Distribution	Habitat Association	Identification Period	Habitat Present/ Absent[2]	Rationale[3]
Greene's tuctoria *Tuctoria greenei*	FE/SR/1B.1	Annual herb	Butte, Colusa, Fresno[4], Glenn, Madera[4], Merced, Modoc, Shasta, San Joaquin[4], Stanislaus[4], Tehama, Tulare[4] counties	Vernal pools 990 – 3,531 feet	May – September	A	No suitable habitat present in the BSA (i.e., no vernal pools)

[1]Status explanations:

-- = no listing.

Federal

FE = listed as endangered under the federal Endangered Species Act.
FT = listed as threatened under the federal Endangered Species Act.

State

SE = listed as endangered under the California Endangered Species Act.
SR = listed as rare under the California Endangered Species Act.
ST = listed as threatened under the California Endangered Species Act.

California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2B = List 2B species: rare, threatened, or endangered in California but more common elsewhere.
0.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 = Moderately threatened in California (20%-80% occurrences threatened/moderate degree and immediacy of threat)
0.3 = Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

[2]A = absent; HP = habitat present

[3] Rationale includes an effects determination under the FESA for all federally listed species.

[4] Presumed extirpated

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Invertebrates							
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	--	Occurs only in the central valley of California below 1,500 foot elevations.	Prefers to lay eggs in elderberry shrubs 2-8 inches in diameter; can also use smaller elderberry shrubs as food source.	Year-round for host plant and exit holes; March – June for adults	A	No elderberry shrubs are present within the BSA.
Conservancy fairy shrimp *Branchinecta conservatio*	E	--	Central valley and southern coast ranges.	Vernal pools and seasonal wetlands.	January – April	A	No suitable habitat (vernal pool) is present in the BSA.
Vernal pool fairy shrimp *Branchinecta lynchi*	T	--	Central valley, central coast ranges, and south coast ranges.	Vernal pools and seasonal wetlands.	January – April	A	No suitable habitat (vernal pool) is present in the BSA.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	--	Shasta County south to Merced County.	Vernal pools, seasonal wetlands, and ephemeral stock ponds.	January – April	A	No suitable habitat (vernal pool) is present in the BSA.
Fish							
Delta smelt *Hypomesus transpacificus*	T	E	Sacramento River–San Joaquin River Delta.	Euryhaline (fresh/brackish water) estuary channels. Spawning habitats consist of side channels and sloughs in the middle reaches of the Delta.	Year-round	A	The BSA is outside the known range of this species.

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Hardhead *Mylopharodon conocephalus*	--	SSC	Streams at low to mid elevations in the Sacramento-San Joaquin and Russian River drainages.	Found in clear deep pools with sand/gravel/boulder bottoms and slow water velocity.	Year-round	A	No suitable habitat is present within the BSA. NF Duck Creek has a heavily vegetated channel.
Central Valley Steelhead (Distinct Population Segment) *Oncorhynchus mykiss*	T	–	The Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo Bays and their tributaries, and coastal marine waters off California.	Central Valley rivers and streams.	Year-round	A	No suitable habitat is present within the BSA.
Amphibians							
California tiger salamander *Ambystoma californiense*	FT	ST	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet above sea level and coastal region from Butte County to northeastern San Luis Obispo County.	Valley floor grasslands or low foothill elevations where lowland aquatic sites like large vernal pools, playa pools, sag ponds, and stock ponds are available for breeding. Upland habitat consists of small mammal burrows within approximately 1.2 miles of breeding habitat.	October – May (depending on rainfall and temperature)	A	No suitable habitat is present within the BSA. There are no annual grasslands, vernal pools, or evidence of burrowing mammals.

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
California red-legged frog *Rana draytonii*	T	SSC	Along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Found in permanent and semi-permanent aquatic habitats, such as creeks and ponds, with emergent and submergent vegetation. May aestivate in rodent burrows or cracks during dry periods.	Year round	A	No suitable habitat present within the BSA; presumed extirpated from much of the floor of the Central (especially San Joaquin) Valley.
Western spadefoot *Spea hammondii*	--	SSC	Originally found over most of California below 6,000 feet, west of the deserts and the Sierra-Cascade crest.	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats.	October – May (depending on rainfall)	P	See Section 4.3.1.
Reptiles							
Western pond turtle *Emys marmorata*	--	SSC	Populations extend from southern British Columbia, Canada through Northern California.	Thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches with aquatic vegetation.	Year-round	P	See Section 4.3.2

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Giant garter snake *Thamnophis gigas*	T	T	Central Valley from Fresno north to the Gridley/Sutter Buttes area.	Sloughs, canals, and other small waterways where there is a prey base of small fish and amphibians; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	April – October	A	No suitable habitat is present within the BSA. There is no perennial source of water and the surrounding fields are routinely disked.
Birds							
Tricolored blackbird *Aeglaius tricolor*	--	CE, SSC	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields. Habitat must be large enough to support at least 50 pairs. Probably requires water at or near the nesting colony.	Year-round	P	See Section 4.3.4
Burrowing owl *Athene cunicularia*	--	SSC	Widely distributed in proper habitat throughout the lowlands of the state, but rare along the coast north of Marin County and extremely rare east of the Sierra Nevada crest.	Burrow sites are in open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	Year-round	P	See Section 4.3.5

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Swainson's hawk *Buteo swainsoni*	--	T	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley.	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields.	March – September	P	See Section 4.3.6
Yellow-breasted chat *Icteria virens*	--	SSC	Found up to about 4800 ft in valley foothill riparian, and up to 6500 ft east of the Sierra Nevada in desert riparian habitats. Uncommon along coast of northern California east to Cascades and occurs only locally south of Mendocino County.	Thickets and other dense, regrowing areas such as bramble bushes, clearcuts, powerline corridors, and shrubs along streams.	March – September	A	There is no suitable riparian habitat within the BSA.
Mammals							
Pallid bat *Antrozous pallidus*	--	SSC	Western half of the U.S. between northern Washington and south to central Mexico.	Deserts, grasslands, shrubland, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts in caves, crevices, mines, and occasionally in hollow trees and buildings.	Year-round	A	No suitable habitat is present within the BSA (i.e. no trees or other suitable roosting structures).

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Western mastiff bat *Eumops perotis californicus*	--	SSC	Uncommon resident in southeastern San Joaquin Valley and Coastal Ranges from Monterey County southward through southern California, from the coast eastward to the Colorado Desert.	Found in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.	Year-round	A	No suitable habitat is present within the BSA (i.e. no trees or other suitable roosting structures).
Western red bat *Lasiurus blossevillii*	--	SSC	Common in some areas of California, occurring from Shasta Co. to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts; winter in lowlands and coastal regions south of San Francisco Bay.	Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests. Feeds over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands.	March – October	A	No suitable habitat is present within the BSA (i.e. no trees or other suitable roosting structures).
Critical Habitat							
Central valley steelhead	--	--	Critical habitat designated in Tehama, Whitmore, Redding, Eastern Tehama, Sacramento Delta, Valley Putah – Cache, American River, Marysville, Yuba River, Valley – American, Colusa Basin, Butte Creek, Ball Mountain, Shasta Bally, North Valley Floor, Upper Calaveras, Stanislaus River, San Joaquin Valley Floor, Delta – Mendota Canal, North Diablo Range, and San Joaquin Delta Hydrologic Units in CA.		--	A	There is no critical habitat designated within the BSA.

Table 3-3. Special-status Wildlife with the Potential to Occur in the Biological Study Area

Common and Scientific Name	Legal Status[1]		Distribution	Habitat Association	Identification Period	Habitat Present / Absent[2]	Rationale[3]
	Federal	State					
Essential Fish Habitat							
Chinook salmon	--	--	Includes those streams, estuaries, marine waters, and other water bodies occupied or historically accessible to chinook salmon in Washington, Oregon, Idaho, and California. Exceptions include cases in which long-standing naturally occurring barriers (e.g., waterfalls) or specifically identified man-made barriers (e.g., dams) represent the current upstream extent of Pacific salmon access.	--	A	Although EFH has been included on the NOAA Fisheries list, the portion of NF Duck Creek within the BSA lacks the important elements that comprise EFH.	

[1] Status explanations:

-- = no listing

Federal

PT = proposed threatened for listing under the federal Endangered Species Act.
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
CT = candidate for listing as threatened under the California Endangered Species Act.
SSC = state species of special concern

[2] A = absent; HP = habitat present

[3] Rationale includes an effects determination under the FESA for all federally listed species.

Chapter 4. Results: Biological Resources, Discussion of Impacts and Mitigation

This chapter provides survey results and analyzes the effects of the Project on natural communities, special-status species, and other protected biological resources. Habitat impacts are calculated for the PIA and include permanent and temporary impact areas. The permanent impact area includes the area within the footprint of the new bridge and roadway improvements as well as areas with permanent RSP. The temporary impact area includes the area needed to construct the temporary work and staging areas required for equipment access and work areas.

As described in detail throughout this chapter, the Project will be required to implement a variety of avoidance and compensatory measures to avoid or offset potential effects to biological resources.

4.1. Habitats and Natural Communities of Special Concern

Habitats are considered to be of special concern based on (1) federal, State, or local laws regulating their development; (2) limited distributions; and/or (3) the habitat requirements of special-status plants or animals occurring on site. NF Duck Creek is considered to be waters of the U.S which is considered sensitive by both federal and state agencies and is discussed in more detail within the Preliminary Jurisdictional Delineation Report (Appendix B). **Figure 4-1** and **Table 4-1** summarizes temporary and permanent impacts on these habitats.

Table 4-1. Summary of Temporary and Permanent Effects by Habitat Type

Habitat Community	Permanent (acres)	Temporary (acres)	Totals (acres)
Agriculture	0.04	0.14	0.18
Ruderal (Disturbed)	0.03	0.01	0.04
Urban (Developed)	0.19	0.02	0.21
Riverine (NF Duck Creek)	0.004	0.07	0.074
Total	**0.26**	**0.24**	**0.50**

Legend

Project Impact Area

Permanent Impacts

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

Temporary Impacts

- Agriculture
- Riverine
- Ruderal (Disturbed)
- Urban (Developed)

0 30 60 120 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Permanent and Temporary Impacts

Figure 4-1

4.1.1. Discussion of Waters of the U.S (NF Duck Creek)

NF Duck Creek is mapped as an intermittent channel on the Farmington CA USGS 7.5' Quadrangle and is classified as a palustrine, emergent, persistent, seasonally flooded (PEM1C) feature on the current NWI map (USFWS 2018c). NF Duck Creek flows in a northeast to southwest direction through the BSA, under Buckman Road (**Figure 4-2**), and empties into Duck Creek, approximately 0.6 river miles southwest of the BSA. For more detailed information on this feature, refer to the Preliminary Wetland Delineation in Appendix C.

4.1.1.1. **SURVEY** Results

NF Duck Creek had slow-moving water during the delineation field work in March 2018. The banks are gently sloping and vegetated primarily with non-native invasive species (i.e. Himalayan blackberry and poison hemlock). Concrete blocks of rip-rap line the banks. The bed of NF Duck Creek is sandy silt with patches of hydrophytic vegetation (cattails) growing within the channel. The OHWM determination was based primarily on the presence of scour and water staining on both banks and has an average width of approximately 16 feet.

4.1.1.2. **PROJECT** Impacts

This Project would not involve permanent modification or alteration of NF Duck Creek, as the bridge span abutments would be located at each top of channel location. While in-channel work on NF Duck Creek will be minimal, some degree of permanent RSP may be required at the bridge supports on the banks to prevent scour to the new bridge supports. Placement of RSP could result in up to 0.004 acres of permanent impacts to NF Duck Creek.

The Project will temporarily impact approximately 0.07 acres of NF Duck Creek. Temporary impacts to NF Duck Creek will result from stream diversion and removal of the existing bridge.

4.1.1.3. **AVOIDANCE** and Minimization Efforts

During construction, water quality will be protected by implementation of best management practices (BMPs) of the California Stormwater Quality Association (2003). BMPs designed to address water quality (and related special status species) impacts are described below and will be finalized in consultation with the Project engineer, County, CVRWQCB, and other appropriate agencies.

- The contractor will develop and implement a toxic materials control and spill response plan to regulate the use of hazardous materials, such as the petroleum-based products used as fuel and lubricants for equipment and other potentially toxic materials associated with Project construction.

Legend

Biological Study Area

Potentially Jurisdictional Waters of the U.S

North Fork Duck Creek: Riverine - Intermittent (0.16 acres)

0 37.5 75 150 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Potentially Jurisdictional Aquatic Features

Figure 4-2

- Standard construction BMPs will be implemented throughout construction to avoid and minimize adverse effects to the water quality within the Project site. Appropriate erosion control measures will be used (e.g., straw wattles, filter fences, vegetative buffer strips, or other accepted equivalents) to reduce siltation and contaminated runoff from project sites. The specific BMPs to be implemented will be described in full in the Project's SWPPP. All erosion control materials, including straw wattles and erosion control blanket material, used on-site will be biodegradable. Use of erosion control containing plastic monofilament will not be allowed as wildlife may become entrapped in this material. Wattles should be wrapped with 100 percent biodegradable materials like burlap, jute, or coir.
- Measures would be implemented during ground-disturbing activities to reduce erosion and sedimentation. These measures may include mulches, soil binders/ erosion control blankets, silt fencing, fiber rolls, and temporary berms.
- Existing vegetation would be protected, using temporary fencing or other protection devices where feasible, to reduce erosion and sedimentation.
- Exposed soils would be covered by loose bulk materials or other materials to reduce erosion and runoff during rainfall events.
- Exposed soils would be stabilized, through watering or other measures, to prevent the movement of dust at the Project site caused by winds and construction activities such as traffic and grading activities.
- All construction roadway areas would be properly protected to prevent excess erosion, sedimentation, and water pollution.
- Temporary berms would be constructed along the tops of slopes to prevent water from running uncontrolled from slopes during construction activities. Water would be collected in these berms and taken down the slopes in an erosion-proof drainage system. Sediment that is collected within these berms would be allowed to "settle out" and would be removed from the site.
- All erosion control measures and storm water control measures would be properly maintained until the site has returned to a pre-construction state.
- All disturbed areas would be restored to pre-construction contours and revegetated, either through hydroseeding or other means, with native or approved non-invasive exotic species.
- All construction materials would be hauled off-site after completion of construction activities.

The Project will minimize the effects of disturbance to NF Duck Creek and the adjacent riparian corridor. The Project proposes to revegetate areas of temporary disturbance within the Project footprint with native riparian vegetation.

4.1.1.4. Compensatory **MITIGATION**

After the Project is approved, the County will apply for any necessary permits from the Corps, CDFW, and RWQCB. Impacts will be mitigated in accordance with agency requirements to ensure no net loss of acreage or value to waters of the U.S which will

include restoring temporarily impacted areas to pre-Project condition. In addition, to compensate for permanent impacts on jurisdictional waters, the County will purchase credits from a Corps and/or CDFW approved mitigation bank at a minimum 1:1 ratio (one acre of habitat replaced for every one acre filled). Based on the preliminary Project design, the Project will permanently affect 0.004 acres of intermittent stream.

4.1.1.5. CUMULATIVE Impacts

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek would not result from the construction of both bridges concurrently as they are located on separate waterways. In regard to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in water quality, erosion, and drainage impacts to the NF Duck Creek and surrounding waterways, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement BMPs to reduce water quality impacts to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.2. Special-status Plant Species

The plants listed are considered to be of special concern based on: (1) federal, state, or local laws regulating their development; (2) limited distributions; and/or (3) the presence of habitat required by the special-status plants occurring on site. There are no special-status plant species, or associated habitat, within the BSA.

4.3. Special-status Wildlife Species

After completion of the field surveys and review of existing information on special-status wildlife in the Project region, it was determined that five special-status wildlife species have the potential to occur within the BSA. These species include western spadefoot, western pond turtle, tricolored blackbird, burrowing owl, and Swainson's hawk. In addition, there is the potential for the Project to impact nesting migratory birds and raptors. Each of these species is discussed below.

4.3.1. Discussion of Western Spadefoot (*Spea hammondii*)

The western spadefoot occurs throughout the Central Valley and adjacent foothills (including the Sierra foothills). It also occurs in the Southern Coast Range from Santa Barbara County to the Mexican border. This species primarily inhabits lowlands, including

such features as washes, floodplains of rivers, alluvial fans, playas, and alkali flats. The toad is almost completely terrestrial, entering water only to breed. Preferring areas of short grasses, where soil is sandy or gravelly, it can be found in valley and foothill grasslands, open chaparral, and pine-oak woodlands. Though some surface activity may occur in any month between October and April, it typically becomes surface-active following relatively warm rains in late winter-spring and fall. The western spadefoot breeds in temporary pools, such as vernal pools, or pools in ephemeral waterways. For young to successfully metamorphose, breeding pools must lack exotic predators, such as fish, bullfrogs, and crayfishes. Breeding occurs between January and May (Stebbins 2003).

4.3.1.1. SURVEY RESULTS

There are six recorded occurrences of western spadefoot within 5 miles of the BSA. The closest record, from 1978, is approximately 1.03 miles north of the BSA. Tadpoles were observed in several slow-moving creeks that crossed Southworth Road and Ospital Road. The most recent record is from 1992 and is approximately 1.2 miles south southwest of the BSA. Tadpoles were found in three natural ponds in grasslands along dredge tailings which are likely utilized as terrestrial habitat by the adults during most of the year.

The slow-moving nature of NF Duck Creek could provide potential dispersal habitat for this species while the ruderal (disturbed) habitat could provide marginally suitable upland dispersal habitat. This species was not observed during the surveys conducted in March 2018.

4.3.1.2. PROJECT IMPACTS

Potential impacts include direct harm to spadefoot that could potentially come into contact with construction personnel and/or equipment, temporarily inhibiting movement of spadefoot through the PIA, and increased chance of predation or physical harm if they were to become trapped in the construction area. While spadefoot are not expected to reside in the PIA, they could be present within the ruderal (disturbed) habitat and NF Duck Creek during normal dispersal activities. However, avoidance and minimization measures will be in place during construction to avoid harming any western spadefoot.

4.3.1.3. AVOIDANCE AND MINIMIZATION EFFORTS

The following avoidance and minimization efforts shall be implemented to reduce potential Project effects to western spadefoot:

- For work conducted during the western spadefoot migration and breeding season (November 1 to May 31), a qualified biologist will survey the active work areas (including access roads) in mornings following measurable precipitation events. Construction may commence once the biologist has confirmed that no spadefoot are in the work area.

- When feasible, there will be a 50-foot no-disturbance buffer around burrows that provide suitable upland habitat for western spadefoot. Burrows considered suitable for spadefoot will be identified by a qualified CDFW biologist. The biologist will delineate and mark the no-disturbance buffer.

- If western spadefoot is found within the construction footprint, it will be allowed to move out of harm's way of its own volition or a qualified biologist will relocate the organism to the nearest burrow that is outside of the construction impact area.

- Prior to beginning work each day, a qualified biologist will inspect underneath equipment and stored pipes greater than 1.2 inches (3 cm) in diameter for western spadefoot. If any are found they will be allowed to move out of the construction area under their own accord.

- Trenches and holes will be covered and inspected daily for stranded animals. Trenches and holes deeper than one foot deep will contain escape ramps (maximum slope of 2:1) to allow trapped animals to escape uncovered holes or trenches. Holes and trenches will be inspected prior to filling.

4.3.1.4. COMPENSATORY MITIGATION

No compensatory mitigation is required.

4.3.1.5. CUMULATIVE IMPACTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek would not result from the construction of both bridges concurrently as they are located on separate waterways. In regard to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in water quality, erosion, and drainage impacts to the NF Duck Creek and surrounding waterways, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement BMPs to reduce water quality impacts to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.3.2. Discussion of Western Pond Turtle (*Emys marmorata*)

Western pond turtles, including both the northwestern (ssp. *marmorata*) and southwestern (ssp. *pallida*) subspecies, are California species of concern. Western pond turtles range

throughout the state of California, from southern coastal California and the Central Valley, east to the Cascade Range and the Sierra Nevada. The two subspecies are believed to integrate over a broad range in the Central Valley (Jennings and Hayes, 1994). Western pond turtles occur in a variety of permanent and intermittent aquatic habitats, such as ponds, marshes, rivers, streams, and ephemeral pools. Pond turtles require suitable basking and haul-out sites, such as emergent rocks or floating logs, which they use to regulate their temperature throughout the day (Holland, 1994). In addition to appropriate aquatic habitat, these turtles require an upland oviposition site in the vicinity of the aquatic habitat, often within 200 meters (656 feet). Nests are typically dug in grassy, open fields with soils that are high in clay or silt fraction. Egg-laying usually takes place between March and August (Zeiner et al., 1988).

This species may spend the winter in an inactive state, on land or in the water, and in other cases may remain active and in the water throughout the year (Jennings and Hayes, 1994). While the turtles may be active all year along the coast, at interior locations such as the Central Valley, pond turtles are more likely to be active between April and October. Western pond turtles have been documented hibernating up to 350 meters (1,007 feet) from a watercourse, immediately adjacent to a watercourse (Jennings and Hayes, 1994), and underwater in mud (Zeiner et al., 1988). Upland hibernaculae may include any type of crack, hole, or object that a turtle seeking cover might squeeze into or burrow under.

4.3.2.1. SURVEY RESULTS

There are no recorded occurrences of western pond turtle within 5 miles of the BSA; however, NF Duck Creek does provide suitable habitat for this species. Review of aerial photography shows that water is typically present until June of most years and the gentle slope of the banks provides suitable basking structure. The presence of aquatic vegetation and small amphibians (i.e., tree frogs) provide suitable forage for this species. This species was not observed during the surveys conducted in March 2018.

4.3.2.2. PROJECT IMPACTS

Potential aquatic and upland habitat for western pond turtle is present within the BSA. If western pond turtles are present within the PIA during construction, the movement of equipment within uplands and construction of bridge structures could crush pond turtles or nests containing eggs or young. With implementation of the proposed avoidance and minimization measures, the Project is not expected to result in impacts to western pond turtle.

4.3.2.3. AVOIDANCE AND MINIMIZATION EFFORTS

The following avoidance and minimization efforts shall be implemented to reduce potential Project effects to western pond turtle:

- If dewatering is necessary, the construction area shall be dewatered prior to construction activities. CDFW shall be notified prior to dewatering activities.
- No more than two weeks prior to the commencement of ground-disturbing activities, the County shall retain a qualified biologist to perform surveys for western pond turtle within suitable aquatic and upland habitat within the Project site. Surveys will include western pond turtle nests as well as individuals. The biologist (with the appropriate agency permits) will temporarily move any identified western pond turtles upstream of the construction area, and temporary barriers will be placed around the construction area to prevent ingress. Construction will not proceed until the work area is determined to be free of turtles. The results of these surveys will be documented in a technical memorandum that will be submitted to CDFW (if turtles are documented).
- Standard construction BMPs shall be implemented throughout construction to avoid and minimize adverse effects to the water quality within the BSA.

4.3.2.4. COMPENSATORY MITIGATION

No compensatory mitigation is required.

4.3.2.5. CUMULATIVE IMPACTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek would not result from the construction of both bridges concurrently as they are located on separate waterways. In regard to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in water quality, erosion, and drainage impacts to the NF Duck Creek and surrounding waterways, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement BMPs to reduce water quality impacts to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.3.3. Discussion of Tricolored Blackbird (*Agelaius tricolor*)

Tricolored blackbird is designated as a State Candidate for listing as Endangered, as well as a species of special concern by CDFW and is considered nearly endemic to California. This species historically nested throughout the Central Valley and along the coast from Sonoma County to Mexico. During the winter, tricolored blackbirds generally withdraw from the southern San Joaquin Valley and north Sacramento Valley and concentrate around the Sacramento-San Joaquin River Delta and coastal areas, including Monterey and Marin counties (Beedy and Hamilton 1999). California's population of tricolored

blackbirds has been reduced by an estimated 64 percent from its historic numbers due to the loss of freshwater wetland habitat and human disturbance (San Francisco Estuary Project 1992).

Tricolored blackbird is a highly colonial species reported to breed in groups which consist of up to 100,000 and 200,000 nests. This species historically nested almost exclusively in freshwater marshes dominated by cattails or bulrushes with smaller numbers nesting in willow, blackberry (*Rubus* spp.), thistle (*Cirsium* and *Centaurea* spp.), and nettles (*Urtica* spp.) (Beedy and Hamilton 1999). In recent decades, many colonies have been observed in areas of dense Himalayan blackberry (*Rubus armeniacus*). In the San Joaquin Valley, large flocks have been observed nesting in silage and grain fields (Collier 1968 and Cook 1996 in Beedy and Hamilton 1999). Other observed nesting substrates include giant reed (*Arundo donax*), safflower (*Carthamus tinctorius*), black mustard (*Brassica nigra*), tamarisk (*Tamarix* spp.), Fremont's cottonwood (*Populus fremontii*), Oregon ash (*Fraxinus latifolia*), barley (*Hordeum* spp.), mule fat (*Baccharis salicifolia*), wheat (*Triticum* spp.), a desert olive (*Forestiera neomexicana*) grove, and a lemon (*Citrus limon*) orchard (Beedy and Hamilton 1999).

High-quality foraging habitat for tricolored blackbirds includes irrigated pastures, lightly grazed rangelands, dry seasonal pools, mowed alfalfa fields, feedlots, and dairies. Low-quality foraging habitat includes cultivated row crops, orchards, vineyards, and heavily grazed rangelands (Beedy and Hamilton 1999).

4.3.3.1. SURVEY RESULTS

There is one recorded occurrence of tricolored blackbird within 5 miles of the BSA. The occurrence was recorded in 1994, approximately 4.5 miles east of the BSA on the north side of SR 4 where it crosses Rock Creek. Habitat consisted of willow riparian along Rock Creek where about 2,000 – 4,000 birds were observed.

No tricolored blackbirds or their nests were observed in the BSA during the March 2018 survey. The patches of cattail within the creek channel, as well as the patches of Himalayan blackberry along the banks, may provide marginal nesting habitat for tricolored blackbirds; the adjacent agricultural fields provide medium to low quality foraging habitat for this species.

4.3.3.2. PROJECT IMPACT

If construction begins during the breeding season (February 1 through August 31) and tricolored blackbirds are nesting in or immediately adjacent to the BSA, the new disturbance associated with the use of heavy equipment in the BSA could adversely affect nesting birds. Indirect impacts to nesting birds during construction could extend up to 250 feet from the limits of construction. Potential impacts could include abandonment of nest sites and the mortality of young.

4.3.3.3. AVOIDANCE AND MINIMIZATION EFFORTS

The following avoidance and minimization measures shall be used when work occurs on or in the vicinity of structures that may be subject to nesting by migratory birds.

- To avoid and minimize impacts to tree and shrub nesting species, the following measures would be implemented:
    - If feasible, conduct all tree and shrub removal and grading activities during the non-breeding season (generally September 1 through January 31).
    - If grading and tree removal activities are scheduled to occur during the breeding and nesting season (February 1 through August 31), pre-construction surveys would be performed prior to the start of Project activities.
- If construction, grading, or other Project-related activities are schedule during the nesting season (February 1 to August 31), preconstruction surveys for other migratory bird species would take place no less than 14 days and no more than 30 days prior to the beginning of construction within 250 feet of suitable nesting habitat.
    - If the pre-construction surveys do not identify any nesting migratory bird species within areas potentially affected by construction activities, no further mitigation would be required.
    - If the pre-construction surveys do identify nesting bird species within areas that may be affected by site construction, the following measures would be implemented.
- Should active nest sites be discovered within areas that may be affected by construction activities, additional measures would be implemented as described below:
    - If active nests are found, Project-related construction impacts would be avoided by establishment of appropriate no-work buffers to limit Project-related construction activities near the nest site. The size of the no-work buffer zone would be determined in consultation with the DFW, although a 500-foot would be used when possible. The no-work buffer zone would be delineated by highly-visible temporary construction fencing. In consultation with DFW, monitoring of nest activity by a qualified biologist may be required if the Project-related construction activity has potential to adversely affect the nest or nesting behavior of the bird. No Project-related construction activity would commence within the no-work buffer area until a qualified biologist and DFW confirms that the nest is no longer active.

4.3.3.4. COMPENSATORY MITIGATION

No compensatory mitigation is required.

4.3.3.5. CUMULATIVE EFFECTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek, and the surrounding habitat, would not result from the construction of both bridges concurrently as they are located on separate waterways. In regards to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in a loss of nesting habitat for special-status bird species, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement avoidance and minimization measures to reduce impacts to special-status bird species to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.3.4. Discussion of Western Burrowing Owl (*Athene cunicularia*)

Burrowing owls, a California species of concern, are often found in open, dry grasslands, agricultural lands; range lands; and desert habitats. They can also inhabit grass, forb, and shrub stages of pinyon and ponderosa pine habitats. Burrowing owls occur at elevations ranging from 200 feet below sea level to over 9,000 feet above sea level. In California, the highest elevation where burrowing owls are known to occur is 5,300 feet above sea level in Lassen County. In addition to natural habitats, burrowing owls can be found in urban habitats such as at the margins of airports and golf courses and in vacant urban lots.

Burrowing owls nest in ground burrows, often occupying old ground squirrel burrows or badger dens. They are also known to use artificial burrows such as abandoned pipes or culverts. The nesting season for burrowing owls can begin as early as February 1 and continues through August 31. The owl commonly perches on fence posts or on top of mounds outside its burrow. Burrowing owls forage in adjacent grasslands and other suitable habitats primarily for insects and small mammals, and less often for reptiles, amphibians, and other small birds.

4.3.4.1. SURVEY RESULTS

There are two recorded occurrences of western burrowing owl within 5 miles of the BSA. The closest occurrence is approximately 1-mile northeast of the BSA along NF Duck Creek where several small colonies of owls were observed along the banks of the creek in 1987.

Soils within the BSA are sandy and friable and, although there are no mounds, the banks of the creek could provide potential nesting sites. The agriculture habitat also provides suitable foraging habitat for this species. This species was not observed during the surveys conducted in March 2018.

4.3.4.2. PROJECT IMPACTS

The proposed Project could potentially impact individual burrowing owls if they occupied the PIA prior to construction. Indirect impacts to nesting birds during construction could extend up to 500 feet from the limits of construction. Potential impacts could include abandonment of nest sites and the mortality of young. The proposed Project could also result in a temporary loss of foraging opportunities for burrowing owl in and adjacent to the PIA during construction.

4.3.4.3. AVOIDANCE AND MINIMIZATION EFFORTS

Prior to construction, surveys shall be conducted by a qualified biologist to determine presence/absence of burrowing owls and/or occupied burrows in and within 500 feet of the PIA according to the 2012 CDFW Staff Report on Burrowing Owls. If presence is confirmed, during that same year a winter survey will be conducted between December 1 and January 31 and a nesting survey will be conducted between April 15 and July 15. Preconstruction surveys will also be conducted within 30 days prior to construction to ensure that no additional burrowing owls have established territories since the initial surveys. If no burrowing owls are found during any of the surveys, no further mitigation will be necessary. If burrowing owls are found, then the following measures shall be implemented prior to the commencement of construction:

- During the non-breeding season (September 1 through January 31), burrowing owls occupying the PIA should be evicted from the PIA by passive relocation as described in the Staff Report on Burrowing Owls (CDFW 2012).

- During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed and shall be provided with a 250 foot protective buffer unless a qualified biologist approved by CDFW verifies through non-invasive means that either: 1) the birds have not begun egg laying, or 2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. Once the fledglings are capable of independent survival, the burrow can be destroyed.

4.3.4.4. COMPENSATORY MITIGATION

No compensatory mitigation is required.

4.3.4.5. CUMULATIVE IMPACTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek, and the surrounding habitat, would not result from the construction of both bridges concurrently as they are located on separate waterways. In regards to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in a loss of nesting habitat for special-status bird species, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement avoidance and minimization measures to reduce impacts to special-status bird species to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.3.5. Discussion of Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawk is a state-listed threatened species under the CESA. The Swainson's hawk is a medium-sized hawk with relatively long, pointed wings and a long, square tail. Swainson's hawks were once found throughout lowland California and were absent only from the Sierra Nevada, north Coast Ranges, Klamath Mountains, and portions of the desert regions of the state. Presently, Swainson's hawks are restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available. Swainson's hawks nest in riparian forests, remnant oak woodlands, isolated trees, and roadside trees. They forage primarily in open agricultural habitats, particularly those that optimize availability of prey (e.g., alfalfa and other hay crops, some row and grain crops), but they also use irrigated pastures and annual grasslands (Estep 1989, England et al. 1997). In summer months, Swainson's hawks primarily eat insects, birds, and small mammals, occasionally taking reptiles, amphibians, and other invertebrates (Estep 1989). Swainson's hawks breed in the Central Valley, occurring in California only during the spring and summer breeding season (generally, March through August), and migrate to Mexico and portions of Central and South America during winter.

4.3.5.1. SURVEY RESULTS

There is one recorded occurrence of Swainson's hawk within 5 miles of the BSA. The occurrence was recorded in July 1994 and is located approximately 3 miles southeast of the BSA along Littlejohns Creek at the Henry Road crossing. A nest with a pair of adults and one juvenile were observed in a large oak within a remnant patch of riparian vegetation.

The BSA is located within a predominately agricultural setting which supports grassland habitat and agricultural fields that provide suitable foraging areas for Swainson's hawk. There is no suitable nesting habitat within the BSA; however, there are suitable nesting trees within 0.25 miles of the BSA. A pair of Swainson's hawks were observed exhibiting courtship flying behavior over the BSA and two large stick nests were observed within the large valley oak trees approximately 115 and 485 feet northeast of the BSA.

4.3.5.2. PROJECT IMPACTS

Noise associated with construction activities involving heavy equipment operation that occurs during the breeding season (generally between February 1 and August 31) could disturb nesting Swainson's hawk if an active nest is located near these activities. Potential impacts could include abandonment of nest sites and the mortality of young. Any disturbance that causes Swainson's hawk nest abandonment and subsequent loss of eggs or developing young at active nests located near the Project Site would violate the CESA, (CFGC Sections 2800, 3503, and 3503.5)and the MBTA.

4.3.5.3. AVOIDANCE AND MINIMIZATION EFFORTS

Prior to construction, surveys will be conducted by a qualified biologist to determine presence/absence of nesting Swainson's hawk in and within 0.50 miles of the BSA according to the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If no Swainson's hawks are found during any of the surveys, no further mitigation will be necessary. If Swainson's hawk nests are found, CDFW will be consulted regarding measures to reduce the likelihood of forced fledging of young or nest abandonment by adult birds. These measures will likely include, but are not limited to, the establishment of a no-work zone around the nest until the young have fledged as determined by a qualified biologist.

4.3.5.4. COMPENSATORY MITIGATION

No compensatory mitigation is required.

4.3.5.5. CUMULATIVE IMPACTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek, and the surrounding habitat, would not result from the construction of both bridges concurrently as they are located on separate waterways. In regards to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in a loss of nesting habitat for special-status bird species, the incremental

effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement avoidance and minimization measures to reduce impacts to special-status bird species to the extent practicable. Therefore, no adverse cumulative impacts are expected.

4.3.6. Discussion of Other Migratory Birds and Raptors

Fish and Game Code 3503.5 protects all birds in the orders Accipitriformes, Falconiformes, and Strigiformes (collectively known as raptors or birds of prey) and include hawks, eagles, falcons, and owls. All other migratory bird species, with the exception of non-native and invasive bird species, are protected under the federal MBTA of 1918 (16 U.S.C. 703-711).

Swallows, such as the barn swallow (*Hirundo rustica*) and cliff swallow (*Petrochelidon pyrrhonota*), and black phoebes commonly nest on the undersides of bridges that cross over, or are in close proximity to, aquatic habitats such as rivers, streams, and lakes. Such bridges provide suitable nesting habitat due to their proximity to nest building material as well as optimal foraging habitat. Aquatic habitats and associated corridors provide habitat for large numbers of aquatic and terrestrial insects, which are these species primary prey items.

Common raptors, such as red-shouldered hawk (*Buteo lineatus*) and red-tailed hawk (*Buteo jamaicensis*), and birds, such as tree swallows (*Tachycineta bicolor*) and sparrows, commonly nest in large trees that overhang or are in close proximity (within 0.25 miles), to aquatic habitats such as rivers, streams, and lakes, as well as in close proximity to annual grasslands and agricultural fields. Large trees provide suitable nesting habitat due to their proximity to nest building material as well as optimal foraging habitat. Aquatic and terrestrial habitats and associated corridors provide habitat for large numbers of aquatic and terrestrial insects, which are these species primary prey items.

4.3.6.1. SURVEY RESULTS

The more densely vegetated ruderal (disturbed) habitat along the banks of the creek, as well as the existing Buckman Road Bridge, provides potential nesting and foraging habitat for birds listed by the MBTA. No nests were observed within the ruderal (disturbed) habitat or beneath the bridge; however, cliff swallows were observed flying beneath the bridge with nesting material and small flocks of sparrows and red-winged blackbirds were observed exhibiting nesting behavior within the patches of Himalayan blackberry along NF Duck Creek. A pair of red-tailed hawks were observed calling and soaring over the large stick nests located approximately 115 and 485 feet northeast of the BSA

4.3.6.2. PROJECT IMPACTS

If demolition of the bridge begins during the breeding season (February 1 to August 31), the proposed Project could result in mortality of young through forced fledging or nest abandonment by adult birds. Exclusion of nesting adult birds from the underside of the bridge could potentially result in disruption of nesting activities and the loss of nesting productivity for the season for some birds that do not move to other nesting sites outside of the BSA. However, widening of the bridge could ultimately result in a net increase of potential nesting habitat for swallows, black phoebes, and other bridge nesting birds.

If it is necessary to remove vegetation prior to construction or construction activities begin during the breeding season (February 1 to August 31), the proposed Project could result in mortality of young through forced fledging or nest abandonment by adult birds, as well as destruction of nests.

4.3.6.3. AVOIDANCE AND MINIMIZATION EFFORTS

The avoidance and minimization measures described in Section 4.3.4.3 will also protect other nesting migratory songbirds and raptors protected under the MBTA.

The following avoidance and minimization measures shall be incorporated for bridge-nesting birds if bridge demolition or construction of the new bridge occurs during the nesting season (February 1 to August 31). Exclusionary netting shall be installed around the undersides of the existing bridge before February 1 of the construction year to prevent new nests from being formed, and/or prevent the reoccupation of existing nests. Exclusionary netting may also be required during construction of the new bridge if it is completed during the breeding season. The construction contractor would do the following:

- Adhere to all state and federal laws and regulations pertaining to the protection of migratory birds, their nests, and young birds.
- Remove all existing unoccupied nests on the bridge during the non-nesting season (September 1-January 31).
- Keep the bridge free of nests, using exclusionary netting or other approved methods, until completion of construction activities.
- Inspect all listed structures for nesting activity a minimum of three days per week; no two days of inspection would be consecutive. A weekly log would be submitted to the Project biologist. The contractor would continue inspections until bridge removal and completion of construction on the new bridge. If an exclusion device were found to be ineffective or defective, the contractor would complete repairs to the device within 24 hours. If birds were found trapped in an exclusion device, the contractor would immediately remove the birds in accordance with USFWS guidelines.

- Submit for approval working drawings or written proposals of any exclusion devices, procedures, or methods to the Project biologist before installation.
- The method of installing exclusion devices would not damage permanent features of the new bridge structure. Approval by the Project biologist of the working drawings or inspection performed by the authorized Project biologist would in no way relieve the contractor of full responsibility for deterring nesting.

4.3.6.4. COMPENSATORY MITIGATION

No compensatory mitigation is required. Implementation of avoidance and minimization efforts described under Section 4.3.9.3 would ensure that the Project does not adversely affect migratory birds and raptors.

4.3.6.5. CUMULATIVE EFFECTS

This Project is being constructed concurrently with the BRLO 5929 (245) bridge replacement project which is also located along Buckman Road. This second bridge replacement project crosses Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek, and the surrounding habitat, would not result from the construction of both bridges concurrently as they are located on separate waterways. In regards to future projects, small scale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in a loss of nesting and foraging habitat for bird species, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement avoidance and minimization measures to reduce impacts to other migratory bird and raptor species to the extent practicable. Therefore, no adverse cumulative impacts are expected.

Chapter 5. Results: Permits and Technical Studies for Special Laws or Conditions

5.1. Federal Endangered Species Act Consultation Summary

There are no federally-listed species with the potential to occur within the BSA therefore there will be no effect to any federally listed or proposed species and/or designated critical habitat and Section 7 consultation with the USFWS and NOAA Fisheries is not required.

5.2. Essential Fish Habitat Consultation Summary

Essential fish habitat (EFH) means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. While other waters within the Farmington CA USGS 7.5' Quadrangle may provide these elements, Duck Creek does not. Duck Creek does not provide suitable spawning, rearing, or foraging habitat for salmonids due to its intermittent nature, heavily vegetated channel, lack of shading, and lack of required prey organisms. Based on this, the BSA does not contain EFH for chinook salmon and therefore the Project would not adversely modify EFH.

5.3. California Endangered Species Act Consultation Summary

Two state listed species, tricolored blackbird and Swainson's hawk, were identified as potentially occurring in the vicinity of the proposed Project. Analysis of potential effects the proposed Project would have on tricolored blackbird and Swainson's hawk is located within Sections 4.3.3 and 4.3.5, respectively. Based on the minimal impacts to suitable habitat within the BSA, design and construction avoidance measures, and associated mitigation, the proposed Project will not adversely impact these species. Consultation with CDFW regarding these species will determine whether a California Endangered Species Act Sections 2081 (b) and (c) - Incidental Take Permit will be required for the proposed Project.

5.4. Wetlands and Other Waters Coordination Summary

5.4.1. U.S. Army Corps of Engineers

Approximately 0.16 acres of potentially jurisdictional waters of the U.S. occur within the BSA and includes NF Duck Creek. The determination of jurisdictional acreages of other waters of the U.S. in the BSA is preliminary pending verification by the Corps.

A total of 0.074 acres of riverine habitat will be impacted, either temporarily or permanently, by the Project. Areas that are temporarily impacted during construction will be restored to pre-Project conditions.

Impacts to potential waters of the U.S. will require a permit from the Corps under Section 404 of the CWA (33 USC 1344) and a State Water Quality Certification (CWA Section 401 permit) from the CVRWQCB. The proposed Project would also require a Streambed Alteration Agreement (SAA) pursuant to CFGC Subsection 1601-1603. Impacts will be mitigated in accordance with agency requirements outlined in the permits to ensure no net loss of acreage or value to waters of the United States.

Nationwide Permit (NWP) 14 applies to activities required for the construction, expansion, modification, or improvement of linear transportation crossings (e.g., highways, railways, trails, airport runways, and taxiways) in waters of the U.S., including wetlands, if the activity meets the criteria. Based on avoidance and minimization efforts associated with the proposed Project, the proposed Project would likely qualify under a NWP 14.

5.4.2. State Regulations

The state's authority to regulate activities in waters of the U.S. resides primarily with the CDFW and the SWRCB. CDFW comments on Corps permit actions under the Fish and Wildlife Coordination Act. CDFW is also authorized under the CFGC, Sections 1600–1616 to develop mitigation measures and enter into SAAs with applicants who propose Projects that would obstruct the flow of or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. The SWRCB, acting through the appropriate RWQCB, must certify that a Corps permit action meets state water quality objectives (Section 401, CWA).

5.5. Invasive Species

Bridge construction would occur along the existing road right of way within a disturbed corridor. The BSA is surrounded by urban development and is heavily used by local residents. The BSA currently supports non-native invasive plants. Implementation of the Project is not expected to result in the introduction, establishment, and spread of new invasive weeds into the County. The following measures shall be included in the construction contract special provisions:

- All equipment and vehicles will be thoroughly cleaned to remove dirt and weed seeds prior to being transported or driven to or from the Project site.
- Any borrow site or stockpile will be inspected for the presence of noxious weeds or invasive plants.

- If noxious weeds or invasive plants are present, the contractor will remove approximately five inches of the surface of the material from the site before transporting to the Project.
- Before removal, this material will be chemically or mechanically treated to kill the existing noxious weeds and invasive plants, and will not be used for the Project without approval.

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Appendix A USFWS, NOAA Fisheries, CNDDB, and CNPS Lists of Regionally-Occurring Special-Status Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: December 23, 2019
Consultation Code: 08ESMF00-2018-SLI-1600
Event Code: 08ESMF00-2020-E-01961
Project Name: Buckman Road over North Fork Duck Creek Bridge Replacement Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2018-SLI-1600

Event Code: 08ESMF00-2020-E-01961

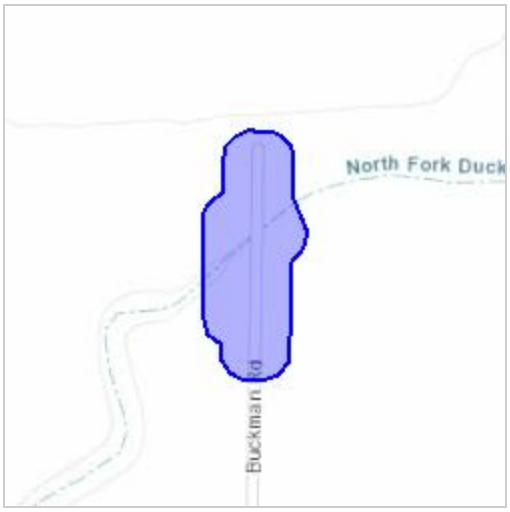
Project Name: Buckman Road over North Fork Duck Creek Bridge Replacement Project

Project Type: BRIDGE CONSTRUCTION / MAINTENANCE

Project Description: The San Joaquin County Department of Public Works (County) is proposing to construct a replacement bridge along Buckman Road (Bridge No. 29C-0307) over North Fork (NF) Duck Creek due to its functionally obsolete status, as determined by the Federal Highway Administration (FHWA) criteria. The proposed Project is located in eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line along Buckman Road approximately 0.8 miles north of SR 4 and crosses over NF Duck Creek. The bridge was constructed in 1931 and consists of timber deck planks on timber stringers on Douglas fir caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and post bents on PCC pedestal footings. The abutment foundation is unknown. This segment of Buckman Road is a single lane local roadway ending approximately 750−feet north of the existing bridge. The road services multiple agricultural field accesses as well as a couple of residences beyond the bridge.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.94155918895899N120.97713222227665W



Counties: San Joaquin, CA

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/321

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/7850
Habitat assessment guidelines:
https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8246

Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/498

Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2246

Flowering Plants

NAME	STATUS
Greene's Tuctoria *Tuctoria greenei*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/1573

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Tisch, Lindsay

From: Tisch, Lindsay
Sent: Monday, December 23, 2019 12:02 PM
To: 'nmfswcrca.specieslist@noaa.gov'
Cc: Piazzoni, Allison M.
Subject: Caltrans D10 Buckman Road Bridge Replacement BRLO 5929(241)

Good afternoon,

Federal Agency: Federal Highway Administration – California Division

Federal agency address: 650 Capitol Mall, Suite 4-100, Sacramento, CA 95814-4708

Non-federal agency representative (if any): California Department of Transportation District 10

Non-federal agency representative (if any)address: 1976 E Charter Way, Stockton, CA 95205

Project title: Buckman Road Bridge Replacement BRLO 5929(241)

Quad Name **Farmington**
Quad Number **37120-H8**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) - **X**
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -

CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Farmington (3712088) OR Bachelor Valley (3712087) OR Jenny Lind (3812017) OR Valley Springs SW (3812018) OR Linden (3812111) OR Peters (3712181) OR Avena (3712171) OR Escalon (3712078) OR Oakdale (3712077))

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAAAA01180	***Ambystoma californiense*** California tiger salamander	Threatened	Threatened	G2G3	S2S3	WL
AAABF02020	***Spea hammondii*** western spadefoot	None	None	G3	S3	SSC
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S3	
ABNSB10010	***Athene cunicularia*** burrowing owl	None	None	G4	S3	SSC
ABPBX24010	***Icteria virens*** yellow-breasted chat	None	None	G5	S3	SSC
ABPBXB0020	***Agelaius tricolor*** tricolored blackbird	None	Threatened	G2G3	S1S2	SSC
AFCHA0209K	***Oncorhynchus mykiss irideus pop. 11*** steelhead - Central Valley DPS	Threatened	None	G5T2Q	S2	
AFCJB25010	***Mylopharodon conocephalus*** hardhead	None	None	G3	S3	SSC
AMACC01020	***Myotis yumanensis*** Yuma myotis	None	None	G5	S4	
AMACC05030	***Lasiurus cinereus*** hoary bat	None	None	G5	S4	
AMACC05060	***Lasiurus blossevillii*** western red bat	None	None	G5	S3	SSC
AMACC10010	***Antrozous pallidus*** pallid bat	None	None	G5	S3	SSC
AMACD02011	***Eumops perotis californicus*** western mastiff bat	None	None	G5T4	S3S4	SSC
ARAAD02030	***Emys marmorata*** western pond turtle	None	None	G3G4	S3	SSC
ARACC01020	***Anniella pulchra*** northern California legless lizard	None	None	G3	S3	SSC
ARADB36150	***Thamnophis gigas*** giant gartersnake	Threatened	Threatened	G2	S2	
CTT44110CA	***Northern Hardpan Vernal Pool*** Northern Hardpan Vernal Pool	None	None	G3	S3.1	
ICBRA03030	***Branchinecta lynchi*** vernal pool fairy shrimp	Threatened	None	G3	S3	
ICBRA03150	***Branchinecta mesovallensis*** midvalley fairy shrimp	None	None	G2	S2S3	

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
ICBRA06010	***Linderiella occidentalis*** California linderiella	None	None	G2G3	S2S3	
ICBRA10010	***Lepidurus packardi*** vernal pool tadpole shrimp	Endangered	None	G4	S3S4	
IICOL48011	***Desmocerus californicus dimorphus*** valley elderberry longhorn beetle	Threatened	None	G3T2	S2	
IIHYM24250	***Bombus occidentalis*** western bumble bee	None	Candidate Endangered	G2G3	S1	
IIHYM35030	***Andrena blennospermatis*** Blennosperma vernal pool andrenid bee	None	None	G2	S2	
IIHYM35210	***Andrena subapasta*** An andrenid bee	None	None	G1G2	S1S2	
PDAPI0Z0S0	***Eryngium racemosum*** Delta button-celery	None	Endangered	G1	S1	1B.1
PDCAM0C010	***Legenere limosa*** legenere	None	None	G2	S2	1B.1
PDPLM0C0X1	***Navarretia myersii ssp. myersii*** pincushion navarretia	None	None	G2T2	S2	1B.1
PMJUN011L1	***Juncus leiospermus var. ahartii*** Ahart's dwarf rush	None	None	G2T1	S1	1B.2
PMPOA4C010	***Neostapfia colusana*** Colusa grass	Threatened	Endangered	G1	S1	1B.1
PMPOA6N010	***Tuctoria greenei*** Greene's tuctoria	Endangered	Rare	G1	S1	1B.1

Record Count: 31

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

7 matches found. *Click on scientific name for details*

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B], Found in Quads 3812111, 3812018, 3812017, 3712181, 3712088, 3712087, 3712171 3712078 and 3712077;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Eryngium pinnatisectum	Tuolumne button-celery	Apiaceae	annual / perennial herb	May-Aug	1B.2	S2	G2
Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	Jun-Oct	1B.1	S1	G1
Juncus leiospermus var. ahartii	Ahart's dwarf rush	Juncaceae	annual herb	Mar-May	1B.2	S1	G2T1
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Navarretia myersii ssp. myersii	pincushion navarretia	Polemoniaceae	annual herb	Apr-May	1B.1	S2	G2T2
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
Tuctoria greenei	Greene's tuctoria	Poaceae	annual herb	May-Jul(Sep)	1B.1	S1	G1

Suggested Citation

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 23 December 2019].

Appendix B Determination of GGS Habitat Presence

From: Ludwick, Timothy
To: Moore, David@DOT
Subject: Re: [EXTERNAL] RE: Buckman Bridge replacement project
Date: Tuesday, December 3, 2019 9:29:07 AM

David,
Thank you for following up on our phone call. As we discussed on the phone call, habitat in the project area as described do not appear appropriate for the giant gartersnake. The project area appears to lack water during the active season for the snake. Furthermore, the project area is disconnected from extant giant gartersnake populations that occur to the west. The lack of aquatic habitat, distance from known populations, and intense development of the surrounding uplands significantly reduces the suitability of the area for giant gartersnake. Furthermore, the project is proposed to be implemented during the active season for the snake during which time the channel is expected to be largely dry. Thank you and please let me know if you have any questions.

Regards,
Tim Ludwick

On Mon, Dec 2, 2019 at 12:30 PM Moore, David@DOT <david.j.moore@dot.ca.gov> wrote:

> Hey Tim,
>
> I wanted to thank you for the conversation we had in regards to the Buckman Bridge Project (5929(241)). Would you mind forwarding me a correspondence email summarizing our discussion about your opinion of the "No Effects" determination to GGS based on the location of the bridge being unlikely to harbor habitat or even traveling methods? It was great talking to you and I look forward to working with you on future projects.
>
> Thank you,
>
> David J. Moore
>
> Associate Environmental Planner (Biologist)
>
> California Department of Transportation – District 10
>
> Division of Planning, Local Assistance & Environmental

Appendix C Wetland Delineation

Buckman Road Bridge Replacement Project

Preliminary Delineation of Jurisdictional Waters

Buckman Road Bridge Replacement Project
San Joaquin County

March 2018

Prepared for:
San Joaquin County Department of Public Works
E Hazelton Avenue
Stockton, CA 95205

Prepared by:
Drake Haglan & Associates
11060 White Rock Road, Suite 200
Rancho Cordova, CA 95670

TABLE OF CONTENTS

Buckman Road Bridge (29C-0307) Replacement Project Wetland Delineation

CHAPTER 1.0
Introduction

On behalf of the San Joaquin County Department of Public Works (County), Drake Haglan and Associates (DHA) investigated the extent of potentially jurisdictional wetlands and other waters of the U.S. occurring at the Buckman Road Bridge Replacement Project site, hereafter the "study area." The study area encompasses a total of approximately 1.36 acres of land located in eastern San Joaquin County along Buckman Road, where it crosses North Fork (NF) Duck Creek, approximately 1.5 miles northeast of the community of Farmington. The investigation was conducted in March 2018, and concludes that there are approximately 0.07 acres of potentially jurisdictional waters of the U.S in the study area.

This report documents wetland and channel boundary delineation using the best professional judgment of DHA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the U.S. Army Corps of Engineers (Corps).

1.1 Responsible Parties

The applicant's contact information is:

Don Rodgers, EIT, Bridge Engineering Division
(209) 468-3040
San Joaquin County Dept. of Public Works
1810 E. Hazelton Avenue
Stockton, CA 95201

1.2 Directions to Site

Directions to the site from Sacramento:

- Take I-80 BUS E/US-50 E/Reno/Placerville/Fresno/CA-99 S ramp
- Keep right at fork, follow signs for CA-99 S and merge onto CA-99 S
- Take exit 252B for Golden Gate Ave
- Turn left onto CA-4 E/S Golden Gate Ave
- Turn left onto Buckman Road

1.3 Purpose of Assessment

The purpose of this investigation is to describe and delineate all wetlands and other waters of the U.S. within the Buckman Road Bridge Replacement Project wetland delineation study area that may be subject to Section 404 of the Clean Water Act (CWA). If necessary, information from this report may be used in preparing permit applications for future actions proposed in the study area. This report will be reviewed by the Corps to verify their jurisdiction over wetlands and other waters of the U.S.

SECTION 2.0
Setting

2.1 Delineation Study Area

The proposed Project is located in the eastern San Joaquin County, approximately 2.8 miles west of the Calaveras County line (**Figure 2-1**) along Buckman Road approximately 0.8 miles north of SR 4 and crosses over NF Duck Creek (**Figure 2-2**). The proposed Project is on the Farmington CA USGS 7.5' Quadrangle within Township 1 North, Range 9 East, Section 15 (**Figure 2-3**).

The study area lies within the Hardpan Terraces ecological subsection, an area consisting of very gently to gently sloping terraces and small areas of floodplain and alluvial fans along streams that cross from mountains to reach the Sacramento and San Joaquin Rivers. The subsection elevation range is from 100 to about 400 feet. Fluvial erosion is the main geomorphic processes. Streams in this subsection drain to the Sacramento or San Joaquin Rivers or to closed basins in the San Joaquin Valley. All but the larger streams are generally dry during the summer. There are no lakes, but there is temporary ponding in vernal pools on Pleistocene terraces. The Hardpan Terraces is characterized by needlegrass grasslands, and northern hardpan vernal pools are common within the undeveloped grasslands. The annual average precipitation at the National Climatic Data Center Stockton Metro Airport weather station (048558) is 13.76 inches (WRCC, 2018). Precipitation occurs primarily from November through March. Elevation of the study area ranges between 115 to 120 feet above mean sea level (msl).

2.2 Soils

The *Custom Soil Resource Report for San Joaquin, California* (Natural Resource Conservation Service [NRCS], 2018a – **Appendix C**) (**Table 2-1** and **Figure 2-4)** shows one soil unit occurring within the study area. The soil unit has a minor component listed on the national hydric soils list for San Joaquin County, California (NRCS, 2018b).

TABLE 2-1
STUDY AREA SOIL UNITS

Soil Map Unit Name	Hydric Status	Landforms
170: Hicksville loam, 0 to 2 percent slopes, occasionally flooded	Non-hydric with hydric inclusions.	Stream terraces

SOURCE: NRCS, 2018

★ Project Location: Buckman Road Bridge

0 3.5 7 14 Miles

Source: ESRI Online Basemap, World Street Map, San Joaquin County;
Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Regional Location Map

Figure 2-1

★ Project Location: Buckman Road Bridge

0 187.5 375 750 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Location Map

Figure 2-2

Legend

Project Study Area

0 250 500 1,000 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project Farmington, CA

Project Study Area

Figure 2-3

Legend

Project Study Area

Soil Map Units

170: Hicksville loam, 0 to 2 percent slopes, occassionally flooded

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Soil Map Units

Figure 2-4

- **Hicksville loam, 0 to 2 percent slopes, occasionally flooded**, is listed as non-hydric; however, the minor component, Yellowlark, is considered hydric (NRCS 2018b). The map unit composition is 85 percent Hicksville and similar soils, and 15 percent minor components. The Hicksville map unit consists of moderately well drained loams over alluvium derived from mixed rock sources. Mapped areas are on stream terraces. Included in this map unit are minor components of unnamed, reddish clayey subsoil and rock outcrops.

2.3 Hydrology

Regional Hydrology

NF Duck Creek belongs to the Rock Creek – French Camp Slough (HUC 18040051) within the San Joaquin River Basin. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The Rock Creek – French Camp Slough watershed covers approximately 472.8 square miles (302,576 acres or 9,130 square kilometers) and includes San Joaquin, Stanislaus, and Calaveras counties.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

Local Hydrology

NF Duck Creek is an intermittent stream which flows in a northeast to southwest direction, beginning northeast of the Project site, before draining into Duck Creek approximately 0.5 miles southwest of the Project site. It is approximately 13 miles long and is within the Upper Duck Creek watershed (HUC 180400510401) which drains an area of approximately 28 square miles (73 square kilometers). Based on a review of historical aerial photographs on Google Earth, it appears the creek carries water until late April or early May. In addition, it is mapped as a palustrine emergent, persistent, seasonally flooded feature on the National Wetlands Inventory Mapper and as an intermittent stream on the Farmington CA USGS 7.5-minute Quadrangle.

2.4 Wildlife Habitats and Vegetation Alliances

Wildlife habitats are generally described in terms of dominant plant species and plant communities along with landform, disturbance regime, and other unique environmental characteristics. The wildlife habitats described in this section are based on the California Department of Fish and Wildlife's (CDFW) A Guide to Wildlife Habitats (Mayer and Laudenslayer, 1988) that is used in CDFW's California Wildlife Habitat Relationships System.

Within CDFW's current vegetation classification system, vegetation alliances are the scientifically derived hierarchical class that corresponds best with plant communities and are designed to be the unit for conservation of rare or threatened plant communities (Sawyer et al., 2009). Vegetation alliances typically represent a much finer scale of vegetation description than wildlife habitats but correspond appropriately with one or several wildlife habitat types. CDFW provides crosswalks to help correlate vegetation alliances with wildlife habitats and the descriptions below make use of the crosswalk. A description of each habitat type is presented below. Related vegetation alliances are listed following the wildlife habitat description and are based on the alliance descriptions presented by Sawyer et al. (2009). **Appendix A** includes the list of species observed and the wetland indicator status of each.

Agriculture

Agricultural fields are present in the southern portion of the BSA and appeared to have been recently disked. Agricultural fields, such as hay fields and row crops, have high foraging habitat value for wildlife species. Red-tailed hawks (*Buteo jamaicensis*) and Swainson's hawks (*Buteo swainsonii*) were observed flying over the agricultural fields within and adjacent to the BSA during the March 2018 field survey.

Ruderal (Disturbed)

Ruderal (disturbed) habitat is present along the banks of NF Duck Creek, along the southern shoulder of Buckman Road, and the parcel of land in the southeast corner of the BSA. This vegetation type is subjected to ongoing or past disturbances (e.g., vehicle use, mowing, herbicide application, etc.). Due to the disturbance regime, assemblages of non-native and introduced weedy species become established. The majority of plant species that occur in ruderal areas are various annual grasses and forbs of Eurasian origin. Some of the common plants observed in the ruderal community within the BSA include Himalayan blackberry (*Rubus armeniacus*), poison hemlock (*Conium maculatum*), yellow star-thistle (*Centaurea solstitialis*), ripgut brome (*Bromus diandrus*), pigweed (*Amaranthus* sp,), long-beaked filaree (*Erodium botrus*), common mallow (*Malva neglecta*), prickly lettuce (*Lactuca serriola*), doveweed (*Croton setigerus*), milk thistle (*Silybum marianum*), wild radish (*Raphanus sativus*), and bristly ox-tongue (*Helminthotheca echioides*).

Urban (Developed)

Within the study area, urban areas are landscaped with ornamental species, paved, or otherwise developed and generally lack natural vegetation. Habitats associated with urban areas include ruderal grassland and disturbed areas. Urban areas within the study area include Buckman Road and the unpaved agricultural access roads, where sparse patches of doveweed, and smooth cat's ear (*Hypochaeris glabra*) grow along the shoulders.

SECTION 3
Methodology

3.1 Definition of "Waters of the U.S."

The federal government defines "Waters of the United States" in 33 CFR (Code of Federal Regulations) 328.3 as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of the above waters;
6. The territorial seas;
7. Wetlands adjacent to the above waters (other than waters that are themselves wetlands). Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.
8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the EPA.

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Under normal circumstances, the definition of wetlands requires three wetland identification parameters be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands may include freshwater marsh, seasonal wetlands, and vernal pool complexes that are adjacent to perennial waters of the U.S.

"Other waters of the U.S." refers to those hydric features that are regulated by the CWA but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high water mark. The term "ordinary high water mark" refers to that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. Examples of other waters of the U.S. may include rivers, creeks, ponds, and lakes.

In January 2001, the U.S. Supreme Court issued a decision in the case of the *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* that altered the Corps' regulatory authority over wetlands that are isolated from navigable waters[1]. On June 5, 2007, the EPA and the Corps released guidance on the definitions of jurisdictional waters of the U.S. in response to *Rapanos v. United States* and *Carabell v. United States*. According to this guidance the Corps and the EPA will take jurisdiction over the following waters:

1. Traditional navigable waters, which is defined as all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. Wetlands adjacent to traditional navigable waters; including adjacent wetlands that do not have a continuous surface connection to traditional navigable waters;
3. Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months);
4. Wetlands adjacent to non-navigable tributaries as defined above; that have a continuous surface connection to such tributaries (e.g. they are not separated by uplands, a berm, dike, or similar feature).

[1] Since the SWANCC decision, waters covered solely by this definition by virtue of their use as habitat by migratory birds are no longer considered "waters of the United States." The Supreme Court's opinion did not specifically address what other connections with interstate commerce might support the assertion of CWA jurisdiction over "nonnavigable, isolated, intrastate waters" under this definition, and the Corps is recommending case by case consideration. A factor that may be relevant to this consideration includes, but is not limited to, the following: Jurisdiction of isolated, intrastate, and nonnavigable waters may be possible if their use, degradation, or destruction could affect other "waters of the United States," thus establishing a significant nexus between the water in question and other "waters of the United States" (Corps, undated memorandum).

5. The EPA and the Corps decide jurisdiction over the following waters, based on a fact-specific analysis to determine if there is a significant nexus, as defined below, to a traditional navigable water (TNW):

    a. Non-navigable tributaries that are not relatively permanent;

    b. Wetlands adjacent to non-navigable tributaries that are not relatively permanent;

    c. Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

The EPA and the Corps generally do not assert jurisdiction over the following features:

1. Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow);

2. Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The EPA and the Corps have defined the significant nexus standard as follows:

1. A significant nexus analysis assesses the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters;

2. Significant nexus includes consideration of hydrologic and ecologic factors including:

    a. Volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary,

    b. Proximity to the traditional navigable water,

    c. Size of the watershed,

    d. Average annual rainfall,

    e. Average annual winter snow pack,

    f. Potential of tributaries to carry pollutants and flood waters to traditional navigable waters,

    g. Provision of aquatic habitat that supports a traditional navigable water,

    h. Potential of wetlands to trap and filter pollutants or store flood waters, and

    i. Maintenance of water quality in traditional navigable waters.

In April 2011, the EPA and the Corps released draft guidance to clarify protection of waters under the Clean Water Act and further clarify how they will implement the Supreme Court's decisions on this topic (SWANCC and Rapanos). Because the guidance is still in draft form and has not yet been finalized, it is not a rule, and hence it is not binding and lacks the force of law. Although the

guidance does not have the force of law, it is currently being used by Federal agencies to explain and clarify their understandings of existing requirements. Therefore, this wetland delineation report follows the April 2011 draft guidance. The guidance is focused on protection of streams that flow long distances before reaching traditionally navigable waters, small streams, streams that flow for only part of the year, and many wetlands and ponds that cumulatively affect the health of the nation's navigable waters. The guidance does not extend federal protection to any waters not historically protected under the Clean Water Act and will be fully consistent with the law, including decisions of the Supreme Court. The guidance also maintains all of the existing exemptions for agricultural discharges and waters. The guidance gives specific direction on the jurisdictional status of non-tidal ditches (including roadside and agricultural ditches). According to this guidance the Corps and the EPA will take jurisdiction over the following non-tidal ditches:

- Non-tidal ditches that have a bed, bank, and ordinary high water mark; connect directly or indirectly to a traditional navigable or interstate water; and have one of the following five characteristics:
    - Natural streams that have been altered (e.g. channelized, straightened or relocated);
    - Ditches that have been excavated in waters of the U.S., including wetlands;
    - Ditches that have relatively permanent flowing or standing water;
    - Ditches that connect two or more jurisdictional waters of the U.S.; or
    - Ditches that drain natural water bodies (including wetlands) into the tributary system of a traditional navigable or interstate water.

The scope of waters of the U.S. does not include all waters. EPA and the Corps previously have described in preambles to CWA regulations waters that the agencies generally do not consider to be waters of the U.S. The categories of waters generally not waters of the U.S. include:

- Wet areas that are not tributaries or open waters and do not meet the regulatory definition of wetlands.
- Waterbodies excluded from coverage under the CWA by existing regulations.
- Waters that lack a significant nexus when one is required for jurisdiction.
- Artificially irrigated areas which would revert to upland if the irrigation ceased.
- Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
- Artificial reflecting pools or swimming pools excavated in uplands.
- Small ornamental bodies of water created by excavating and/or diking dry land to retain water primarily for aesthetic reasons.
- Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the

construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the U.S.

- Groundwater drained through subsurface drainage systems.
- Erosional features (gullies and rills), and swales and ditches that are not tributaries or wetlands.

3.2 Pre-field Review

Prior to conducting the field investigation, the following background tasks were conducted:

- Review of USGS 7.5 minute topographic quadrangle for Farmington, CA (USGS 1968);
- Review of color aerial photography for vegetative, topographic, and hydrologic signatures;
- Review of the *Custom Soil Resource Report for San Joaquin County, California* (NRCS, 2018a), for information about soils and geomorphology;
- Review of the National Hydric Soils List for California, San Joaquin County (NRCS, 2018b) to determine if any soils mapped within the study area are considered hydric at the level of soil series;
- Review of the National Wetlands Inventory (USFWS, 2018).

3.3 Field Investigation

A delineation of wetlands and other waters of the U.S. was conducted within the study area by DHA biologist Lindsay Tisch on March 19, 2018. The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps, 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed.

Three positive wetland parameters must normally be present for an area to be wetland: 1) a dominance of wetland vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. Presence or absence of positive indicators for wetland vegetation, soils, and hydrology was assessed per the 1987 Manual and Arid West Supplement guidelines. No wetlands were identified within the study area therefore no data points were collected.

For "other waters of the U.S." to be considered jurisdictional, these features must exhibit a defined bed and bank and an OHWM. Drainages with obvious bed and banks and OHWM were characterized by noting vegetation, geomorphology (e.g., incision) and hydrologic characteristics, and by measuring representative channel bank cross-sections to obtain average bankfull width (i.e., ordinary high water mark). Representative channel cross-section

average bankfull width was recorded in the field and used to map stream channels in GIS, along with high-resolution aerial photographs and detailed topographic data.

Representative photographs were taken throughout the study area, a selection of which is contained in **Appendix B**.

3.4 Mapping and Acreage Calculations

Within the study area, boundaries of potentially jurisdictional waters of the U.S. were recorded in the field on color aerial photo base maps at a scale of 1 inch = 50 feet. Field mapping was digitized onto the aerial base maps using ArcGIS 10.3 software. The acreages of potential jurisdictional features were calculated with ArcGIS, based on the portion of each feature contained within the study area.

SECTION 4.0
Results

4.1 Results

This wetland delineation identified approximately 0.07 acres of potentially jurisdictional features within the study area which consist of other waters of the U.S. Potentially jurisdictional features within the study area include NF Duck Creek. Aquatic communities and habitats were classified using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The locations and extent of jurisdictional features are depicted in **Figure 4-1**, with a summary also provided in **Table 4-1**. Section 4.1.1 (below) describes the other waters of the US in greater detail.

TABLE 4-1
POTENTIALLY JURISDICTIONAL FEATURES WITHIN THE PROJECT STUDY AREA

Map ID	Wetland Type – Cowardin Classification	Average Width of OHWM (feet)	Length (feet)	Acres
Other Waters				
NF Duck Creek	Creek – Riverine Intermittent	16	200	0.07
Total Area of Potentially Jurisdictional Features:		**16**	**200**	**0.07**

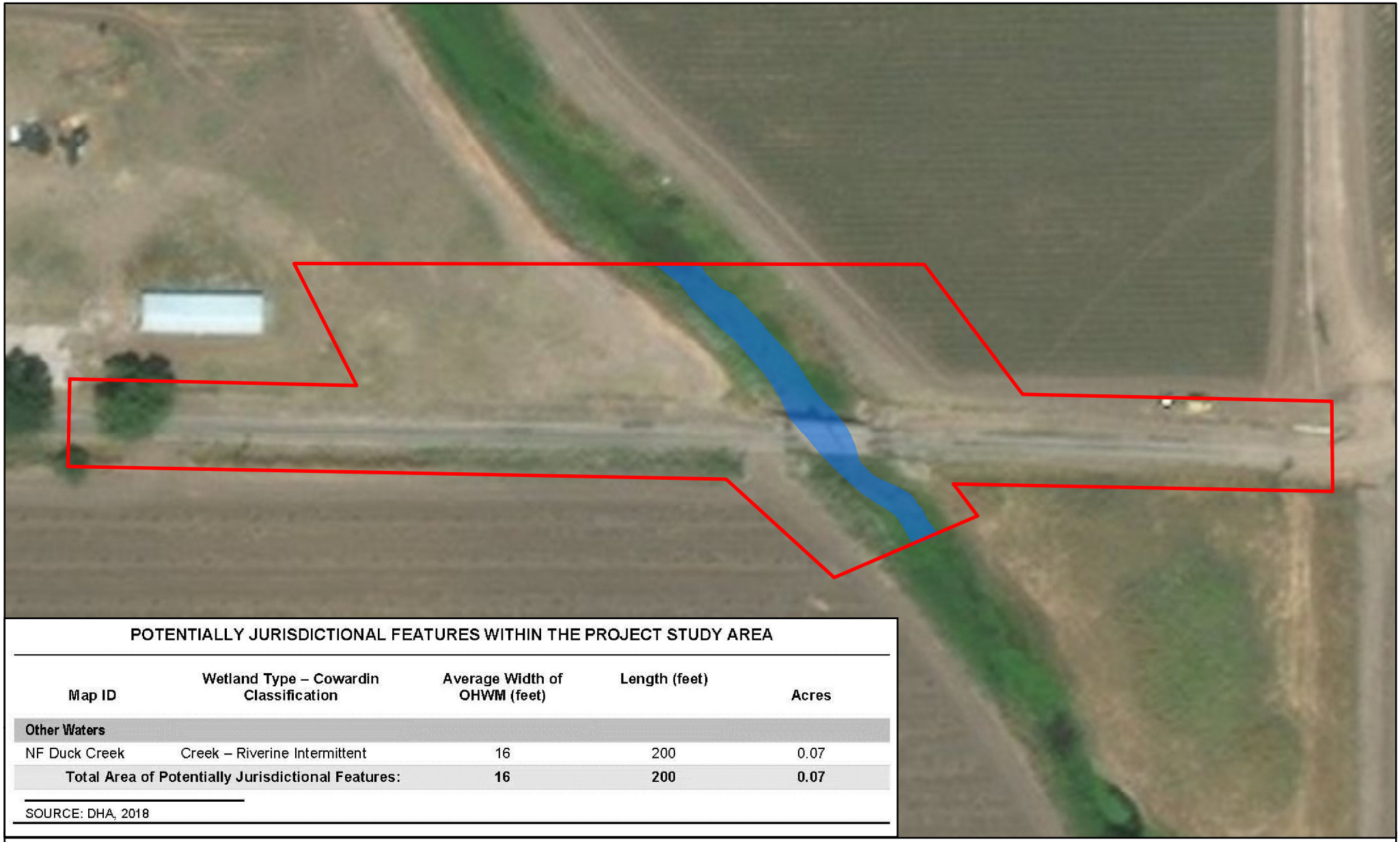
SOURCE: DHA, 2018

4.1.1 Potentially Jurisdictional Waters of the U.S.

NF Duck Creek (*Riverine Intermittent*)

Within the study area, NF Duck Creek is classified as "riverine intermittent" using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et. al, 1979). An intermittent channel has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

NF Duck Creek is mapped as an intermittent stream on the USGS Farmington quad map and based on a review of historical aerial photographs on Google Earth, it appears the creek typically carries water from late fall (October/November) to mid-spring (April/May), however during years of high precipitation the creek has visible pools, and likely a small amount of flow, into June. NF Duck Creek is classified as a palustrine, emergent, persistent, seasonally flooded (PEM1C) feature on the current NWI map (USFWS 2018c). NF Duck Creek is tributary to Duck



POTENTIALLY JURISDICTIONAL FEATURES WITHIN THE PROJECT STUDY AREA

Map ID	Wetland Type – Cowardin Classification	Average Width of OHWM (feet)	Length (feet)	Acres
Other Waters				
NF Duck Creek	Creek – Riverine Intermittent	16	200	0.07
Total Area of Potentially Jurisdictional Features:		**16**	**200**	**0.07**

SOURCE: DHA, 2018

Legend

Project Study Area

Potentially Jurisdictional Waters of the U.S

Riverine - Intermittent

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Potentially Jurisdictional Waters of the U.S

Figure 4-1

Creek and occupies approximately 0.07 acres in the study area with a total length of 200 feet. The average width of the OHWM of NF Duck Creek in the study area is approximately 16 feet. NF Duck Creek had approximately 2 to 4 feet of slow-moving water. The banks are gently sloping and vegetated primarily with non-native invasive species (i.e. Himalayan blackberry and poison hemlock). Concrete blocks of rip-rap line the banks. The bed of NF Duck Creek is sandy silt with patches of hydrophytic vegetation (cattails) growing within the channel.

The OHWM determination was based on scour, wracking, destruction of terrestrial vegetation, and deposition. When water is flowing, it appears that the majority of the creek in the study area consists of a mix of shallow and deep glides and pools. The deepest pools in the creek appear to obtain a maximum depth of approximately four feet during high spring flows.

NF Duck Creek was mapped as a polygon feature based on field data, topographic data, and aerial photos. The total extent was calculated in GIS.

4.1.2 Jurisdictional Analysis

Jurisdictional Features

The Corps and EPA issued guidance related to the Rapanos decision on June 5, 2007. The *Rapanos-Carabell* consolidated decisions addressed several issues, including the question of jurisdiction in relation to waters that are relatively permanent (RPW) or are not relatively permanent (non-RPW). It was concluded that non-RPWs that have a "significant ecological nexus" with a TNW, including non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally; wetlands adjacent to such tributaries; and wetlands adjacent to but that do not directly abut permanent, non-navigable tributary, may be considered waters of the U.S. A significant nexus can be determined to be present if the tributary, in combination with any adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical, and biological integrity of a TNW. Key considerations when evaluating a significant nexus include volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to the TNW, plus hydrologic, ecologic, and other functions related to the tributary and all of its adjacent wetlands.

NF Duck Creek is hydrologically connected to the San Joaquin River, a TNW, by surface water (**Figure 4-2**). In a typical year, NF Duck Creek would have continuous flows seasonally for at least three months; therefore, NF Duck Creek should be considered an RPW that is a non-navigable tributary to a TNW and should be considered as a regulated feature under the CWA.

4.2 Conclusions

A total of 0.07 acres of potentially jurisdictional features occur within the 1.36-acre study area consisting of other waters of the U.S. This report documents the wetland boundary delineation and best professional judgment of DHA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and verification in writing by the Corps.

Legend

- Project Study Area
- Direction of Flow
- NF Duck Creek
- Duck Creek
- Walker Slough
- French Camp Slough
- San Joaquin River

0 0.75 1.5 3 Miles

drake haglan AND ASSOCIATES

Source: ESRI Online Basemap, USGS Topo Maps; CDFW 2017; San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Route to Traditional Navigable Waterway

Figure 4-2

SECTION 5.0
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APPENDIX A
Plant Species Observed within the Study Area

TABLE A-1
VASCULAR FLORA RECORDED FROM THE STUDY AREA

Scientific Name*	Common Name	Wetland Indicator Status
Avena barbata	slender wild oat	NL
Avena fatua	common wild oat	NL
Bromus diandrus	ripgut brome	NL
Centaurea solstitialis	yellow star-thistle	NL
Conium maculatum	poison hemlock	FACW
Croton setigerus	doveweed	NL
Erodium botrys	filaree	FACU
Galium aparine	cleavers	FACU
Geranium molle	geranium	NL
Helminthotheca echioides	bristly ox-tongue	FAC
Hordeum murinum	hare barley	FAC
Hypochaeris glabra	smooth cat's-ear	NL
Lactuca serriola	prickly lettuce	FACU
Pastinaca sativa	wild parsnip	NL
Raphanus raphanistrum	wild radish	NL
Rubus armeniacus	Himalayan blackberry	FAC
Silybum marinum	milk thistle	NL
Typha spp.	cattail	OBL
Vicia sativa	spring vetch	UPL
Xanthium strumarium	rough cocklebur	FAC

NOTES: * National List of Plant Species that Occur in Wetlands: California Region 0 (Lichvar et al,2016).
Plant taxonomy follows the Jepson Manual (Baldwin et al., 2012)

Wetland Indicator Status Notes:

OBL	=	Obligate Wetland; occur almost always (estimated probability >99%) under natural conditions in wetlands.
FACW	=	Facultative Wetland; usually occur in wetlands (estimated probability 67–99%), but occasionally found in non-wetlands.
FAC	=	Facultative; equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%).
FACU	=	Facultative Upland; usually occur in nonwetlands (estimated probability 67–99%), but occasionally found in wetlands.
UPL	=	Obligate Upland; occur almost always (estimated probability >99%) under natural conditions in nonwetlands within this region.
NL	=	Not listed
--	=	Species unidentified in field

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APPENDIX B
Site Photos

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure B-1

Representative photo of upstream NF Duck Creek (Top) and downstream NF Duck Creek (Bottom). Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure B-2

Representative photo of agriculture habitat (Top) and ruderal (disturbed) habitat (Bottom) within the study area.
Photo date: March 19, 2018

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APPENDIX C
NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Joaquin County, California

Buckman Road over NF Duck Creek

June 19, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

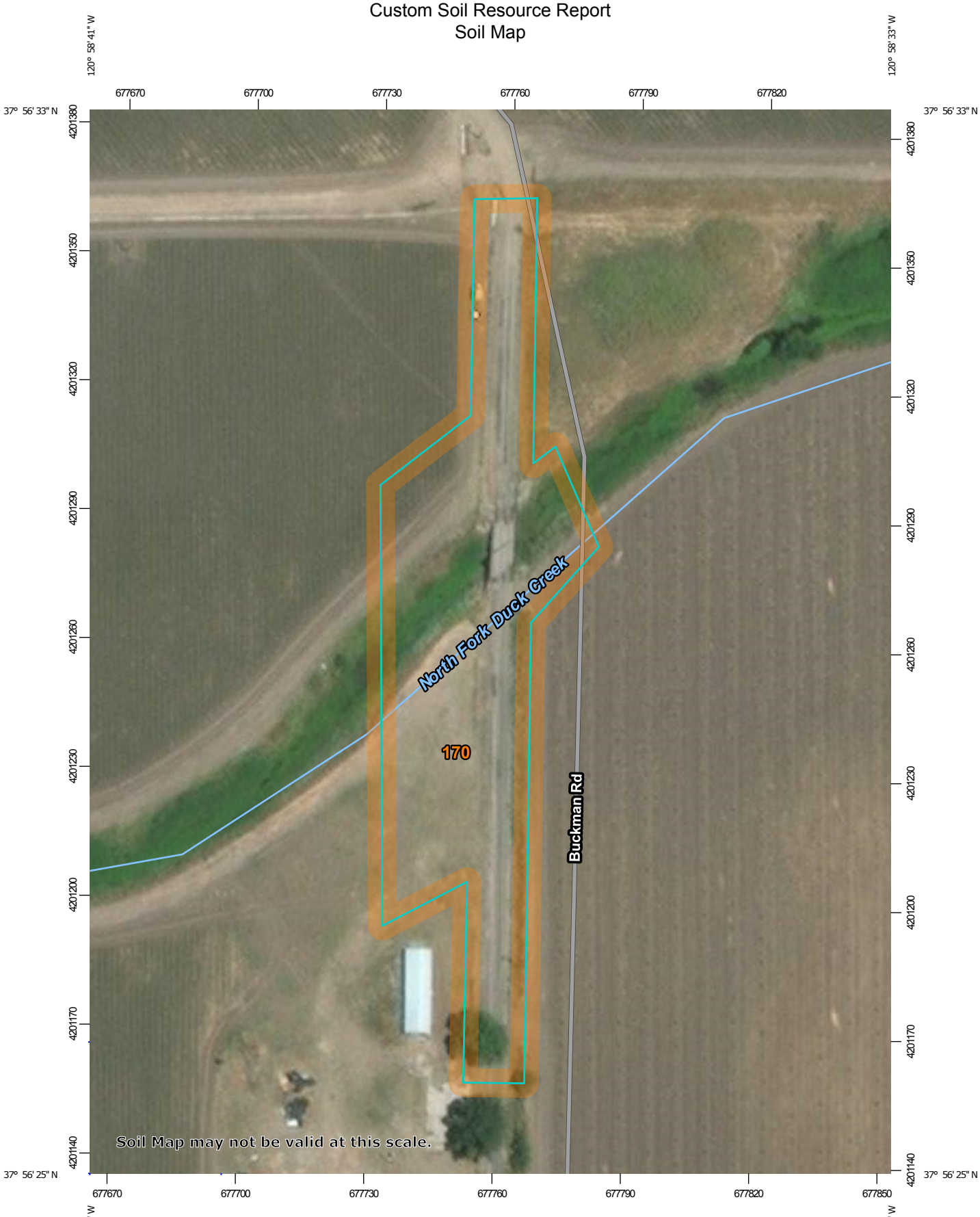
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: San Joaquin County, California
Survey Area Data: Version 11, Oct 6, 2017

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

Date(s) aerial images were photographed: Mar 16, 2016—Oct 3, 2016

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
170	Hicksville loam, 0 to 2 percent slopes, occasionally flooded	1.4	100.0%
Totals for Area of Interest		**1.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Joaquin County, California

170—Hicksville loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: hht7
Elevation: 100 to 140 feet
Mean annual precipitation: 17 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hicksville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hicksville

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed rock sources

Typical profile

A - 0 to 15 inches: loam
Bt - 15 to 36 inches: clay loam
2Bt - 36 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 60 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: LOAMY STREAM TERRACE (R017XE103CA)
Hydric soil rating: No

Minor Components

Yellowlark
Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed, gravelly subsoil
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, clayey textures
Percent of map unit: 3 percent
Hydric soil rating: No

Pentz
Percent of map unit: 2 percent
Hydric soil rating: No

Redding
Percent of map unit: 2 percent
Hydric soil rating: No

Rocklin
Percent of map unit: 2 percent
Hydric soil rating: No

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Appendix D Photographs

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-1

Representative photo of upstream NF Duck Creek (Top) and downstream NF Duck Creek (Bottom). Photo date: March 19, 2018

Buckman Road Bridge Replacement Project

Source: L.Tisch

Figure C-2

Representative photo of agriculture habitat (Top) and ruderal (disturbed) habitat (Bottom) within the BSA.
Photo date: March 19, 2018

Appendix E Plant and Wildlife Species Observed

Plant and Animal List at Buckman Road over NF Duck Creek

Survey Date: 05/04/2016
Surveyors: DHA biologist Lindsay Tisch

Plant Species Observed:

Avena barbata	slender wild oat
Avena fatua	common wild oat
Bromus diandrus	ripgut brome
Centaurea solstitialis	yellow star-thistle
Conium maculatum	poison hemlock
Croton setigerus	turkey mullein
Erodium botrys	filaree
Galium aparine	cleavers
Helminthotheca echioides	bristly ox-tongue
Hordeum murinum	hare barley
Hypochaeris glabra	smooth cat's-ear
Lactuca serriola	prickly lettuce
Raphanus raphanistrum	wild radish
Rubus armeniacus	Himalayan blackberry
Silybum marinum	milk thistle
Typha spp.	cattail
Vicia sativa	spring vetch

Animal Species Observed:

Agelaius phoeniceus	Red-winged blackbird
Aphelocoma californica	western scrub-jay
Buteo jamaicensis	red-tailed hawk
Mimus polyglottos	northern mockingbird
Molothrus ater	brown-headed cowbird
Passer domesticus	house sparrow
Petrochelidon pyrrhonota	cliff swallow
Sayornis nigricans	black phoebe
Turdus migratorius	American robin
Zonotrichia leucophrys	white-crowned sparrow

APPENDIX D:

HISTORIC PROPERTY SURVEY REPORT AND ARCHAEOLOGICAL SURVEY REPORT

HISTORIC PROPERTY SURVEY REPORT

1. UNDERTAKING DESCRIPTION AND LOCATION

District	*County*	*Federal Project. Number. (Prefix, Agency Code, Project No.)*	*Location*
10	San Joaquin	BRLO 5929(241)	Buckman Road over Duck Creek

The studies for this undertaking were carried out in a manner consistent with Caltrans' regulatory responsibilities under Section 106 of the National Historic Preservation Act (36 CFR Part 800) and pursuant to the January 2014 *First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act* (Section 106 PA).

Project Description:

The Buckman Road Bridge has been rated as functionally obsolete and has a sufficiency rating of 68.4. The bridge is on the eligible bridge list and qualifies for federal funding under the Highway Bridge Program. The Federal and Local Highway Bridge Program Federal-Aid number is BRLO 5929 (241) and the funds would be administered by the Caltrans District 10, Office of Local Assistance, Stockton.

The purpose of the project is to provide a new functional structure that is consistent with the American Association of State Highway and Transportation Officials (AASHTO) and Caltrans design standards for roadway geometry, accessibility, hydraulics, and structural integrity. The project consists of replacing the bridge (No. 029-307) over Duck Creek with a cast-in-place reinforced concrete bridge with a 42-foot span. The work would consist of constructing a temporary low crossing on the west side of the bridge and relocating the farm access road. A full project description, along with location and vicinity maps is included in Attachment A - Archaeological Survey Report (ASR).

2. AREA OF POTENTIAL EFFECTS

In accordance with Section 106 PA Stipulation VIII.A, the Area of Potential Effects (APE) for the project was established in consultation with Ben Elliott, Archaeologist PQS-PI/Prehistoric Archaeology; Parminder Singh, Chief Caltrans District 10 Local Assistance District Engineer on July 12, 2017; and Mahmoud Saqqa, Local Agency Manager, San Joaquin County on March 15, 2017 (Appendix A of the ASR).

The 1.4-acre APE consists of the bridge (No. 29C-307) over Duck Creek and extends approximately 240 feet from the bridge to the north and 380 feet from the bridge to the south, and a corridor approximately 170 feet wide across the bridge. The detour for the project includes a temporary creek crossing located approximately 20 feet west of the bridge and would not substantially increase travel distance or times for vehicle trips. Staging of construction equipment would occur within APN 18-731-009 to the southwest of the bridge, and would be

approximately 70 feet wide by 105 feet long. The vertical APE includes the construction of the bridge abutments that would require excavation up to approximately 48-feet wide by 55-feet long, and 12-feet deep. A total of 0.98 acres would act as a temporary construction easement (TCE).

3. CONSULTING PARTIES / PUBLIC PARTICIPATION

☒ Local Government

San Joaquin County Department of Public Works

☒ Native American Heritage Commission

Sacred Lands File check on January 5, 2018, was negative for cultural resources.

☒ Native American Tribes, Groups and Individuals

On behalf of the County and Caltrans, AB52 and Section 106 consultation letters were sent to eight tribes on February 6, 2018, with follow-up phone calls placed on March 2 and March 15, 2018.

On March 2, 2018, Randy Yonemura, Cultural Committee Chair of the Ione Band of Miwok Indians, was contacted during the first follow up call attempt and is consulting for the project under AB52 and Section 106. Ms. Starkey left Mr. Yonemura two voice messages in an attempt to consult. No additional contact has been made to date.

Representative Tiger Polk from the Southern Sierra Miwuk Nation left a message for Ms. Starkey on February 9, 2018, that the tribe did not have any project concerns and requested that the tribe be notified in the event of an unanticipated discovery of Native American artifacts or human remains and would like to repatriate them on site, if found.

Katherine Perez of the Northern Valley Yokut/Ohlone/Bay Miwuk emailed Ms. Starkey on March 3, 2018, that the proposed project to replace both bridges in Farmington is a concern; and even though the record search was negative, it does not preclude the fact that the ground disturbances, which may include new widening area of undisturbed ground, could have inadvertent discovery. The recommendation of the tribe is to have a qualified archaeological firm and a Native American monitor during the ground disturbance. A follow-up email was sent to Ms. Perez on August 15, 2018 and followed up with a voice message the following week providing information on the sensitivity for buried archaeological deposits. The email and voice message stated there is a low potential for buried resources to be present based on the age of the soil type present (Pleistocene-age), which would pre-date known human

occupation in the area and that for this reason, monitoring during ground disturbance would be unwarranted.

A reasonable and good-faith effort was made to contact all tribes and four did not respond or could not be reached: Buena Vista Rancheria; California Valley Miwok Tribe; Wilton Rancheria; and Crystal Martinez-Alire, Chairperson of Ione Band of Miwok Indians.

☒ Local Historical Society / Historic Preservation Group

The San Joaquin County Historical Society was called and emailed on January 5, 2018, and again on March 19, 2018. No discussion with the society has occurred to date.

4. SUMMARY OF IDENTIFICATION EFFORTS

☒ National Register of Historic Places (NRHP)

☒ California Register of Historical Resources (CRHR)

☒ National Historic Landmark (NHL)

☒ California Historical Landmarks (CHL)

☒ California Points of Historical Interest

☒ California Historical Resources Information System (CHRIS)

☒ Caltrans Historic Bridge Inventory

☐ Caltrans Cultural Resources Database (CCRD)

☒ Other Sources consulted:

The following historic maps were reviewed:

- 1855 General Land Office, Plat map of Township 1 North, Range 9 East;
- 1915 *Trigo, California*. 7.5-minute quadrangle map;
- 1942 *Farmington, California*. 7.5-minute quadrangle map;
- 1953 *Farmington, California*. 7.5-minute quadrangle map; and
- 1968 *Farmington, California*. 7.5-minute quadrangle map

Other historic research pertinent to the study area included:

- *California Place Names* (Gudde 1998);
- *Historic Spots in California* (Kyle 1990);
- Bureau of Land Management land patents; and
- various California Ethnographic and Ethnohistoric literature (see Attachment A - ASR).

☒ Results:

Results of the January 2018 Central California Information Center records search (File No. 10569L) show that no previously conducted cultural resources

investigations or recorded cultural resources are in the APE. Two resources were documented within 1-mile of the APE — prehistoric lithic isolates and a historic-era canal. Seven studies of various sizes were conducted within 1-mile of the project, none directly within the APE (Appendix B of the ASR).

The Caltrans Structures Maintenance and Investigations of Historical Significance of Local Agency Bridges shows Bridge Number 29C-307 over Duck Creek was built in 1931 and is not eligible for listing in the NRHP. No resources listed in the NRHP, CRHR, or local registries are in the APE or within 1-mile of the APE.

An intensive pedestrian survey using tight (5-meter) transects of the entire APE was conducted by Anna M. Starkey, DHA's Principal Archaeologist, on March 19, 2018, resulting in the recordation of three prehistoric isolates 307-ISO1, 307-ISO2, and 307-ISO3 in an area greater than 100 square meters. No architectural resources or buried prehistoric resources were identified in the APE.

5. PROPERTIES IDENTIFIED

☒ Caltrans, in accordance with Section 106 PA Stipulation VIII.C.5 and as applicable PRC 5024 MOU Stipulation VIII.C.5, has determined there are cultural resources within the APE that were **previously determined not eligible** for inclusion in the NRHP and/or not eligible for registration as a CHL with SHPO concurrence and those determinations remain valid. Copy of SHPO/Keeper correspondence is attached.

☒ Bridges listed as **Category 5** (previously determined not eligible for listing in the NRHP) in the Caltrans Historic Bridge Inventory are present within the APE and those determinations remain valid. Appropriate pages from the Caltrans Historic Bridge Inventory are attached (Attachment B).

- Buckman Bridge (No. 29C-307)

☒ Anna M. Starkey, who meets the Professionally Qualified Staff (PQS) Standards in Section 106 PA Attachment 1 and as applicable PRC 5024 MOU Attachment 1 as a Principal Investigator, Prehistoric Archaeology, has determined that the only/only other properties present within the APE meet the criteria for Section 106 PA Attachment 4 (Properties Exempt from Evaluation) and as applicable PRC 5024 MOU Stipulation VIII.C.1 and Attachment 4.

- Isolates 307-ISO1 and 307-ISO2 are greenstone cores and 307-ISO3 is a greenstone flake tool, all recorded on a single Primary DPR form and Location map (Appendix E of the ASR). The three isolates recorded in the APE are exempt from evaluation per Attachment 4 of Section 106 PA - Properties Exempt from

Evaluation, isolated prehistoric finds consisting of fewer than three items per 100 square meters.

6. FINDING FOR THE UNDERTAKING

☒ Caltrans, pursuant to Section 106 PA Stipulation IX.A and as applicable PRC 5024 MOU Stipulation IX.A.2, has determined a Finding of **No Historic Properties Affected** is appropriate for this undertaking because there are no historic properties within the APE.

7. CEQA CONSIDERATIONS

☒ Not applicable; **Caltrans is not the lead agency under CEQA**

8. LIST OF ATTACHED DOCUMENTATION

☒ Project Vicinity, Location, and APE Maps (Figures 1 and 2 and Appendix A of ASR).

☒ Caltrans Historic Bridge Inventory Sheet (Appendix C of the ASR).

☒ Archaeological Survey Report (ASR- Attachment A). Anna M. Starkey, Drake Haglan and Associates. March 2018.

9. HPSR PREPARATION AND CALTRANS APPROVAL

Prepared by: _____ April 18, 2019
Anna M. Starkey Date
Principal Archaeological Investigator
Drake Haglan and Associates, Rancho Cordova

Reviewed for
Approval by: _____ 4/24/2019
Kelli Sullivan Date
PQS Co-Principal Investigator, Prehistoric Archaeology
Division of Planning, Local Assistance, and Environmental
Caltrans District 10, Stockton

Approved by: _____ 4/25/19
Dominic Vitali Date
Environmental Branch Chief
Division of Planning, Local Assistance, and Environmental
Caltrans District 10, Stockton

BRLO-5929(241)
Buckman Road
over Duck Creek

Attachment A. Archaeological Survey Report

CONFIDENTIAL - To review, contact
San Joaquin County Department of Public Works

Archaeological Survey Report

Buckman Bridge (No. 29C-307) Replacement Project

Buckman Road, San Joaquin County, California

Federal Aid Project No. BRLO 5929(241)

7.5′ USGS Quadrangle: F*armington, California* (1968)
Township 1 North, Range 9 East, Section 15
Project Acreage: 1.4± acres
Cultural Resources Identified: 307-ISO1, 307-ISO2, and 307-ISO3

Prepared by Anna M. Starkey
Drake Haglan and Associates
11060 White Rock Road, Suite 200
Rancho Cordova, California 95670
Main Office: 916.363.4210
www.drakehaglan.com

March 2019

drake haglan AND ASSOCIATES

APPENDIX E:

WATER QUALITY TECHNICAL MEMORANDUM

drake haglan AND ASSOCIATES

11060 White Rock Road, Suite 200
Rancho Cordova, CA 95670 ▪ Phone: (916) 363-4210 ▪ Fax: (916) 363-4230

M e m o r a n d u m

To: Reena Gohil
California Department of Transportation
Local Assistance District 10
1976 E. Charter Way,
Stockton, CA 95201

Date: March 5, 2019

Subject: **Water Quality Technical Memorandum for the Buckman Road Bridge Replacement Project (BRLO-5929[241])**

Introduction

The San Joaquin (County) Department of Public Works proposes to replace the existing bridge on Buckman Road over North Fork (NF) Duck Creek (Bridge No. 29C-0307) located approximately 2.8 miles west of the Calaveras County line and approximately 0.8 miles north of State Route (SR) 4 (**Figure 1**). The general setting is agricultural. The bridge carries vehicular traffic over the North Fork (NF) Duck Creek (**Figure 2**).

The Buckman Road Bridge Replacement Project (Project) is funded primarily by the federal-aid Highway Bridge Program (HBP) administered by the Federal Highway Administration (FHWA) through the California Department of Transportation (Caltrans) Local Assistance. The replacement bridge will meet current applicable County, American Association of State Highway and Transportation Officials (AASHTO), and Caltrans design criteria and standards.

The purpose of this Water Quality Technical Memorandum is to provide an analysis of potential water quality degradation associated with the Project proposed by the County.

Project Purpose and Need

According to the Caltrans Bridge Inspection Report (BIR) dated November 14, 2012, the existing bridge has a Sufficiency Rating of 68.4 and is classified as Functionally Obsolete (FO). The FO classification is a result of insufficient deck geometry. In addition, the timber cap at Bent 3 has a check half its length along the neutral axis. The asphalt concrete on the timber deck has cracks along each deck plank. The left wingwall at Abutment 1 has moved laterally. There is a large gap measuring seven inches at the top of the

★ Project Location: Buckman Road Bridge

0 3.75 7.5 15 Miles

Source: ESRI Online Basemap, World Street Map, San Joaquin County;
Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307)
Replacement Project
Farmington, CA

Regional Location Map

Figure 1

★ Project Location: Buckman Road Bridge

0 187.5 375 750 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Location Map

Figure 2

wall between the abutment and the left wingwall. A cable to help reduce the lateral movement was placed behind Abutment 1 and is attached from the left to the right wingwall. The bridge railings have been removed without permission or otherwise damaged by wide agricultural equipment using the narrow bridge.

The purpose of the Project is to provide a new functional structure that is consistent with AASHTO and Caltrans design standards for roadway geometry, accessibility, hydraulics, and structural integrity.

Project Description

Existing Conditions

The bridge was constructed in 1931 and consists of timber deck planks on timber stringers on Douglas fir caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and post bents on PCC pedestal footings. The abutment foundation is unknown. This segment of Buckman Road is a single-lane local roadway ending approximately 750 feet north of the existing bridge. The road services multiple agricultural fields, as well as a couple of residences beyond the bridge.

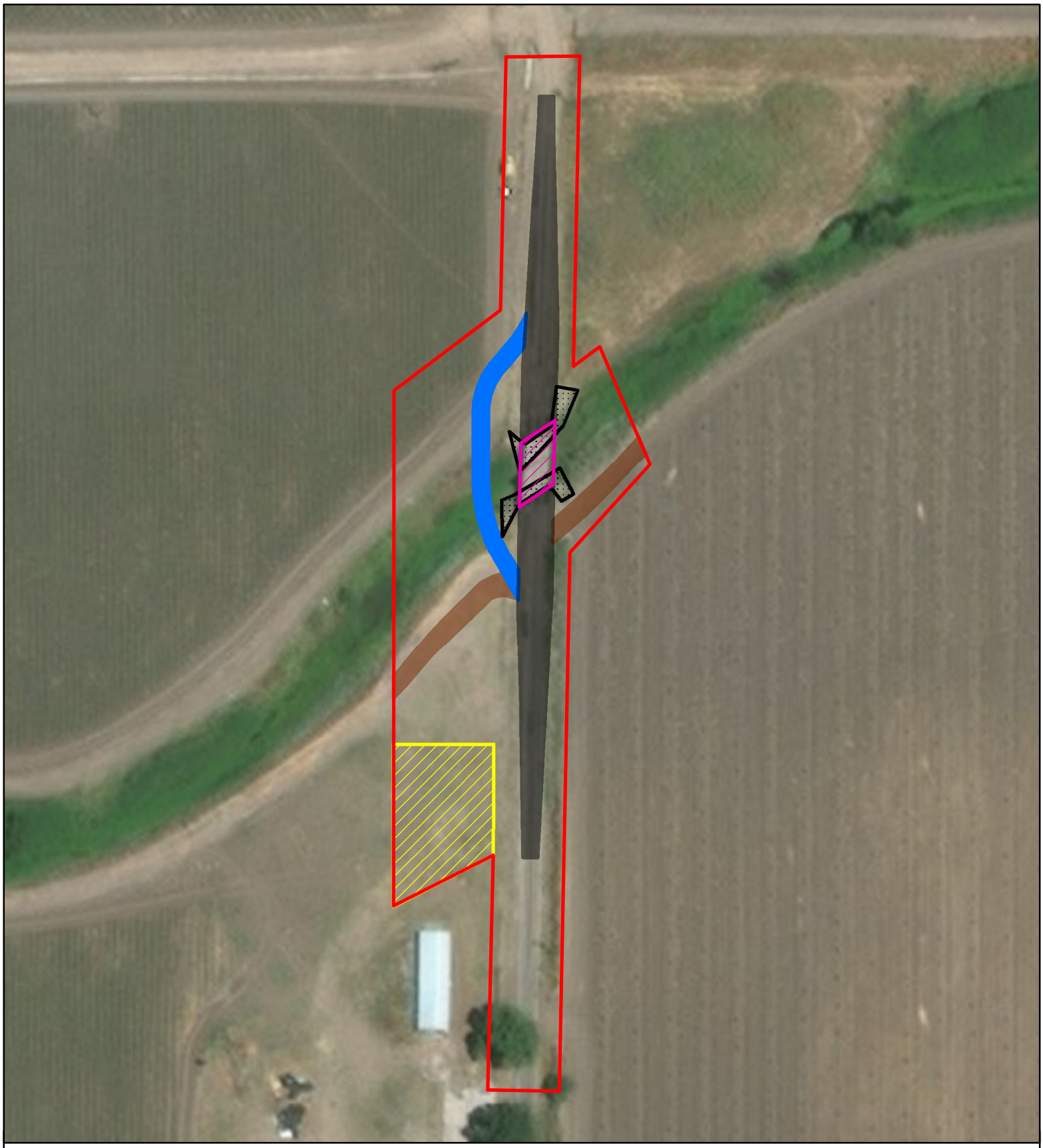
Proposed Conditions

The replacement bridge will be a single span reinforced concrete bridge. The new bridge will consist of one 10-foot lane and 6-foot shoulders to allow for the agricultural equipment that utilizes the bridge. The total width of the new structure will be 25 feet 6 inches. From the end of the bridge, the County will transition the paved 22-foot clear width to match the existing 18-foot roadway. The southern approach transition will be approximately 236 feet while the northern approach will transition at approximately 220 feet. Pile driving will occur up to 80 feet deep for the bridge footings. Work will also include the construction of approach railing with terminal systems and appropriate approach road work at the ends of the bridge. In addition, rock slope protection will be placed in the channel to prevent future scour on the new structure.

A temporary low water crossing will be placed west of and adjacent to the existing bridge to allow access for residences and agricultural field entrances. The detour would include placing two 36-inch diameter corrugated metal pipes within NF Duck Creek which will be covered with clean gravel fill to a height above the ordinary high-water mark. Geotextile fabric placed over the gravel and earth fill will be placed to minimize migration of soil into the creek. In addition, if water is present within the creek when construction is scheduled to begin, a temporary diversion system would be installed to isolate and dewater the work area so the proposed construction activities can occur. The temporary stream crossing and diversion system would be removed once the new bridge is constructed. All in-channel work will be limited to the dry season (June-October).

The new bridge will be designed to avoid additional right-of-way acquisition; however, temporary construction easements and/or permits to enter and construct may be necessary for possible construction staging or contractor access routes. The construction staging area would be located on the southwest side of Buckman Road within a temporary construction easement (TCE).

Construction of the Project is anticipated to take approximately three months to complete, pending a final construction plan. Construction is anticipated to start in May 2021 and as determined appropriate by the irrigation needs of its customers, as well as the United States (US) Fish and Wildlife Service (FWS), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB). The Project site and select Project features are shown in **Figure 3.**



Legend

- Project Impact Area
- Proposed Bridge
- Proposed Roadway
- Proposed RSP
- Temporary Detour Crossing
- Proposed Staging Areas
- Proposed Access Roads

0 25 50 100 Feet

Source: ESRI Online Basemap, World Imagery and World Street Map, San Joaquin County; Coordinate System NAD 83 State Plane California III FIPS 0403 Feet
Notes: This map was created for informational and display purposes only

Buckman Road Bridge (29C-0307) Replacement Project
Farmington, CA

Project Impact Area and Project Details

Figure 3

Regulatory Setting

Federal Laws and Requirements

Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the US from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Known today as the Clean Water Act (CWA), Congress has amended the CWA several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. Important CWA sections include:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant to apply for a federal license or permit to conduct any activity that may result in a discharge to waters of the US and to obtain certification from the State that the discharge will comply with other provisions of the act (this is most frequently required in tandem with a Section 404 permit request described below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the US. The RWQCB administers this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the US. This permit program is administered by the United States Army Corps of Engineers (Corps).

The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The Corps issues two types of 404 permits: Standard permits and General permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when activities are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the Corps' Standard permits. For Standard permits, the Corps decision to approve is based on compliance with US Environmental Protection Agency's (EPA) Section 404 (b) (1) Guidelines (US EPA CFR 40 Part 230), and whether permit approval is in the public interest. The Section 404(b) (1) Guidelines were developed by the US EPA in conjunction with the Corps and allow the discharge of dredged or fill material into the aquatic system (waters of the US) only if there is no practicable alternative which would have less adverse effects. The EPA Guidelines state that the Corps may not issue a permit if there is a less environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the US, and not have any other adverse environmental consequences. Per the EPA Guidelines,

documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The EPA Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the US. In addition, every permit from the Corps, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements (see 33 CFR 320.4).

Clean Water Act Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a Total Maximum Daily Load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. In California, preparation and management of the Section 303(d) list is administered by the RWQCB.

Federal Antidegradation Policy

The federal antidegradation policy is designed to protect water quality and water resources. The policy directs states to adopt a statewide policy that includes the following primary provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, quality shall be maintained and protected unless the state finds that allowing lower-water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Safe Drinking Water Act

The Safe Drinking Water Act was established to protect the quality of waters actually or potentially designated for drinking use, whether from aboveground or underground sources. Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. Primary and secondary Maximum Contaminant Levels (MCL) are established for numerous components of concern including turbidity, total dissolved solids (TDS), chloride, fluoride, nitrate, priority pollutant metals and organic compounds, selenium, bromate, trihalomethane and haloacetic acid precursors, radioactive compounds, and gross radioactivity. All domestic water suppliers must follow the requirements established by this act and its associated amendments.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad

categories of discharges, including point-source municipal waste discharges and nonpoint-source storm water runoff. NPDES permits generally identify the following:

- effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- prohibitions on discharges not specifically allowed under the permit; and
- provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

State Laws and Requirements

Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than waters of the US, such as groundwater and surface waters not considered waters of the US. Additionally, the Porter-Cologne Act prohibits discharges of "waste" as defined; and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act must be regulated by the Waste Discharge Requirements (WDRs) Program, which may regulate the project even when the discharge is already permitted or exempt under the CWA.

State Water Resources Control Board and Regional Water Quality Control Board

The State Water Resources Control Board (SWRCB) and RWQCB are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a study area are contained in the applicable RWQCB Basin Plan. States designate beneficial uses for all water body segments, and then set criteria necessary to protect the uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, each state identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more components and the standards cannot be met through point source controls, the CWA requires the establishment of TMDLs. TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

Central Valley Regional Water Quality Control Board

The Project lies within Central Valley Regional Water Quality Control Board (CVWRQCB) Region 5. The CVRWQCB Region 5 has two Basin Plans covering the Region: one for the Tulare Lake Basin and one for the Sacramento River and San Joaquin River Basins. The Region 5 Basin Plans, like those in other regions, were originally adopted in 1975 and have been updated and revised since that time. The Basin Plan currently applicable to the proposed Project is the Sacramento River and San Joaquin River Basin Plan updated in September of 1998 (fourth edition) and revised in October of 2011 (CVRWQCB 2011).

NPDES – Construction General Permit

Construction General Permit Order No. 2009-0009-DWQ (as amended by 2010-0014-DWQ and 2012-006-DWQ) (CGP) became effective on July 17, 2012. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1 acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than 1 acre is subject to this CGP if there is potential for significant water quality impairment resulting from the activity as determined by the SWRCB or RWQCB. A Notice of Intent (NOI) must be submitted to the SWRCB for approval before construction activities may commence. A completed Notice of Termination Form must be submitted to the SWRCB after the permitted construction is complete. For projects subject to the CGP, contractors are required to file a NOI to be covered under the permit and discharges are required to:

- develop and implement a Storm Water Pollution Prevention Plan (SWPPP) with best management practices (BMPs) that prevent construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off-site into receiving waters;
- Eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the U.S.; and
- Perform inspections of all BMPs.

The CGP separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

One primary factor considered when determining Risk Level is the water quality of receiving water bodies. High risk receiving water bodies are listed on the 303(d) list for water bodies impaired for sediment; have a USEPA approved sediment-related TMDL; or have beneficial uses of SPAWN, MIGRATORY, and COLD.

Within the Central Valley for projects that include dewatering, the contractor (under very specific conditions and under a permit or waiver) can discharge to water or to land. The permits and waiver that typically apply for bridge replacement projects, contingent upon operational field variables, parameters, and Regional Board approval, include the following:

- State Water Resources Control Board Water Quality Order No. 2003-003-DWQ General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality
- California Regional Water Quality Control Board Central Valley Region Resolution R5-2013-0145: Approving Waiver of Reports of Waste Discharge and Waste Discharge Requirements for Specific Types of Discharge within the Central Valley Region

- California Regional Water Quality Control Board Central Valley Region Order R5-2013-0074, NPDES NO. CAG995001: Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters

California Department of Fish and Wildlife

The CDFW reviews applications and issues Streambed Alteration Agreement Permits under Section 1600 of the California Fish and Game Code (CFGC) to persons or entities seeking to alter a streambed. Notifications to CDFW must be made for all activities that may divert water; change bed material; or deposit sediment in or near a river, stream, or lake that flows at least intermittently through a bed or channel. If CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a streambed alteration agreement will be prepared. The streambed alteration agreement includes reasonable conditions necessary to protect those resources and must comply with the CEQA. The entity may proceed with the activity in accordance with the final streambed alteration agreement.

Regional and Local Requirements

San Joaquin County General Plan

The San Joaquin County General Plan, Natural and Cultural Resources Element, provides policy guidance and implementation measures to address the conservation and long-range management of the County's limited water resources.

Affected Environment

Topography

The Project site is located on the agriculturally-dominated floor of the Central Valley, an area characterized by vast agricultural regions and dotted with numerous population centers, including the small community of Farmington, the closest unincorporated community approximately 1.5 miles southwest of the Project site. Topography is generally flat. The Project site is at an elevation of approximately 122 feet above sea level. The closest water body that could be impacted by construction is NF Duck Creek.

Special – Status Species

The Project area provides potential habitat for one federally-listed species: giant garter snake (*Thamnophis gigas*) and two state listed species and one state candidate for listing: giant garter snake, Swainson's hawk (*Buteo swainsonii*), and tricolored blackbird (*Agelaius tricolor*), respectively. In addition, the following species of concern may be present: western spadefoot (*Spea hammondii*), western pond turtle (*Emys marmorata*), and burrowing owl (*Athene cunicularia*).

For further information on special-status species within the Project area, please refer to the *Natural Environment Study* and *Biological Assessment* which includes discussions of potential impacts to these species and avoidance and minimization measures that would be incorporated into the Project to reduce impacts.

Hydrology

Regional Hydrology

NF Duck Creek belongs to the Rock Creek – French Camp Slough watershed (HUC 18040051) within the San Joaquin River Basin. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. The area includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. The Rock Creek – French Camp Slough watershed covers approximately 472.8 square miles (302,576 acres or 9,130 square kilometers) and includes San Joaquin, Stanislaus, and Calaveras counties.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

Local Hydrology

NF Duck Creek is an intermittent stream that flows in a northeast to southwest direction, beginning northeast of the Project site, before draining into Duck Creek approximately 0.5 miles southwest of the Project site. It is approximately 13 miles long and is within the Upper Duck Creek watershed (HUC 180400510401) which drains an area of approximately 28 square miles (73 square kilometers). Based on a review of historical aerial photographs on Google Earth, it appears the creek carries water until late April or early May. In addition, it is mapped as a palustrine emergent, persistent, seasonally flooded feature on the National Wetlands Inventory Mapper and as an intermittent stream on the Farmington CA USGS 7.5' Quadrangle.

Groundwater

NF Duck Creek is located within the Eastern San Joaquin groundwater sub-basin. Groundwater in the Eastern San Joaquin sub-basin contains calcium-magnesium bicarbonate or calcium-sodium bicarbonate. Water contamination in the sub-basin includes high concentrations of chlorides, salinity intrusion, and some nitrate and arsenic contamination. Large parts of the sub-basin along the San Joaquin River contain chlorides, resulting from salinity intrusion from the west. Declining water levels and increasing salinity intrusion are major concerns in the Eastern San Joaquin sub-basin (DWR 2006).

Groundwater measurements over the past 40 years show a fairly continuous decline in groundwater levels in Eastern San Joaquin County. Groundwater levels have declined at an average rate of 1.7 feet per year and have dropped as much as 100 feet in some areas. It is estimated that groundwater overdraft during the past 40 years has reduced storage in the basin by as much as 2 million acre-feet. Due to the continued overdraft of groundwater within the subbasin, significant groundwater depressions are present below the City of Stockton, east of Stockton, and east of Lodi. Several of these groundwater depressions extend to depths of about 100 feet below ground surface (or more than 40 feet below mean sea level) (DWR 2006).

Existing Water Quality

At the Project site, Buckman Road influences water quality in NF Duck Creek. Vehicles traveling on Buckman Road are sources of oil, grease, gasoline, heavy metals, and combustion byproducts. Land uses

surrounding NF Duck Creek consist of agriculture. Water pollutants associated with agricultural land uses include fertilizers, herbicides, and pesticides; pollutants from vehicles; animal waste; and improperly disposed of chemicals.

NF Duck Creek is not included in the 2010 California 303(d) List of Water Quality Limited Segments as it has not been assessed. However, Duck Creek, which NF Duck Creek flows into, approximately 0.5 river miles southwest of the Project site, is included on the list for chlorpyrifos, E. coli, and mercury from unknown sources (SWRCB, 2010). Therefore, it is likely NF Duck Creek also has these water quality impairments.

Beneficial Uses and Water Quality Objectives/Standards

Beneficial uses are not set in the Basin Plan explicitly for NF Duck Creek, but standards are established for the San Joaquin River to which NF Duck Creek is a tributary. The Basin Plan states that the beneficial uses of any specifically identified water body generally apply to its tributary streams. Therefore, beneficial uses applied to the San Joaquin River would also apply to NF Duck Creek. Beneficial uses are set in the Basin Plan for the San Joaquin River and include municipal and domestic supply, agriculture water supply, industrial water supply, recreation, commercial and sport fishing, freshwater habitat, migration and spawning of aquatic organisms, and wildlife habitat for terrestrial species (RWQCB, 2016).

Water quality objectives for surface waters in the region have been set for bacteria, bioaccumulation, biostimulatory substances, mercury and methylmercury, chemical components, color, dissolved oxygen (DO), floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, sulfide, tastes and odors, temperature, toxicity, and turbidity.

Water Quality Impacts

Construction-Related Impacts

Construction activities would include the series of activities described above, under Project Description, that would result in disturbance within and adjacent to NF Duck Creek. Proposed channel disturbance during construction, including installation of Rock Slope Protection (if required), could result in a temporary increase in turbidity in and around the area of the in-channel construction footprint. In addition, the use of construction equipment and other vehicles could result in spills of oil, grease, gasoline, brake fluid, antifreeze, or other vehicle-related fluids and pollutants. Improper handling, storage, or disposal of fuels and materials, or improper cleaning of machinery could cause surface water and groundwater quality degradation.

A temporary culvert detour would be installed to maintain access to the surrounding agricultural fields; and if water is present when construction is scheduled to begein, a temporary diversion system would be installed to isolate and dewater the work area so the construction activities can occur. Installation of the temporary culvert detour and diversion system could result in a temporary increase in turbidity. Dewatering discharge could result in an adverse effect to water quality if the effluent contains chemical pollutants or high levels of sediment. While sediment is the primary pollutant of concern, all construction

effluents, such as nitrogen, oil and grease, total petroleum hydrocarbons, and sulfide,s could potentially impact water quality.

Large pieces of construction equipment may compress soil within the Project work area, which could lead to a reduction in permeability and an increase in site runoff.

Operation-Related Impacts

Implementation of the bridge replacement would not substantially modify the character of the Project site in terms of sources of water pollutants. Vehicles traveling on Buckman Road and rural and agricultural land uses would remain the primary sources of water pollutants at the Project site. The Project would not change the number of vehicles traveling on Buckman Road or other nearby land uses in the watershed.

Cumulative Impacts

NEPA and CEQA require that the direct, indirect, and cumulative impacts of proposed actions be assessed and disclosed. A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions. In the case of this memorandum, water quality is the natural resource of primary concern. With preparation and implementation of BMPs as required under the SWPPP and the avoidance and minimization measures discussed below, the Project would not adversely affect water quality. There are no known concurrent projects within the vicinity of the Project that would also contribute to water quality impacts to NF Duck Creek. The BRLO 5929 (245) bridge replacement project that is located on along Buckman Road and is being constructed concurrently with the Project is located on Duck Creek, which connects to the NF Duck Creek approximately 2,000 feet downstream of the Project site. Cumulative impacts to the NF Duck Creek would not result from the construction of both bridges concurrently as they are located on separate waterways. In regards to future projects, smallscale recreation and rural residential are the types of projects that are most likely to occur in the vicinity of the Project. While future development within the watershed could result in water quality, erosion, and drainage impacts to the NF Duck Creek and surrounding waterways, the incremental effects of the Project are not considerable when viewed in the context of effects from past projects and probable future projects. Future development within the watershed is subject to the federal, state, and local regulations described herein and would be required to implement BMPs to reduce water quality impacts to the extent practicable. Therefore, no adverse cumulative impacts are expected.

Best Management Practices

BMPs designed to address water quality (and related special status species) impacts are described below and will be finalized in consultation with the Project engineer, County, CVRWQCB, and other appropriate agencies.

- The contractor will develop and implement a toxic materials control and spill response plan to regulate the use of hazardous materials, such as the petroleum-based products used as fuel and

lubricants for equipment and other potentially toxic materials associated with Project construction.

- Standard construction BMPs will be implemented throughout construction to avoid and minimize adverse effects to the water quality within the Project site. Appropriate erosion control measures will be used (e.g., straw wattles, filter fences, vegetative buffer strips, or other accepted equivalents) to reduce siltation and contaminated runoff from the Project site. The specific BMPs to be implemented will be described in full in the Project SWPPP. All erosion control materials, including straw wattles and erosion control blanket material used on-site, will be biodegradable. Use of erosion control containing plastic monofilament will not be allowed as wildlife may become entrapped in this material. Wattles should be wrapped with 100 percent biodegradable materials like burlap, jute, or coir.
- Measures would be implemented during ground-disturbing activities to reduce erosion and sedimentation. These measures may include mulches, soil binders/erosion control blankets, silt fencing, fiber rolls, and temporary berms.
- Existing vegetation would be protected using temporary fencing or other protection devices, where feasible, to reduce erosion and sedimentation.
- Exposed soils would be covered by loose bulk materials or other materials to reduce erosion and runoff during rainfall events.
- Exposed soils would be stabilized, through watering or other measures, to prevent the movement of dust at the Project site caused by winds and construction activities, such as traffic and grading activities.
- All construction roadway areas would be properly protected to prevent excess erosion, sedimentation, and water pollution.
- Temporary berms would be constructed along the tops of slopes to prevent water from running uncontrolled from slopes during construction activities. Water would be collected in these berms and taken down the slopes in an erosion-proof drainage system. Sediment that is collected within these berms would be allowed to “settle out” and would be removed from the site.
- All erosion control measures and storm water control measures would be properly maintained until the site has been returned to a pre-construction or improved state.
- All temporarily disturbed areas would be restored to pre-construction contours and revegetated, either through hydroseeding or other means, with native or approved non-invasive exotic species.
- All construction materials would be hauled off-site after completion of construction activities.

Requirements for Storm Water Pollution Prevention Plans

- The SWPPP shall be prepared and implemented to address all construction-related activities, equipment, and materials that have the potential to impact water quality.

- The SWPPP shall identify the sources of pollutants that may affect the quality of storm water and include the construction site BMPs to control pollutants such as sediment control, catch basin inlet protection, construction materials management, and non-storm water BMPs.
- The SWPPP shall be prepared according to the requirements stated in the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activities (Construction General Permit, Order No. 2009-0009-DWQ [as amended by Order No. 2010-0014-DWQ and 2012-006-DWQ]), or subsequent permit in effect at the time of construction.
- All construction site BMPs shall follow the latest edition of the Storm Water Quality Handbooks: Construction Site Best Management Practices (BMPs) Manual to control and minimize the impacts of construction related activities, material, and pollutants on the watershed. These include, but are not limited to, temporary sediment control, temporary soil stabilization, scheduling, waste management, materials handling, and other non-storm water BMPs.

Agency Coordination and Anticipated Regulatory Permits

The following agency coordination and regulatory permits are anticipated for the Project. All BMPs and other avoidance/minimization measures will be prepared in consultation with the Project engineer, County, CVRWQCB, and other appropriate agencies.

- The Project would require a NPDES General Construction Permit for Discharges of storm water associated with construction activities (Construction General Permit (Order No. 2009-0009-DWQ [as amended by Order No. 2010-0014-DWQ and 2012-006-DWQ]). A SWPPP would also be developed and implemented as part of the Construction General Permit. In addtion, the following NPDES permits may also be required:
    - State Water Resources Control Board Water Quality Order No. 2003-003-DWQ General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality
    - California Regional Water Quality Control Board Central Valley Region Resolution R5-2013-0145: Approving Waiver of Reports of Waste Discharge and Waste Discharge Requirements for Specific Types of Discharge within the Central Valley Region
    - California Regional Water Quality Control Board Central Valley Region Order R5-2013-0074, NPDES NO. CAG995001: Waste Discharge Requirements for Dewatering and Other Low Threat Discharges to Surface Waters
- U.S. Army Corps of Engineers – Clean Water Act, Section 404, Nationwide Permit #14 (Linear Transportation Projects).
- California Department of Fish and Wildlife – California Endangered Species Act Section 1600-1602 Streambed Alteration Agreement.
- Regional Water Quality Control Board - Clean Water Act, Section 401 Water Quality Certification.

Should you need additional information or have any questions, please do not hesitate to contact me at (916) 363-4210.

Drake Haglan & Associates

Lindsay Tisch, CPSWQ, QSD
Environmental Planner – Biologist

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Department of Water Resources. 2006. California's Groundwater Bulletin 118: Duck Valley Groundwater Basin Eastern Duck Subbasin. California Department of Water Resources

State Water Resources Control Board. 2010. 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report. Available online at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

APPENDIX F:

BRIDGE INSPECTION REPORT

Photo No. 7
New AC overlay after repairs at Abutment 4. Looking north.

Photo No. 8
Supplemental girders (7 and 8) and new decking as seen from Span 3 right.

Photo No. 9
Supplemental girders (7 and 8) and new decking as seen from Bent 3.

Photo No. 10
Close up of supplemental girders (7 and 8), feathers and blocking at Abutment 4.

Photo No. 11
Supplemental girders (7 and 8) at Bent 3.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/03/2016

Bridge Inspection Report

Inspection Type
Routine FC Underwater Special Other
[X]

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Modified: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span timber girders (16) with a timber plank deck on timber 3-column bents and RC abutments with monolithic wingwalls. The foundation is unknown.

Span Configuration : 1 @ 11.5 ft, 1 @ 14.5 ft, 1 @ 13 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.82 =>26.6 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.33 ft br, 18.33 ft, 0.33 ft br
Total Width: 5.8 m Net Width: 5.6 m No. of Lanes: 1 Speed: 40 mph
Min. Vertical Clearance: Unimpaired AC Thickness: 2.0 Inches

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Timber Rail	Right/Left	162	

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

There was 2 feet of stagnant water in all spans and all of the visible elements were inspected with the aid of waders.

SAFE LOAD CAPACITY

INSPECTION COMMENTARY

A Load Rating Summary Sheet dated 07/05/2013 is on file for this structure. The current rating is based on Timber Stringer v1.03 and hand calculations dated 07/05/2013. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis.

WATERWAY

NBI item #113 is coded as "U." The 11/04/2008 Channel Cross Section was spot checked and no significant changes were observed.

There is a Scour Plan of Action on file for this structure dated 08/13/2015. The plan calls for annual monitoring and after and high water events.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
31			Deck-Timber	2	73	sq.m	41	20	12	0
	1140		Decay/Section Loss (Timber)	2	32		0	20	12	0
	510		Deck Wearing Surface-Asphalt	2	73	sq.m	39	2	30	2
		3210	Delam./Pothole-AC (WS)	2	4		0	2	0	2
		3220	Cracking-AC (WS)	2	30		0	0	30	0

(31-1140)
There is a 1 inch deep x 4 inch wide dip in the AC overlay at midspan of Span 2. This is most likely due to a rotten transverse deck plank. See Photos 2 and 3 from the 11/03/14 inspection.

The left and right edges of the timber planks are soft when probed with an awl and are decayed on the edges. This decay extends up to 3 feet along the bottom of the planks and is up to 0.13 inch deep.

White fungus was randomly distributed on approximately 5% of the soffit of the timber deck.

(31-510-3210)
There is a 2 foot long x 6 foot wide area of broken up AC, with cracks up to 1 inch wide, at the right side of Abutment 1. This area appears to have been an older patch but is cracking again. See Photo 1 and archived photos.

There is a 3 foot long X 6 foot wide area of patched AC in the wheel line at the right side of Abutment 4. See archived photos.

(31-510-3220)
The AC on the timber deck has transverse cracks up to 1 inch wide along the edges of the timber deck extending up to full width.

111			Girder/Beam-Timber	2	200	m	200	0	0	0

(111)
There were no significant defects noted.

206			Column-Timber	2	6	each	0	6	0	0

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
	1140		Decay/Section Loss (Timber)	2	6		0	6	0	0

(206-1140)
At Piers 2 and 3, there is rot up to 0.5 inch deep near the base of all of the columns.

215			Abutment-RC	2	24	m	20	4	0	0
	4000		Settlement	2	4		0	4	0	0

(215)
This quantity includes monolithic wingwalls.

(215-4000)
The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 4 inches in the 2006 report but appears to have remained stable at 6 inches since the 2008 inspection. See Photos from 11/04/08 inspection.

235			Pier Cap-Timber	2	24	m	18	3	3	0
	1150		Check/Shake (Timber)	2	6		0	3	3	0

(235-1150)
The timber cap at Bent 3 has two checks. One is 0.5 inch wide half the length of the cap on the Span 2 side and the other is up to 0.75 inch wide, full length, on the bottom. Both checks extend up to 1 inch deep. These checks remain unchanged since the 03/05/2012 bridge inspection.

256			Slope Protection	2	2	ea.	2	0	0	0

(256)
There were no significant defects noted.

332			Railing-Timber	2	25	m	25	0	0	0

(332)
There were no significant defects noted.

WORK RECOMMENDATIONS

RecDate: 11/03/2014
Action : Deck-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Repair the areas of the deck where the AC is breaking up, primarily at midspan of Span 2 and near Abutment 4. This may require replacing the transverse deck planks below the AC,

Team Leader : Louis D. Nash

Report Author : Louis D. Nash

Inspected By : LD.Nash/B.Bullard

01/31/17

Louis D. Nash (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30.11 SEC
(17) LONGITUDE 120 DEG 58 MIN 37.22 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 13
(30) YEAR OF ADT 2015 (109) TRUCK ADT 3 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.6 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 78.4
STATUS
HEALTH INDEX 94.7
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 5
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********** LOAD RATING AND POSTING ********** CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 36.0
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 26.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 4
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 30
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 11/16 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
Cracking AC at the right side of Abutment 1.

Photo No. 1
Cracking AC at the right side of Abutment 1.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/23/2015

Bridge Inspection Report

Inspection Type
Routine [X] FC Underwater Special Other

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span timber girders (16) with a timber plank deck on timber 3-column bents and RC abutments. The foundation is unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.82 =>26.6 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 5.6 m, 0.1 m br
Total Width: 5.8 m Net Width: 5.6 m No. of Lanes: 1 Speed: 40 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 2.0 Inches

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Timber Rail	Right/Left	82	

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

There was 2 feet of stagnant water in the channel and all of the visible elements were inspected.

SAFE LOAD CAPACITY

INSPECTION COMMENTARY

A Load Rating Summary Sheet dated 07/05/2013 is on file for this structure. The current rating is based on Timber Stringer v1.03 and hand calculations dated 07/05/2013. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis.

WATERWAY

The 11/04/2008 Channel Cross Section was spot checked and no significant changes were observed. NBI item #113 is coded as "U."

There is a Scour Plan of Action on file for this structure dated 08/13/2015.

ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
31			Deck-Timber	2	73	sq.m	41	20	12	0
	1140		Decay/Section Loss (Timber)	2	32		0	20	12	0
	510		Deck Wearing Surface-Asphalt	2	73	sq.m	54	2	15	2
		3210	Delam./Pothole-AC (WS)	2	4		0	2	0	2
		3220	Cracking-AC (WS)	2	15		0	0	15	0

(31-1140)
There is a 1 inch deep x 4 inch wide dip in the AC overlay at midspan of Span 2. This is most likely due to a rotten transverse deck plank. See Photos 2 and 3 from 11/03/14.

The left and right edges of the timber planks are soft when probed with an awl and are decayed on the edges.

White fungus was randomly distributed on approximately 5% of the soffit of the timber deck.

(31-510-3210)
There is a 2 foot long x 6 foot wide area of broken up AC at the right side of Abutment 1. See Photo 1.

There is a 3 foot long X 6 foot wide area of patched AC in the wheel line at the right side of Abutment 4. See Photo 2.

(31-510-3220)
The AC on the timber deck has transverse cracks up to 1 inch wide along the edges of the timber deck extending up to full width.

111			Girder/Beam-Timber	2	200	m	200	0	0	0

(111)
There were no significant defects noted.

206			Column-Timber	2	6	each	0	6	0	0
	1140		Decay/Section Loss (Timber)	2	6		0	6	0	0

(206-1140)
At Piers 2 and 3, there is rot up to 0.5 inch deep near the base of all of the columns.

215			Abutment-RC	2	21	m	19	2	0	0
	4000		Settlement	2	2		0	2	0	0

ELEMENT INSPECTION RATINGS AND NOTES

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
			(215-4000)							
			The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 4 inches in the 2006 report but appears to have remained stable at 6 inches since the 2008 inspection. See Photos from 11/04/08 inspection.							
235		**Pier Cap-Timber**		2	24	m	18	3	3	0
	1150	**Check/Shake (Timber)**		2	6		0	3	3	0
			(235-1150)							
			The timber cap at Bent 3 has two checks. One is 0.5 inch wide half the length of the cap on the Span 2 side and the other is up to 0.75 inch wide, full length, on the bottom. Both checks extend up to 1 inch deep. These checks remain unchanged since the 03/05/2012 bridge inspection.							
256		**Slope Protection**		2	2	ea.	2	0	0	0
			(256)							
			There were no significant defects noted.							
332		**Railing-Timber**		2	42	m	42	0	0	0
			(332)							
			There were no significant defects noted.							

WORK RECOMMENDATIONS

RecDate: 11/03/2014
Action : Deck-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Repair the areas of the deck where the AC is breaking up, primarily at midspan of Span 2 and near Abutment 4. This may require replacing the transverse deck planks below the AC,

Team Leader : Heidi Kuntz

Report Author : Louis D. Nash

Inspected By : H.Kuntz/LD.Nash

Ryan Odell 12/14/15

Ryan N. Odell (Registered Civil Engineer) (Date)

REGISTERED PROFESSIONAL ENGINEER
RYAN N. ODELL
C 66198
EXP 6-30-16
CIVIL
STATE OF CALIFORNIA

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30.11 SEC
(17) LONGITUDE 120 DEG 58 MIN 37.22 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 49
(30) YEAR OF ADT 2013 (109) TRUCK ADT 3 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.6 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 90.4
STATUS
HEALTH INDEX 94.9
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 8
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 36.0
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 26.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 6
(68) DECK GEOMETRY 4
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- CODE
(76) LENGTH OF STRUCTURE IMPROVEMENT M
(94) BRIDGE IMPROVEMENT COST
(95) ROADWAY IMPROVEMENT COST
(96) TOTAL PROJECT COST
(97) YEAR OF IMPROVEMENT COST ESTIMATE
(114) FUTURE ADT 64
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 11/15 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
Broken up AC at Abutment 1 right.

Photo No. 2
AC patch at Abutment 4 right.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/03/2014
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span timber girders (16) with a timber plank deck on timber 3-column bents and RC abutments. The foundation is unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.82 =>26.6 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 5.6 m, 0.1 m br
Total Width: 5.8 m Net Width: 5.6 m No. of Lanes: 1 Speed: 55 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Timber Rail	Right/Left	138	

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS

The channel was dry and all of the visible elements were inspected.

SAFE LOAD CAPACITY

A Load Rating Summary Sheet dated 07/05/2013 is on file for this structure. While this

INSPECTION COMMENTARY

report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on hand calculations dated 07/05/2013.

WATERWAY

The 11/04/2008 Channel Cross Section was spot checked and no significant changes were observed.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
31			Deck-Timber	2	73	sq.m	32	0	41	0
	1140		Decay/Section Loss (Timber)	2	41		0	0	41	0
	510		Deck Wearing Surface-Asphalt	2	73	sq.m	55	0	15	3
		3210	Delam./Pothole-AC (WS)	2	3		0	0	0	3
		3220	Cracking-AC (WS)	2	15		0	0	15	0

(31-1140)
There is a 25 mm dip in the deck AC at the midspan of Span 2. This is most likely due to a rotten transverse deck plank. See attached Photo Numbers 2 and 3.

The left and right edges of the timber planks are soft when probed with an awl and are decayed on the edges. See attached Photo Number 6.

White fungus was observed on the soffit of the timber deck under the broken up AC near Abutment 4. See attached Photo Number 7.

(31-510-3210)
There is a 1.1 m long X 1.5 m wide area of broken AC in the wheel line at Abutment 4, left side. A dip in the deck was noticed in this area and a timber spike was sticking up into the roadway. See attached Photo Numbers 4, 5, and 6.

(31-510-3220)
The AC on the timber deck has transverse cracks up to 25 mm wide along the edges of the timber deck. See attached Photo Number 1.

111			Girder/Beam-Timber	2	200	m	200	0	0	0

(111)
Water staining was present on the timber girders.

206			Column-Timber	2	6	each	3	3	0	0
	1140		Decay/Section Loss (Timber)	2	3		0	3	0	0

(206-1140)
At Piers 2 and 3, there is surface rot up to 25 mm in all of the columns.

215			Abutment-RC	2	13	m	11	2	0	0
	4000		Settlement	2	2		0	2	0	0

(215-4000)
The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 100 mm in the 2006 report but appears to have remained stable at 175 mm since the 2008 inspection.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
235			Pier Cap-Timber	2	24	m	18	0	6	0
	1150		Check/Shake (Timber)	2	6		0	0	6	0

(235-1150)
The timber cap at Bent 3 has two checks along the neutral axis. One is 15 mm wide half the length of the cap on the Span 2 side and the other is 25 mm wide, full length, on the bottom. These checks remain unchanged since the 03/05/2012 bridge inspection.

256			Slope Protection	2	2	ea.	2	0	0	0

(256)
There were no significant defects noted.

332			Railing-Timber	2	42	m	42	0	0	0

(332)
There were no significant defects noted.

WORK RECOMMENDATIONS

RecDate: 11/03/2014
Action : Deck-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Repair the areas of the deck where the AC is breaking up, primarily at midspan of Span 2 and near Abutment 4. This may require replacing the transverse deck planks below the AC,

RecDate: 11/03/2014
Action : Deck-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 1 YEAR
DistTarget:
EA:

Remove the metal spike that is sticking up into the roadway near Abutment 4.

Team Leader : Patrick Piacentini

Report Author : Patrick Piacentini

Inspected By : P.Piacentini/M.McCracken

12/24/14

Patrick Piacentini (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30.11 SEC
(17) LONGITUDE 120 DEG 58 MIN 37.22 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 49
(30) YEAR OF ADT 2013 (109) TRUCK ADT 3 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.6 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 89.4
STATUS
HEALTH INDEX 92.3
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 5
(59) SUPERSTRUCTURE 8
(60) SUBSTRUCTURE 7
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 36.0
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 26.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 6
(68) DECK GEOMETRY 4
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $70,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $117,600
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 64
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 11/14 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
Transverse cracks in the deck AC

Photo No. 1
Transverse cracks in the deck AC

Photo No. 2
Transverse dip in the deck AC at midspan of Span 2

Photo No. 2
Transverse dip in the deck AC at midspan of Span 2

Photo No. 3
Transverse dip in the deck AC at midspan of Span 2

Photo No. 3
Transverse dip in the deck AC at midspan of Span 2

Photo No. 4
AC breaking up in the deck near Abutment 4

Photo No. 4
AC breaking up in the deck near Abutment 4

Photo No. 5
AC breaking up in the deck near Abutment 4

Photo No. 5
AC breaking up in the deck near Abutment 4

Photo No. 6
Spike sticking out of the deck AC near Abutment 4

Photo No. 6
Spike sticking out of the deck AC near Abutment 4

Photo No. 7
White fungus present on the soffit near Abutment 4

Photo No. 7
White fungus present on the soffit near Abutment 4

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 01/13/2014
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span timber stringers (16) with a timber plank deck on timber 3-column piers and timber abutments. The foundation is unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.82 =>26.6 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1 Speed: 55 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Timber Rail	Right/Left	138	

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

INSPECTION COMMENTARY

SCOPE AND ACCESS

Ponded water up to 0.3 m deep was present in the channel and Piers 2 and 3 were at the water line. All of the visible elements were inspected.

MISCELLANEOUS

The speed limit is not posted so by default 55 MPH was entered.

DECK AND ROADWAY

The AC on the timber deck has transverse cracks up to 25 mm wide along the timber deck plank edges. See attached Photo Number 2.

There is a 25 mm dip in the deck AC at midspan. This is most likely due to a rotten transverse deck plank. See attached Photo Number 3.

There is a 2.4 m long X 2.1 m wide area of broken AC in the wheel line at Abutment 4,

INSPECTION COMMENTARY

left side. A dip in the deck was noticed in this area. A piece of the AC was pulled up and the timber deck was sound when probed with an awl in that spot. See attached Photo Numbers 4 and 5.

The left and right edges of the timber planks are soft when probed with an awl and are decayed on the edges. See attached Photo Number 6.

Water staining and white fungus were present on the soffit of the timber deck. See attached Photo Numbers 7, 8, and 9.

The left timber rail was replaced. See attached Photo Number 1.

SUPERSTRUCTURE

Water staining was present on all of the timber stringers in all of the spans.

The exterior timber Stringer 1 was replaced in Spans 1, 2, and 3.

SUBSTRUCTURE

The timber cap at Pier 3 has two checks along the neutral axis. One is 15 mm wide half the length of the cap on the Span 2 side and the other is 25 mm wide, full length, on the bottom. These checks remain unchanged since the 03/05/2012 bridge inspection.

At Piers 2 and 3, there is surface rot up to 25 mm in all of the columns.

The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 100 mm in the 2006 report but appears to have remained stable at 175 mm since the 2008 inspection.

SAFE LOAD CAPACITY

A Load Rating Summary Sheet dated 07/05/2013 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on calculations dated 07/05/2013.

WATERWAY

The 11/04/2008 Channel Cross Section was spot checked and no significant changes were observed.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
32	Timber Deck - w/ AC Overlay	2	73	sq.m.	0	0	73	0	0
117	Timber Stringer	2	200	m.	200	0	0	0	0
206	Timber Column or Pile Extension	2	6	ea.	3	3	0	0	
215	Reinforced Conc Abutment	2	13	m.	11	0	2	0	
235	Timber Cap	2	24	m.	18	6	0	0	

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
256	Slope Protection	2	1	ea.	1	0	0	0	0
332	Timber Bridge Railing	2	42	m.	42	0	0		
360	Settlement	2	1	ea.	1	0	0	0	0

WORK RECOMMENDATIONS - NONE

Team Leader : Patrick Piacentini

Report Author : Patrick Piacentini

Inspected By : P.Piacentini/J.Gillis

4/15/14

Patrick Piacentini (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 49
(30) YEAR OF ADT 2013 (109) TRUCK ADT 3 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.2 M RIGHT 0.2 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 72.7
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 89.1
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 5
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 36.0
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 26.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $70,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $117,600
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 64
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 01/14 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
New left timber rail

Photo No. 1
New left timber rail

Photo No. 2
Rotten deck board in the middle of the bridge

Photo No. 2
Rotten deck board in the middle of the bridge

Photo No. 3
Rotten deck board in the middle of the bridge

Photo No. 3
Rotten deck board in the middle of the bridge

Photo No. 4
Bridge deck at Abutment 4, left side

Photo No. 4
Bridge deck at Abutment 4, left side

Photo No. 5
Bridge deck at Abutment 4, left side

Photo No. 5
Bridge deck at Abutment 4, left side

Photo No. 6
Typical condition of the deck board edges

Photo No. 6
Typical condition of the deck board edges

Photo No. 7
White fungus on the left side of Span 3

Photo No. 7
White fungus on the left side of Span 3

Photo No. 8
Soffit of deck below Abutment 4, left side

Photo No. 8
Soffit of deck below Abutment 4, left side

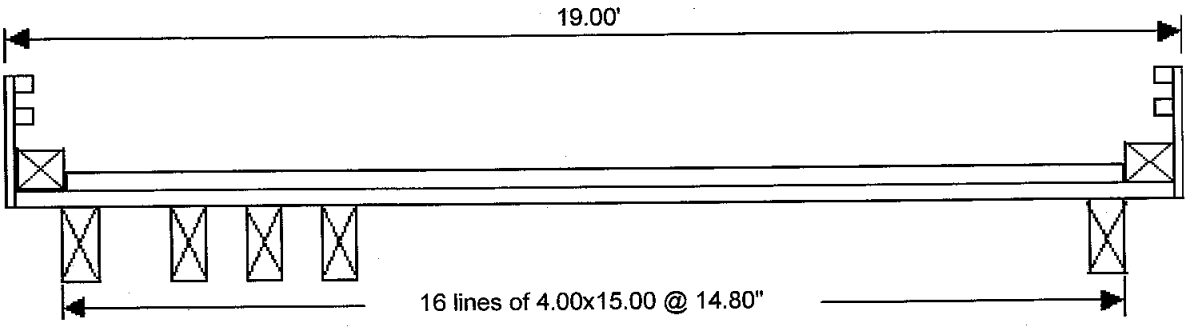
Photo No. 9
White fungus on the soffit of Span 2

Photo No. 9
White fungus on the soffit of Span 2

TIMBER STRINGER, SIMPLE SPAN

Date: 07/05/13
Bridge Number: **29C0307**
Bridge Name: **Duck Creek**
Bridge Location: **0.8 MI N OF SR 4.**

Rated by: Patrick Piacentini
Check By: Ramon Reyes RR



Typical Section (Original)

BRIDGE DATA

Geometry Data

Span Length, (L)	=	14.40 ft
Deck Plank Thickness	=	3.50 in
Average AC Thickness	=	1.00 in
Number of Stringers	=	16

Stringer Details for Analysis

Stringer Width	=	4.00 in
Stringer Depth	=	15.00 in
Stringer Spacing, (S)	=	14.80 in

Stringer Allowable Stresses

Allow. Operating Bending Stress Fb	=	1800.00 psi
Allow. Operating Shear Stress, Fv	=	125.00 psi

Comments

Span 2 was rated since it is the longest span. Blocking was observed between all of the stringers at the 1/3 points of each span. This rating is based on the 11/16/2012 BIR. One inch of AC was used in the calculation.

14

DEAD LOAD

Uniform loading

AC Overlay	=	1.000 x 14.800 x 0.144 x 1/144	=	0.0148 kip/ft
Timber Stringer	=	4.000 x 15.000 x 0.050 x 1/144	=	0.0208 kip/ft
Timber Planks	=	3.500 x 14.800 x 0.050 x 1/144	=	0.0180 kip/ft
*Misc.(Railing,...)			=	0.0010 kip/ft
		Total	=	**0.0547** kip/ft

Notes:

1 Barrier weight is distributed to all the stringers.

REGISTERED PROFESSIONAL ENGINEER
PATRICK N. PIACENTINI
63438
EXP. 9/14
CIVIL
STATE OF CALIFORNIA

7/5/13

FLEXURAL ANALYSIS

Dead Load Moment Calculation

Due to Uniform loading = wl^2/8 = 0.0547 x 14.40^2 /8 = **1.42** kip-ft

Thus, the total dead load moment = **1.42** kip-ft

Live Load Lane Distribution

Type of Deck for estimating Live Load Lane evaluation = Timber Plank

Based on Table 3.22.1 of BDS, the live load wheel distribution is taken as S/3.75 where S is in feet

Therefore, the number of wheel-line per stringer = 14.80/(3.75 x 12) = **0.329** Wheel Line

Live Load Moments

Truck Moment per girder = LL wheel line x moment/wheel line

For Type 3 Truck	= 0.3290 x 45.4	=	**14.9** kip-ft
For Type 3S2 Truck	= 0.3290 x 41.4	=	**13.6** kip-ft
For Type 3-3 Truck	= 0.3290 x 37.4	=	**12.3** kip-ft
For HS20 loading	= 0.3290 x 57.6	=	**19.0** kip-ft
For Permit Truck	= 0.3290 x 59.4	=	**19.5** kip-ft

Moment Capacity

Thus, allowable inventory bending stress F_b	= Operating Stress/1.33	=	**1353.38** psi
Section Modulus of the Stringer S_{xx}	= bd^2 /6 =4.000 x 15.000^2 /6	=	**150.0** in^3
Therefore, Inventory Moment Capacity	= Sxx*Fb =150.0 x 1.353 /12	=	**16.92** kip-ft
and, Operating Moment Capacity	= 1.33 x Inventory Capacity	=	**22.51** kip-ft

Rating Factors based on Flexure

Inventory Rating

HS20 $RF = \dfrac{\text{Inv.Moment Cap - DL Moment}}{19.0}$

$= \dfrac{16.92 - 1.42}{19.0} = \dfrac{15.5}{19.0} = 0.82$ = **26.5** metric tonnes

Operating Rating

HS20 $RF = \dfrac{\text{Opr.Moment Cap - DL Moment}}{19.0}$

$= \dfrac{22.51 - 1.42}{19.0} = \dfrac{21.09}{19.0} = 1.11$ = **36.1** metric tonnes

Legal Load Rating

Type 3 $RF = \dfrac{21.09}{14.9} = 1.41$ = **Legal**

Type 3-S2 $RF = \dfrac{21.09}{13.6} = 1.55$ = **Legal**

Type 3-3 $RF = \dfrac{21.09}{12.3} = 1.71$ = **Legal**

Permit Load Rating

Permit $RF = \dfrac{21.09}{19.5} = 1.08$ = **PPPPP**

SHEAR ANALYSIS

According to BDS 13.3.1, Shear must be checked at a distance 3d (=45.00 inch) or Span/4 (=43.20 inch) whichever is lesser.Therefore, Shear is checked at 3.6 feet away from support

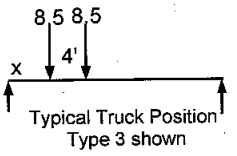
X for Shear in the following Calculation is **3.600** feet

Dead Load Shear

Due to Uniform loading = w(L/2-X) = 0.0547 x (7.200 - 3.600) = **0.197** kips

Thus, the total dead load shear = **0.200** kips

Live Load Shear



For HS20 truck, Vertical Shear due to One Wheel of HS20 Truck	=	12.00 kips
Horizontal Shear= (0.6 V + DF x V)/2 = (0.6 + 0.329) x 12.00/ 2	=	**5.57** kips
For Type 3 truck, Vertical Shear due to One Wheel of Type 3 Truck	=	10.39 kips
Horizontal Shear= (0.6 V + DF x V)/2 = (0.6 + 0.329) x 10.39/ 2	=	**4.83** kips
For Type 3S2 truck, Vertical Shear due to One Wheel of Type 3S2 Truck	=	9.47 kips
Horizontal Shear= (0.6 V + DF x V)/2 = (0.6 + 0.329) x 9.47/ 2	=	**4.40** kips
For Type 3-3 truck, Vertical Shear due to One Wheel of Type 3-3 Truck	=	8.56 kips
Horizontal Shear= (0.6 V + DF x V)/2 = (0.6 + 0.329) x 8.56/ 2	=	**3.97** kips
For Permit truck, Vertical Shear due to One Wheel of Permit Truck	=	14.25 kips
Horizontal Shear= (0.6 V + DF x V)/2 = (0.6 + 0.329) x 14.25/ 2	=	**6.62** kips

Shear Capacity

Shear Stress Factor (C_H) = **1.33**

The allowable inventory shear stress = Ch x Operating Stress/1.33

= 1.33 x 125.00 / 1.33 = **125.0** psi

Then, Inventory Shear Capacity = 2bdFv/3 = 2 x 4.000 x 15.000 x 125 /3 x 1000 = **5.01** kips

and, Operating Moment Capacity = 1.33 x Inventory Capacity = **6.67** kips

Rating Factors based on Shear

Inventory Rating

HS20 $RF = \frac{\text{Inv.Shear Cap - DL Shear}}{\text{LL Shear}}$

$= \frac{5.01 - 0.20}{5.57} = \frac{4.81}{5.57} = 0.86$ = **28.0** metric tonnes

Operating Rating

HS20 $RF = \frac{\text{Opr.Shear Cap - DL Shear}}{\text{LL Shear}}$

$= \frac{6.67 - 0.20}{5.57} = \frac{6.47}{5.57} = 1.16$ = **37.6** metric tonnes

Legal Load Rating

Type 3 $RF = \frac{6.47}{4.83} = 1.34$ = **Legal**

Type 3-S2 $RF = \frac{6.47}{4.40} = 1.47$ = **Legal**

Type 3-3 $RF = \frac{6.47}{3.97} = 1.63$ = **Legal**

Permit Rating

Permit $RF = \frac{6.47}{6.62} = 0.98$ = **GGGGG**

SUMMARY

Critical Rating Factors for the Bridge based on Stringers

Truck		RF	Rating	Controlling Force
HS20	Inventory	0.82	**26.5 m.tonne**	Moment
	Operating	1.11	**36.1 m.tonne**	Moment
Type 3		1.34	**Legal**	Shear
Type 3S2		1.47	**Legal**	Shear
Type 3-3		1.63	**Legal**	Shear
Permit		0.98	**GGGGG**	Shear

Structure Maintenance & Investigations

Load Rating Summary Sheet

Bridge Number: 29C0307
Facility Carried: BUCKMAN RD
Location: 0.8 MI N OF SR 4
City:

Bridge Name: DUCK CREEK BRANCH
Structural Element Rated: Simple three-span untreated DF stringers (16) built in 1931.

Rating Summary

DESIGN LOADING	Rating Factor	Metric Tons	Critical Location: Structure	Control Element	Load Action	Location
Inventory:	0.82	26.6	Span 2	Stringer	Allowable Moment	Midspan
Operating:	1.11	36.0	Span 2	Stringer	Allowable Moment	Midspan

LEGAL RATING	Rating Factor	Posting U.S. Tons	Structure	Control Element	Load Action	Location
Type 3 (25T):	1.34	Legal	Span 2	Stringer	Shear	3.6 ft from support.
Type 3S2 (36T):	1.47	Legal	Span 2	Stringer	Shear	3.6 ft from support.
Type 3-3 (40T):	1.63	Legal	Span 2	Stringer	Shear	3.6 ft from support.

PERMIT RATING	Rating Factor	Permit Rating	Structure	Control Element	Load Action	Location
5 Axle Truck :	0.98	G	Span 2	Stringer	Shear	3.6 ft from support.
7 Axle Truck :	0.98	G	Span 2	Stringer	Shear	3.6 ft from support.
9 Axle Truck :	0.98	G	Span 2	Stringer	Shear	3.6 ft from support.
11 Axle Truck:	0.98	G	Span 2	Stringer	Shear	3.6 ft from support.
13 Axle Truck:	0.98	G	Span 2	Stringer	Shear	3.6 ft from support.

RELEVANT LOAD RATING INFORMATION

NOTES:

Blocking was observed between the stringers at the 1/3 points of each span. This rating is based on the 11/14/2012 BIR. Stresses used at the Operating level are: Fb = 1800 PSI and Fv = 125 PSI.

Overlay Used In Rating: 1 inch

Rating Method: 2 AS Allowable Stress Inventory (65); 2 AS Allowable Stress Operating (63)

Analysis Tool Used: Timber Stringer V1.03

Rating/File Location: Bridge Book/BIRIS

Control Rating By: Patrick Piacentini Rating Date: 07/05/2013

Rating Checked By: Ramon Reyes RR

Rating Type: Calculated

Summary Prepared By: Patrick Piacentini Summary Date: 07/05/2013

7/5/13
Patrick Piacentini - Registered Engineer (Date)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/14/2012

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5

Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span structure with a timber plank deck on timber stringers (16) on timber 3-column piers. The foundation is unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: RF=0.82 =>26.6 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1 Speed: 55 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Timber Rail	Right/Left	138	

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

INSPECTION COMMENTARY

INSPECTION ACCESS

The channel was dry and all of the visible elements were inspected.

DECK AND RAIL

There are checks and splits throughout the left timber rail.

The AC on the timber deck has transverse cracks up to 6 mm wide along the timber deck plank edges. The left and right edges of the timber planks were soft when probed with an awl. Water staining and white fungus were present on the soffit side of the timber deck.

SUPERSTRUCTURE

Water staining was present on all of the timber stringers in all of the spans.

SUBSTRUCTURE

INSPECTION COMMENTARY

The timber cap at Pier 3 has two checks along the neutral axis. One is 15 mm wide half the length of the cap on the Span 2 side and the other is 25 mm wide, full length, on the bottom. See attached photos 6 and 7. These checks remain unchanged since the 03/05/2012 bridge inspection.

At Pier 3, all of the columns were drilled near the ground line. There is surface rot up to 25 mm in all of the columns and the core was sound.

Pier 2 was sighted and similar distress was observed in the columns as in Pier 3.

The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 100 mm in the 2006 report but appears to have remained stable at 175 mm since the 2008 inspection.

SAFE LOAD CAPACITY

A Load Rating Summary Sheet is included with this bridge inspection report. The current rating is based on calculations dated 05/09/2013.

MISCELLANEOUS

The speed limit is not posted so by default 55 MPH was entered.

The 11/04/2008 Channel Cross Section was spot checked and the no significant changes were observed.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
32	Timber Deck - w/ AC Overlay	2	73	sq.m.	0	73	0	0	0
117	Timber Stringer	2	200	m.	200	0	0	0	0
206	Timber Column or Pile Extension	2	6	ea.	3	3	0	0	
215	Reinforced Conc Abutment	2	13	m.	11	0	2	0	
235	Timber Cap	2	24	m.	18	6	0	0	
256	Slope Protection	2	1	ea.	1	0	0	0	0
332	Timber Bridge Railing	2	42	m.	21	21	0		
360	Settlement	2	1	ea.	1	0	0	0	0

WORK RECOMMENDATIONS - NONE

Team Leader : Patrick Piacentini

Report Author : Patrick Piacentini

Inspected By : P.Piacentini/M.Furlong

7/5/13

Patrick Piacentini (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 68
(30) YEAR OF ADT 2011 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 73.6
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 89.8
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 36.0
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 26.6
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $70,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $117,600
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 64
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 11/12 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
Roadway looking north.

Photo No. 1
Roadway looking north.

Photo No. 2
Elevation looking northeast.

Photo No. 2
Elevation looking northeast.

Photo No. 3
Underside Span 1.

Photo No. 3
Underside Span 1.

Photo No. 4
Underside Spans 2 and 3.

Photo No. 4
Underside Spans 2 and 3.

Photo No. 5
Bridge rail.

Photo No. 5
Bridge rail.

Photo No. 6
Pier 3 Timber Cap.

Photo No. 6
Pier 3 Timber Cap.

Photo No. 7
Pier 3 Timber Cap.

Photo No. 7
Pier 3 Timber Cap.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 03/05/2012
Inspection Type
Routine FC Underwater Special Other
[X]

Bridge Inspection Report

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Simple span timber stringers (16) with a timber plank deck on timber Piers. The foundation is unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 22.7 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: 31.7 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1
Rail Description: Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

INSPECTION COMMENTARY

WORK DONE

The right bridge rail was replaced and 3 right exterior stringers were replaced. See attached photos 1 and 3.

INSPECTION ACCESS

The water depth was 0.6 m under Spans 1 and 2. The bottom 0.3 m of the columns in Bent 2 were in murky water and probed with a stick.

DECK AND RAIL

There are checks and splits throughout the left timber rail.

The AC on the timber deck has transverse cracks up to 6 mm wide along the timber deck plank edges. The left and right edges of the timber planks were soft when probed with an awl. Water staining and white fungus were present on the soffit side of the timber deck. See attached photo number 2.

SUPERSTRUCTURE

INSPECTION COMMENTARY

Water staining was present on all of the timber stringers in all of the spans.

SUBSTRUCTURE

The timber cap at Pier 3 has two checks along the neutral axis. One is 15 mm wide half the length of the cap on the Span 2 side and the other is 25 mm wide, full length, on the bottom. See attached photos 4 and 5. These checks have grown in size since the last investigation.

At Pier 3, all of the columns were drilled near the ground line. There is surface rot up to 25 mm in all of the columns and the core was sound.

Pier 2 was sighted and similar distress was observed in the columns as in Pier 3.

The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 100 mm in the 2006 report but appears to have remained stable at 175 mm since the 2008 inspection. See attached photo number 6

LOAD CAPACITY

The Load Rating for this structure is currently under review and the ratings will be updated when the review is complete.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
32	Timber Deck - w/ AC Overlay	2	73	sq.m.	0	73	0	0	0
117	Timber Stringer	2	200	m.	200	0	0	0	0
206	Timber Column or Pile Extension	2	6	ea.	3	3	0	0	
215	Reinforced Conc Abutment	2	13	m.	11	0	2	0	
235	Timber Cap	2	24	m.	18	6	0	0	
256	Slope Protection	2	1	ea.	1	0	0	0	0
332	Timber Bridge Railing	2	42	m.	21	21	0		
360	Settlement	2	1	ea.	1	0	0	0	0

WORK RECOMMENDATIONS - NONE

Inspected By : P.Piacentini/J.Gillis

7/27/12

Patrick Piacentini (Registered Civil Engineer)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 68
(30) YEAR OF ADT 2011 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 89.8
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $70,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $117,600
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 64
(115) YEAR OF FUTURE ADT 2034

********** INSPECTIONS **********

(90) INSPECTION DATE 03/12 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
New timber rail on the right side.

Photo No. 1
New timber rail on the right side.

Photo No. 2
White fungus on the soffit of the deck planks.

Photo No. 2
White fungus on the soffit of the deck planks.

Photo No. 3
New right exterior stringers in all three spans.

Photo No. 3
New right exterior stringers in all three spans.

Photo No. 4
Timber cap at Bent 3.

Photo No. 4
Timber cap at Bent 3.

Photo No. 5
Timber cap at Bent 3.

Photo No. 5
Timber cap at Bent 3.

Photo No. 6
Left wingwall at Abutment 1.

Photo No. 6
Left wingwall at Abutment 1.

Photo No. 7
View of Abutment 4.

Photo No. 7
View of Abutment 4.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 02/04/2011
Inspection Type
Routine [X] FC [ ] Underwater [ ] Special [ ] Other [ ]

Bridge Inspection Report

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Timber deck planks on timber stringers on DF cap and post bents on PCC pedestal footings and on existing PCC abutment walls. The abutment foundations are unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 22.7 metric tonnes Calculation Method: ALLOWABLE STRESS
Operating Rating: 31.7 metric tonnes Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1
Rail Description: Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

CONDITION TEXT

REVISIONS

ELI Element 206, Timber Columns or Pile Extensions, was downgraded to include 3 columns in Condition State 2 due to the deterioration and infestation of the Bent 3 columns.

The inspection frequency was modified to 12 months due to the insect infestation in the columns as Bent 3.

CONDITION OF STRUCTURE

Murky water was present under Spans 1 and 2. The water was as deep as 1.0 m and submerged parts of Abutment 1, Pier 2, and Pier 3. The water impacted the inspection of Abutment 1, Pier 2, and Span 1, as the water limited access to Span 1.

Both timber rails have checks and splits and are leaning outwards up to 75 mm. Additionally the rails are beginning to show signs of rot.

The AC on the timber deck has cracks up to 6 mm in width along the timber deck plank edges. The left and right edges of the timber planks were soft when probed with an pick hammer. Moderate water staining was present and white fungus was growing on the soffit side of the timber deck.

CONDITION TEXT

The exterior sides of the exterior girders exhibit minor checking throughout the structure.

Moderate water staining was present on all timber stringers in all spans.

The timber cap at Bent 3 has a check along the neutral axis on the Span 2 side. The check is on the left side of the cap, is up to 6 mm in width, and is half the length of the cap.

The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. The vertical gap was noted to be 100 mm in the 2006 report but appears to have remained stable at 175 mm since the 2008 inspection.

The Bent 3 columns exhibit rot and insect infestation. Columns 1, 2, and 3 exhibited rot from ground level to 1.0 m above the ground. Columns 2 and 3 were water logged. Column 2 exhibited signs of marine borers and one marine borer was found in Column 2.

Bent 2 exhibited similar distress but could not be verified due to the water and mud.

LOAD CAPACITY

The Load Rating for this structure is currently under review. An updated Load Rating Summary will be submitted when this review is complete.

SCOUR

Inspection reports from 1998 to 2004 noted minor scour, up to 50 mm, at Abutment 4. No scour has been noted since 2006.

The Item 113 code, Scour Critical Bridges is U for this structure. This bridge has an unknown foundation and has not been evaluated for scour. This structure should be monitored for scour related problems during flood events.

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
32	Timber Deck - w/ AC Overlay	2	73	sq.m.	0	73	0	0	0
117	Timber Stringer	2	200	m.	200	0	0	0	0
206	Timber Column or Pile Extension	2	6	ea.	3	3	0	0	
215	Reinforced Conc Abutment	2	13	m.	11	0	2	0	
235	Timber Cap	2	24	m.	18	6	0	0	0
256	Slope Protection	2	1	ea.	1	0	0	0	0
332	Timber Bridge Railing	2	42	m.	0	42	0	0	0

WORK RECOMMENDATIONS

RecDate: 02/04/2011
Action : Sub-Replace
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Replace Columns 2 and 3 of Bent 3.

WORK RECOMMENDATIONS

RecDate: 02/04/2011
Action : Sub-Misc.
Work By: LOCAL AGENCY
Status : PROPOSED

EstCost:
StrTarget: 2 YEARS
DistTarget:
EA:

Inspect and eradicate insect infestation in the timber substructure.

Inspected By : M.O'leary/P.Piacentini

Matthew O'leary (Registered Civil Engineer)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 50
(30) YEAR OF ADT 1988 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 88.3
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $70,000
(95) ROADWAY IMPROVEMENT COST $14,000
(96) TOTAL PROJECT COST $117,600
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2010
(114) FUTURE ADT 63
(115) YEAR OF FUTURE ADT 2028

********** INSPECTIONS **********

(90) INSPECTION DATE 02/11 (91) FREQUENCY 12 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

BRIDGE SCOUR EVALUATION - PLAN OF ACTION				
Br. No. 29C0307	**Owner** SAN JOAQUIN COUNTY	**Location** 0.8 MI NORTH S.R. 4	**Facility Carried** BUCKMAN ROAD	**Name** NORTH FORK DUCK CREEK
Plan of Action Completed By: Awni Taha, Engineer II			**Date of Completion: 8/13/10**	

1. SCOUR VULNERABILITY RATING

Scour Evaluation Summary:
County staff conducted a field review on 8/13/10 and found rock riprap placed along Abutments No.1 and No.4 and apparently around the footing of the piles (See attached photos). The riprap appears to have successfully reduced the bridge's susceptibility to scour. There doesn't appear to be any necessary countermeasures at this time. Copies of the foundation plans will be submitted separately to Caltrans (ABME) for re-evaluation of Item 113.

Scour History:
This structure is currently listed as an "unknown" foundation that has not been evaluated for scour due to insufficient foundation and geological information. The 1988 State Bridge Inspection Report states that Abutment No.4 embankment has scoured to the face of the abutment. The right corner of the abutment is undermined by 50 mm (2 inches) vertically."

a. **Foundation Type** ☒ Spread footing ☐ Pile Extension ☐ Footing on Piles ☐ Unknown

b. **Foundation Material** ☐ Known ☒ Unknown

Scour Review: Done By: SJ County Date: 8/13/10

Structural Assessment: Done By: N/A Date:
Critical Elevation: N/A

Geotechnical Assessment: Done By: Date:
Critical Elevation: N/A

2. NBIS CODING INFORMATION

		Most Recent
Inspection date		11/4/2008
Item 113	Scour	U
Item 60	Substructure	5
Item 61	Channel & Channel Protection	5
Item 71	Waterway Adequacy	7

Rec'd 9/20/10 MJF

AUG 31 '10 PM 2:43

3. COUNTERMEASURE RECOMMENDATION

A. **Completed Countermeasures:** Riprap was placed at Abutments No.1 and No.4. Date of countermeasure is unknown but was installed between 2004 and 2006.

B. **Proposed Countermeasures:** Monitor the bridge on an annual cycle and after flood events. In the event of any future discovery of scour damage areas, the County will evaluate the scoured areas and implement appropriate scour countermeasures.

☐ **Countermeasures Not Required. (Please explain)**

☒ **Install Scour Countermeasures** (See 4 and 5)

	Estimated Cost
___Riprap with monitoring program	$
___Guide bank	$
___Spurs / Bendway weirs / Barbs	$
___Relief bridge / Culvert	$
___Channel improvements	$
_X_Monitoring	$2,000/12 months
___Monitoring device	$
___Check Dam	$
___Substructure Modification	$
___Bridge replacement	$
___Other	$

☐ **Close Bridge** (See 6)

4. COUNTERMEASURE IMPLEMENTATION SCHEDULE

Countermeasure Implementation Project Type:

☐ Proposed Construction Project

Lead Agency

☐ Maintenance Project

Advertised Date: N/A

Other scheduling information: N/A

5. MONITORING PLAN

Monitoring Plan Summary:

The County will conduct inspections annually and after flood events to monitor items such as undermining of the structure's foundation, bank erosion, accumulation of debris, and stream stability. In the event of any future discovery of scour damage areas, the County will evaluate the scoured areas and implement appropriate scour countermeasures.

Monitoring Authority: Department of Public Works, San Joaquin County.

☒ **Regular Inspection Program of** 12 **mo.** ☐ w/surveyed cross sections
Items to Watch: Undermining of the foundation, erosion of banks, accumulation of debris, and stream stability.

☐ **Increased Inspection Interval of** _____ **mo.** ☐ w/surveyed cross sections
Items to Watch:.

☐ **Underwater Inspection Program** **Frequency** _____ **mo.**
Items to Watch:

☐ **Fixed Monitoring Device**
Type of Instrument:
Installation location(s):
Sample Interval: ☐ 30 min. ☐ 1 hr. ☐ 6 hrs. ☐ 12 hrs.
☐ Other _____
Frequency of data logger downloading: ☐ Weekly ☐ Bi-weekly ☐ Monthly
☐ Other _____
Scour-critical discharge:_____
Action required if scour-critical elevation detected:

☒ **Other Monitoring Program**
Type: ☒ Visual
☐ Instrument
☐ Portable ☐ Geophysical ☐ Sonar
☐ Other gages

Flood monitoring required: ☐ Yes ☐ No
Flood monitoring event defined by:
☐ Discharge over N/A
☐ Stage N/A
☐ Elev. measured from N/A

Frequency of flood monitoring: ☐ 1 hr. ☐ 3 hr. ☐ 6 hrs. ☐ Other
Scour critical elevation: N/A
Action required if scour-critical elevation detected: N/A

6. BRIDGE CLOSURE PLAN

Bridge ADT: 50	Built: 1931 Rebuilt (Superstructure) : 1999	% Trucks: 0%	Bridge Length (ft): 41

Closure Plan Summary:

Based on the severity of scour damages in the structure, County will take the appropriate steps to close the bridge and mitigate any further scour damages.

In the event that a temporary or an indefinite closure is required, the County will conduct a press release to notify the traveling public of the closure. The County will provide a detour to the traveling public and set up advance message boards. If an indefinite closure is required, the County will consult the Board of Supervisors and hold public meetings to determine the appropriate plan of action.

Scour Monitoring Criteria for Consideration of Bridge Closure:

- ☐ Water surface elevation reaches _____ ☒ Overtopping road or structure
- ☐ Scour Measurement Results / Monitoring Device ☐ Loss of Riprap
- ☐ Observed amount of Settlement ☐ Loss of Road Embankment
- ☐ Debris Accumulation
- ☐ Other Severe exposure of the foundation resulting in compromised structure integrity.

Person / Area Responsible for Closure: Thomas R. Flinn, Director of Public Works, San Joaquin County.

Contact People (Name & Phone No.):

Mahmoud Saqqa, Senior Bridge Engineer, PE Tel: (209) 468-8924
Awni Taha, Engineer II Tel: (209) 468-0830

Responsible for re-opening after inspection: Mahmoud Saqqa, Senior Bridge Engineer, PE

7. DETOUR ROUTE

Detour route description (route number, from - to, etc.) – See attached map.

Average ADT: 50	Year: 1988	% Trucks: 0%	Length: 2.8

Bridges on Detour Route:

Bridge Number	Waterway	Sufficiency Rating/ Load limitations	Scour 113 code
N/A			


MILTON
COPPEROPOLIS
WAVERLY
HEWITT
Central Valley Irrigation
Disrtict Canal Access
FUNCK
29C-038
BUCKMAN
FUNCK
4
State Highway 4
STANLEY
SONORA
MOBLEY
ESCALON-BELLOTA
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
HENRY
GAWNE
CARTER
Legend
POA Bridge
Detour Route
County Limit
Public Works
San Joaquin County
Working for YOU
Buckman Road Bridge 29C-307
across Duck Creek Branch
Detour Map
0
0.5
1
1.5
2
Miles
SAN JOAQUIN COUNTY
CALIFORNIA

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/04/2008

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Timber deck planks on timber stringers on DF cap and post bents on PCC pedestal footings and on existing PCC abutment walls. The abutment foundations are unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 22.7 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: 31.7 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1
Rail Description: Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

CONDITION TEXT

WORK DONE
The diagonal cross brace was replaced at Bent 2.

The bottom lateral cross brace at Bent 3 was bolted.

REVISIONS
Element 32 (Timber Deck with AC Overlay): 73 sq m was moved to State 2 due to its condition.

Element 215 (Reinforced Concrete Abutment): 11 m was moved to State 1 and 2 m was moved to State 3 due to its condition.

Element 256 (Slope Protection): 1 ea was added because of the slope protection present at Abutment 4.

Element 361 (Scour): 1 ea was removed because no scour was present.

CONDITION OF STRUCTURE
The channel was dry and all of the visible elements were inspected.

The timber rail has a few splits and is leaning to the left.

CONDITION TEXT

The AC on the timber deck has cracks greater than 2 mm wide along each deck plank. The timber left and right edges were soft when probed with an ice pick. White fungus was growing on the soffit side of the deck.

The timber cap at Bent 3 has a check half its length along the neutral axis.

The left wingwall at Abutment 1 has moved laterally. The left and right wing walls have been tied together with steel cables to arrest further movement. There is a large gap measuring 18 cm (7 inches) at the top of the wall between the abutment and left wingwall. See the attached photos.

A channel cross section was taken and compared to one measured on 11/10/1998. The channel has scoured 0.5 m at Bent 2.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101	32	Timber Deck - w/ AC Overlay	2	73	sq.m.	0	73	0	0	0
101	117	Timber Stringer	2	200	m.	200	0	0	0	0
101	206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0
101	215	Reinforced Conc Abutment	2	13	m.	11	0	2	0	
101	235	Timber Cap	2	24	m.	18	6	0	0	0
101	256	Slope Protection	2	1	ea.	1	0	0	0	0
101	332	Timber Bridge Railing	2	42	m.	0	42	0	0	0

WORK RECOMMENDATIONS - NONE

CHANNEL X-SECTION

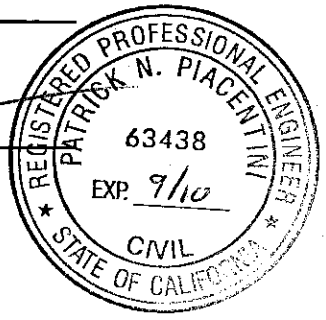
Side : Upstream

X-Section Date: 11/04/2008

Measured From : Left side, top of timber deck

Location	Horiz(m)	Vert(m)	Comments
Abutment 1	0.00	2.78	
Bent 2	4.00	3.50	
Bent 3	8.22	3.18	
Abutment 4	12.20	1.68	

Inspected By : P.Piacentini



Registered Civil Engineer

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 50
(30) YEAR OF ADT 1988 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 90.3
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 6
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $84,000
(95) ROADWAY IMPROVEMENT COST $8,000
(96) TOTAL PROJECT COST $126,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 63
(115) YEAR OF FUTURE ADT 2028

********** INSPECTIONS **********

(90) INSPECTION DATE 11/08 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

Photo No. 1
Movement of the left wing wall at Abutment 1.

Photo No. 1
Movement of the left wing wall at Abutment 1.

Photo No. 1
Movement of the left wing wall at Abutment 1.

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 10/25/2006

Bridge Inspection Report

Inspection Type	Routine	FC	Underwater	Special	Other
	X				

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5

Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Timber deck planks on timber stringers on DF cap and post bents on PCC pedestal footings and on existing PCC abutment walls. Abutment foundations unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 22.7 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: 31.7 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1
Rail Description: Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

CONDITION TEXT

WORK DONE

The rip-rap has been placed at the footing of Abutment 4.

CONDITION OF STRUCTURE

The water depth was approximately 2 feet at the time of this investigation. All elements were inspected.

The timber rail is worn with a few splits. The posts are leaning to the left of the structure.

The approach slabs at both abutments have many large transverse cracks spaced 1 feet apart and 1/16" to 1/8" in width.

The left wingwall at Abutment 1 has moved laterally. The left and right wingwalls have been tied together with steel cables to arrest further movement. There is a large vertical gap (4") between the abutment and left wingwall.

The timber cap at Bent 3 is split along the neutral axis. This condition is not a problem at this time.

CONDITION TEXT

The timber diagonal cross brace at Bent 2 right is split at the bolted column connection.

The bottom horizontal cross brace at Bent 3 is disconnected from Columns 2 and 3.

SCOUR

This structure has an unknown foundation that has not been evaluated for scour. The scour risk can not be determined. Although plans are available, the SMI Hydraulics Unit has determined that the plans are insufficient or lack the appropriate geological information that is needed to perform a hydraulic review at this time. This structure should be monitored for scour related problems during flood events.

ELEMENT INSPECTION RATINGS

F#Elem	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
101 32	Timber Deck - w/ AC Overlay	2	73	sq.m.	73	0	0	0	0
101 117	Timber Stringer	2	200	m.	200	0	0	0	0
101 206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0
101 215	Reinforced Conc Abutment	2	13	m.	0	13	0	0	0
101 235	Timber Cap	2	24	m.	18	6	0	0	0
101 332	Timber Bridge Railing	2	42	m.	0	42	0	0	0
101 361	Scour	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

RecDate: 12/12/2000 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Replace the diagonal cross brace at Bent 2.

RecDate: 12/12/2000 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:

Bolt the bottom lateral cross brace at Bent 3 right post.

Inspected By : THANH LE

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER JOHN ANDREW GILLIS No. C47311 Exp. 12/31/07 CIVIL STATE OF CALIFORNIA

CC: Charles Ineichen, Structure Hydraulics

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 50
(30) YEAR OF ADT 1988 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 85.2
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $84,000
(95) ROADWAY IMPROVEMENT COST $8,000
(96) TOTAL PROJECT COST $126,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 60
(115) YEAR OF FUTURE ADT 2015

********** INSPECTIONS **********

(90) INSPECTION DATE 10/06 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 12/22/2004

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
X				

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened: N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Timber deck planks on timber stringers on DF cap and post bents on PCC pedestal footings and on existing PCC abutment walls. Abutment foundations unknown.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load: M-13.5 OR H-15
Inventory Rating: 22.7 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: 31.7 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width: 5.8 m Net Width: 5.2 m No. of Lanes: 1
Rail Description: Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description: U-shaped channel with grass-lined slopes.

CONDITION TEXT

CONDITION OF STRUCTURE

The water depth was approximately 0.6 m at the time of this investigation. All elements were inspected.

The timber rail is worn with a few splits. The posts are leaning.

Several moderate transverse cracks were observed in the AC deck in all spans.

The left wingwall at Abutment 1 has moved laterally. The left and right wingwalls have been tied together with steel cables to arrest further movement. There is a large vertical gap between the abutment and left wingwall.

The timber cap at Bent 3 is split along the neutral axis. This condition is not a problem at this time.

The timber diagonal cross brace at Bent 2 right is split at the bolted column connection.

The bottom horizontal cross brace at Bent 3 is disconnected from Columns 2 and 3.

SCOUR

CONDITION TEXT

This structure has an unknown foundation that has not been evaluated for scour. The scour risk can not be determined. Although plans are available, the SMI Hydraulics Unit has determined that the plans are insufficient or lack the appropriate geological information that is needed to perform a hydraulic review at this time. This structure should be monitored for scour related problems during flood events.

The Abutment 4 embankment has scoured to the face of the abutment. The right corner of the abutment is undermined 50 mm vertically.

ELEMENT INSPECTION RATINGS

F#	Elem	Element Description	Env	Total	Units	Qty in each Condition State				
						St. 1	St. 2	St. 3	St. 4	St. 5
01	32	Timber Deck - w/ AC Overlay	2	73	sq.m.	73	0	0	0	0
01	117	Timber Stringer	2	200	m.	200	0	0	0	0
01	206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0
01	215	Reinforced Conc Abutment	2	13	m.	0	13	0	0	0
01	235	Timber Cap	2	24	m.	18	6	0	0	0
01	332	Timber Bridge Railing	2	42	m.	0	42	0	0	0
01	361	Scour	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

RecDate: 12/22/2004	EstCost:		Monitor the structure for scour related
Action : Sub-Scour Mitiga	StrTarget:	6 MONTHS	problems during flood events.
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		
RecDate: 12/12/2000	EstCost:		Replace the diagonal cross brace at Bent
Action :	StrTarget:	2 YEARS	2.
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		
RecDate: 12/12/2000	EstCost:		Bolt the bottom lateral cross brace at
Action :	StrTarget:	2 YEARS	Bent 3 right post.
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		
RecDate: 11/10/1998	EstCost:		Place rock slope protection against the
Action :	StrTarget:	2 YEARS	face of Abutment 4.
Work By: LOCAL AGENCY	DistTarget:		
Status : PROPOSED	EA:		

Inspected By : Summer A. Silveira

Summer A. Silveira

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
SUMMER A SILVEIRA
No. 66913
Exp. 9/30/06
CIVIL
STATE OF CALIFORNIA

CC: Charles Ineichen, Structure Hydraulics

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **29C0307**
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL- NOT APPLICABLE
TYPE- NOT APPLICABLE CODE
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 50
(30) YEAR OF ADT 1988 (109) TRUCK ADT 0 %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 85.2
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

******** LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M-13.5 OR H-15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $84,000
(95) ROADWAY IMPROVEMENT COST $8,000
(96) TOTAL PROJECT COST $126,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 60
(115) YEAR OF FUTURE ADT 2015

********** INSPECTIONS **********

(90) INSPECTION DATE 12/04 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- NO MO B)
C) OTHER SPECIAL INSP- NO MO C)

DUCK CREEK BRANCH

10 - SJ -BUCKMAN RD **12/22/2004** **29C0307**

ELEVATION: Looking East

04C-SAS-25-2004-12 Photo Category A

ROADVIEW: Looking North

04C-SAS-25-2004-10 Photo Category A

DUCK CREEK BRANCH

10 - SJ -BUCKMAN RD **12/22/2004** **29C0307**

DETERIORATION: Left wingwall at Abutment 1

04C-SAS-25-2004-13 Photo Category B-1-6

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 11/20/2002

Bridge Inspection Report

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

STRUCTURE NAME: DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened : N/A
Length (m) : 12.5
Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Structure Description: Timber deck planks on timber stringers on DF cap and post bents on PCC footings and on PCC abutment walls.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load : M - 13.5 OR H - 15

Inventory Rating : 22.7 metric tons Calculation Method : ALLOWABLE STRESS
Operating Rating : 31.7 metric tons Calculation Method : ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A Type 3S2 N/A Type 3-3 N/A

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br
Total Width : 5.8 m Net Width : 5.2 m No. of Lanes : 1
Rail Description : Timber rail Rail Code : 0000
Min. Vertical Clearance: Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description : U-Shaped grass lined.

WORK DONE

The AC roadway approach at Abutment 1 has been resurfaced.

REVISIONS

The Latitude and Longitude (Items 16 and 17) have been revised to 37 deg 56 min 30 sec and 120 deg 58 min 37 sec to reflect the current GPS readings.

Element 32 has been revised from 10 sq m to 73 sq m to reflect the current field conditions.

CONDITION OF STRUCTURE

This bridge is Functionally Obsolete due to the Roadway Width (Item 51) of 5.2 m.

The water depth measured 1.0 m at the time of this investigation. All elements were inspected with the use of waders.

The timber rail is worn with a few splits. The rail is still functional.

Several moderate transverse cracks were observed in the AC deck in all spans.

The wood barrier on top of the wingwall at the right side of Abutment 1 has failed.

The left wingwall at Abutment 1 has moved laterally. The left and right wingwalls have been tied together with steel cables to arrest further movement. There is a large vertical crack between the abutment and left wingwall.

The timber cap at Bent 3 is split along the neutral axis. This condition is not a problem at this time.

The timber diagonal cross brace at Bent 2 right is split at the bolted column connection.

The bolt connecting the bottom lateral cross brace member to the right column at Bent 3 is missing. This condition was noted in the previous report and could not be verified due to the water depth.

SCOUR

The Item 113 code, Scour Critical Bridges is U for this structure. This bridge has an unknown foundation and has not yet been evaluated for scour.

The Abutment 4 embankment has scoured to the face of the abutment. The right corner of the abutment is undermined 50 mm vertically.

ELEMENT INSPECTION RATINGS

F# Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01 32	Timber Deck - w/ AC Overlay	2	73	sq.m.	73	0	0	0	
01 117	Timber Stringer	2	200	m.	200	0	0	0	0
01 206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0
01 215	Reinforced Conc Abutment	2	13	m.	0	13	0	0	0
01 235	Timber Cap	2	24	m.	18	6	0	0	0
01 332	Timber Bridge Railing	2	42	m.	0	42	0	0	0
01 361	Scour	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

RecDate: 12/12/2000 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Replace the diagonal cross brace at Bent 2.

RecDate: 12/12/2000 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Bolt the bottom lateral cross brace at Bent 3 right post.

RecDate: 11/10/1998 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Place rock slope protection against the face of Abutment 4.

RecDate: 11/10/1998 EstCost:
Action : StrTarget: 2 YEARS
Work By: LOCAL AGENCY DistTarget:
Status : PROPOSED EA:
Patch the large vertical crack at the Abutment 1 left wingwall.

Inspected By : Summer A. Silveira

Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ANTHONY R. TRAINA No. C049807 Exp. 9-30-04 CIVIL STATE OF CALIFORNIA

CC: Charles Ineichen, Structure Hydraulics

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER 29C0307
(5) INVENTORY ROUTE(ON/UNDER)- ON 140000000
(2) HIGHWAY AGENCY DISTRICT 10
(3) COUNTY CODE 077 (4) PLACE CODE 00000
(6) FEATURE INTERSECTED- DUCK CREEK BRANCH
(7) FACILITY CARRIED- BUCKMAN RD
(9) LOCATION- 0.8 MI N OF SR 4
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 37 DEG 56 MIN 30 SEC
(17) LONGITUDE 120 DEG 58 MIN 37 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- WOOD OR TIMBER
TYPE- STRINGER/MULTI-BEAM OR GD CODE 702
(44) STRUCTURE TYPE APPR:MATERIAL-
TYPE- OTHER CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 3
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- TIMBER CODE 8
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1931
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES: ON STRUCTURE 01 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 50
(30) YEAR OF ADT 1998 (109) TRUCK ADT %
(19) BYPASS, DETOUR LENGTH 14 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 4.3 M
(49) STRUCTURE LENGTH 12.5 M
(50) CURB OR SIDEWALK: LEFT 0 M RIGHT 0 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 5.2 M
(52) DECK WIDTH OUT TO OUT 5.8 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 35 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 5.2 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 99.9 M
(56) MIN LAT UNDERCLEAR LT 0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0 M

****

SUFFICIENCY RATING = 68.4
STATUS FUNCTIONALLY OBSOLETE
HEALTH INDEX 85.2
PAINT CONDITION INDEX N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- LOCAL RURAL 09
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 1 LANE, 2 WAY 3
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY-
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- COUNTY HIGHWAY AGENCY 02
(22) OWNER- COUNTY HIGHWAY AGENCY 02
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 5
(62) CULVERTS N

******** LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- M - 13.5 OR H - 15 2
(63) OPERATING RATING METHOD- ALLOWABLE STRESS 2
(64) OPERATING RATING- 31.7
(65) INVENTORY RATING METHOD- ALLOWABLE STRESS 2
(66) INVENTORY RATING- 22.7
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 5
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 7
(72) APPROACH ROADWAY ALIGNMENT 6
(36) TRAFFIC SAFETY FEATURES 0000
(113) SCOUR CRITICAL BRIDGES U

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- MISC STRUCTURAL WORK CODE 38
(76) LENGTH OF STRUCTURE IMPROVEMENT 12.5 M
(94) BRIDGE IMPROVEMENT COST $84,000
(95) ROADWAY IMPROVEMENT COST $8,000
(96) TOTAL PROJECT COST $126,000
(97) YEAR OF IMPROVEMENT COST ESTIMATE 1999
(114) FUTURE ADT 60
(115) YEAR OF FUTURE ADT 2015

********** INSPECTIONS **********

(90) INSPECTION DATE 11/02 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO -1 MO A)
B) UNDERWATER INSP- NO -1 MO B)
C) OTHER SPECIAL INSP- NO -1 MO C)

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : **29C0307**
Facility Carried: **BUCKMAN RD**
Location : **0.8 MI N OF SR 4**
City :
Inspection Date : **12-DEC-00**

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

Bridge Inspection Report

Name : DUCK CREEK BRANCH

CONSTRUCTION INFORMATION

Year Built : 1931
Year Widened : N/A
Length (m) : 12.5

Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Description of Structure : Timber stringer on DF cap and post bents on PCC footings and on PCC abutment walls.

Span Configuration : 1 @ 3.5 m, 1 @ 4.4 m, 1 @ 4.0 m.

LOAD CAPACITY AND RATINGS

Design Live Load : M - 13.5 OR H - 15
Inventory Rating : 22.7 metric tons — Calculation Method : ALLOWABLE STRESS
Operating Rating : 31.7 metric tons — Calculation Method : ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A english tons — Type 3S2 N/A english tons — Type 3-3 N/A english tons

DESCRIPTION ON STRUCTURE

Bridge width : 0.1 m br, 0.2 m cu, 5.2 m, 0.2 m cu, 0.1 m br

Total Width : 5.6 m — Net Width : 5.20 m — No. of Lanes : 1
Rail Description : Timber rail — Rail Code : 0000
Min. Vertical Clearance : Unimpaired

DESCRIPTION UNDER STRUCTURE

Channel Description : U-Shaped grass lined.

CONDITION OF STRUCTURE

The deck has been overlayed with AC. Some medium size transverse cracks were observed in all spans.

The timber diagonal cross brace at Bent 2 right is split at the bolted column connection.

The Abutment 4 embankment has scoured to the face of the abutment. The bottom right corner of the abutment is undermined 50 mm.

The timber cap at Bent 3 is split along the neutral axis. This condition is not a problem at this time.

The timber rail is worn with a few splits. The rail is still functional.

The water depth measured 0.2 m at the time of this investigation. All elements were inspected.

The following conditions were noted in the previous inspection report and are still true.

* The left wingwall at Abutment 1 has moved laterally. The left and right wingwalls have been tied together with steel cables to arrest further movement. There is a large vertical crack between the abutment and left wingwall.

* The bolt connecting the bottom lateral cross brace member to the right post at Bent 3 is missing.

* The timber cap at Bent 3 has a long longitudinal split along the neutral axis.

* Roadway runoff draining around the right wingwall at Abutment 4 is eroding the embankment.

* The AC roadway approach at Abutment 1 is approximately 65mm low.

Overall, this structure is in fair condition.

Bridge No.: 29C0307 **Location: 0.8 MI N OF SR 4** **Inspection Date: 12-DEC-00**

ELEMENT LEVEL INSPECTION RATINGS

F#	Elem No.	Element Description	Env	Total Quantity	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01	32	Timber Deck - w/ AC Overlay	2	10	sq.m.	10	0	0	0	0
01	117	Timber Stringer	2	200	m.	200	0	0	0	0
01	206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0
01	215	Reinforced Conc Abutment	2	13	m.	0	13	0	0	0
01	235	Timber Cap	2	24	m.	18	6	0	0	0
01	332	Timber Bridge Railing	2	42	m.	0	42	0	0	0
01	361	Scour	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

Patch the large vertical crack at the Abutment 1 left wingwall.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
1	10-NOV-1998	County Agency	40307X98314X		

Place rock slope protection against the face of Abutment 4.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
2	10-NOV-1998	County Agency	40307X98314X		

Provide a roadway runoff drainage system at the right side of Abutment 4.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
3	12-DEC-2000	County Agency	40307X00347X		

Bolt the bottom lateral cross brace at Bent 3 right post.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
4	12-DEC-2000	County Agency	40307X00347X		

Replace the diagonal cross brace at Bent 2.

Item#	Rec. Date	Work By	Work Id.	Prog. Method	Cost
5	12-DEC-2000	County Agency	40307X00347X		

Inspected By : Oscar M. Vasquez

Registered Civil Engineer

Printed on : 26-JAN-2001 08:36:36 AM

Bridge No.: 29C0307 **Location: 0.8 MI N OF SR 4** **Inspection Date: 12-DEC-00**

STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1)	STATE NAME - CALIFORNIA	069
(8)	STRUCTURE NUMBER	29C0307
(5)	INVENTORY ROUTE(ON/UNDER) - ON	1 40 000000
(2)	HIGHWAY AGENCY DISTRICT	10
(3)	COUNTY CODE 077 (4) PLACE CODE	00000
(6)	FEATURE INTERSECTED - DUCK CREEK BRANCH	
(7)	FACILITY CARRIED - BUCKMAN RD	
(9)	LOCATION - 0.8 MI N OF SR 4	
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK - NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	
(16)	LATITUDE	37 DEG 56 MIN 13 SEC
(17)	LONGITUDE	120 DEG 58 MIN 19 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

STRUCTURE TYPE AND MATERIAL

(43)	STRUCTURE TYPE MAIN: MATERIAL - WOOD OR TIMBER TYPE - STRINGER/MULTI-BEAM OR GDR CODE	7 02
(44)	STRUCTURE TYPE APPR: MATERIAL - OTHER TYPE - OTHER CODE	000
(45)	NUMBER OF SPANS IN MAIN UNIT	3
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE TIMBER	CODE 8
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
	A) TYPE OF WEARING SURFACE - BITUMINOUS	CODE 6
	B) TYPE OF MEMBRANE - NONE	CODE 0
	C) TYPE OF DECK PROTECTION - NONE	CODE 0

AGE AND SERVICE

(27)	YEAR BUILT	1931
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON - HIGHWAY	1
	UNDER - WATERWAY	5
(28)	LANES: ON STRUCTURE 01 UNDER STRUCTURE	
(29)	AVERAGE DAILY TRAFFIC	50
(30)	YEAR OF ADT 1998 (109) TRUCK ADT	%
(19)	BYPASS, DETOUR LENGTH	14 KM

GEOMETRIC DATA

(48)	LENGTH OF MAXIMUM SPAN	4.3 M
(49)	STRUCTURE LENGTH	12.5 M
(50)	CURB OR SIDEWALK: LEFT 0 M RIGHT	0 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	5.2 M
(52)	DECK WIDTH OUT TO OUT	5.6 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	4.9 M
(33)	BRIDGE MEDIAN - NO MEDIAN	0
(34)	SKEW 35 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	5.2 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF - NOT H/RR	0 M
(55)	MIN LAT UNDERCLEAR RT REF - NOT H/RR	99.9 M
(56)	MIN LAT UNDERCLEAR LT	0 M

NAVIGATION DATA

(38)	NAVIGATION CONTROL - NO CONTROL	CODE 0
(111)	PIER PROTECTION -	CODE
(39)	NAVIGATION VERTICAL CLEARANCE	0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0

SUFFICIENCY RATING = 68.4

STATUS = FUNCTIONALLY OBSOLETE

HEALTH INDEX = 84.24

CLASSIFICATION

		CODE
(112)	NBIS BRIDGE LENGTH - YES	Y
(104)	HIGHWAY SYSTEM - NOT ON NHS	0
(26)	FUNCTIONAL CLASS - LOCAL RURAL	09
(100)	DEFENSE HIGHWAY - NOT STRAHNET	0
(101)	PARALLEL STRUCTURE - NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC - 1 LANE, 2 WAY	3
(103)	TEMPORARY STRUCTURE -	
(105)	FEDERAL LANDS HIGHWAY -	
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL - ON FREE ROAD	3
(21)	MAINTAIN - COUNTY HIGHWAY AGENCY	2
(22)	OWNER - COUNTY HIGHWAY AGENCY	2
(37)	HISTORICAL SIGNIFICANCE - NOT ELIGIBLE	5

CONDITION

		CODE
(58)	DECK	7
(59)	SUPERSTRUCTURE	7
(60)	SUBSTRUCTURE	5
(61)	CHANNEL & CHANNEL PROTECTION	5
(62)	CULVERTS	N

LOAD RATING AND POSTING

		CODE
(31)	DESIGN LOAD - M - 13.5 OR H - 15	2
(63)	OPERATING RATING METHOD - ALLOWABLE STRESS	2
(64)	OPERATING RATING -	31.7
(65)	INVENTORY RATING METHOD - ALLOWABLE STRESS	2
(66)	INVENTORY RATING -	22.7
(70)	BRIDGE POSTING - Equal to or above legal loads	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED - DESCRIPTION - OPEN, NO RESTRICTION	A

APPRAISAL

		CODE
(67)	STRUCTURAL EVALUATION	5
(68)	DECK GEOMETRY	3
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	7
(72)	APPROACH ROADWAY ALIGNMENT	6
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	U

PROPOSED IMPROVEMENTS

(75)	TYPE OF WORK - MISC STRUCTURAL WORK	CODE 38
(76)	LENGTH OF STRUCTURE IMPROVEMENT	12.5 M
(94)	BRIDGE IMPROVEMENT COST	$84,000
(95)	ROADWAY IMPROVEMENT COST	$8,000
(96)	TOTAL PROJECT COST	$126,000
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	1999
(114)	FUTURE ADT	60
(115)	YEAR OF FUTURE ADT	2015

INSPECTIONS

(90) INSPECTION DATE 12/00 (91) FREQUENCY 24 MO

(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE

A)	FRACTURE CRIT DETAIL -	NO	-1 MO A)
B)	UNDERWATER INSP -	NO	-1 MO B)
C)	OTHER SPECIAL INSP -	NO	-1 MO C)

Printed on : 26-JAN-2001 08:36:36 AM

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Caltrans

Bridge Number : 29C0307
Facility Carried: BUCKMAN RD
Location : 0.8 MI N OF SR 4
City :
Inspection Date : 10-NOV-98

Inspection Type

Routine	Group A	Underwater	Special	Other
X				

Bridge Inspection Report

Name : DUCK CREEK BRANCH

Construction Information

Year Built : 1931
Year Widened : N/A
Length (m) : 12.5

Skew (degrees): 35
No. of Joints : 0
No. of Hinges : 0

Description of Structure : Timber stringer on DF cap and post bents on PCC footings and on PCC abutment walls.

Span Configuration : 1@3.5m, 1@4.4m, 1@4.0m.

Load Capacity and Ratings

Design Live Load : M - 13.5 OR H - 15
Inventory Rating : 22.7 metric tons — Calculation Method : ALLOWABLE STRESS
Operating Rating : 31.7 metric tons — Calculation Method : ALLOWABLE STRESS
Permit Rating : GGGGG
Posting Load : Type 3 N/A english tons Type 3S2 N/A english tons Type 3-3 N/A english tons

Description on Structure

Bridge width : 0.2m cu, 5.2m, 0.2m cu.
Total Width : 5.6 m — Net Width : 5.20 m — No. of Lanes : 1
Rail Description : — Rail Code : 0000
Min. Vertical Clearance : Unimpaired

Description under Structure

Channel Description : U-Shaped grass lined.

CONDITION OF STRUCTURE

The left wingwall at Abutment 1 has moved laterally. The left and right wingwalls have been tied together with steel cables to arrest further movement. There is a large vertical crack between the abutment and left wingwall.

The bolt connecting the bottom lateral cross brace member to the right post at Bent 3 is missing.

The timber cap at Bent 3 has a long longitudinal split along the neutral axis.

Roadway runoff draining around the right wingwall at Abutment 4 is eroding the embankment.

The AC deck has medium and large transverse cracks in all spans.

The AC roadway approach at Abutment 1 is approximately 65mm low.

Overall, this structure is in poor condition.

SCOUR

Abutment 4 is scoured to the face of the abutment diaphragm.

ELEMENT LEVEL INSPECTION RATINGS

F# Elem No.	Element Description	Env	Total Quantity	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01 32	Timber Deck - w/ AC Overlay	2	10	sq.m.	10	0	0	0	0
01 117	Timber Stringer	2	200	m.	200	0	0	0	0
01 206	Timber Column or Pile Extension	2	6	ea.	6	0	0	0	0

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Bridge No.: 29C0307 **Location: 0.8 MI N OF SR 4** **Inspection Date: 10-NOV-98**

F# Elem No.	Element Description	Env	Total Units Quantity	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
01 215	Reinforced Conc Abutment	2	13 m.	0	13	0	0	0
01 235	Timber Cap	2	24 m.	18	6	0	0	0
01 332	Timber Bridge Railing	2	42 m.	0	42	0	0	0
01 361	Scour	2	1 ea.	0	1	0	0	0

WORK RECOMMENDATIONS

Repair the AC deck and pave the AC roadway approach at Abutment 1 to level grade.

Item#	Reco. Date	Work By	Work Id.	Prog. Method	Cost
1	10-NOV-1998	County Agency	40307X98314X		

Patch the large vertical crack at the Abutment 1 left wingwall.

Item#	Reco. Date	Work By	Work Id.	Prog. Method	Cost
2	10-NOV-1998	County Agency	40307X98314X		

Place rock slope protection against the face of Abutment 4.

Item#	Reco. Date	Work By	Work Id.	Prog. Method	Cost
3	10-NOV-1998	County Agency	40307X98314X		

Provide a roadway runoff drainage system at the right side of Abutment 4.

Item#	Reco. Date	Work By	Work Id.	Prog. Method	Cost
4	10-NOV-1998	County Agency	40307X98314X		

Inspected By : Oscar M. Vasquez

Registered Civil Engineer

Printed on : 04-JAN-1999 01:05:22 PM

Bridge No.: 29C0307 **Location: 0.8 MI N OF SR 4** **Inspection Date: 10-NOV-98**

STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1)	STATE NAME - CALIFORNIA	06 9
(8)	STRUCTURE NUMBER	29C0307
(5)	INVENTORY ROUTE(ON/UNDER) - ON	1 40 000000
(2)	HIGHWAY AGENCY DISTRICT	10
(3)	COUNTY CODE 077 (4) PLACE CODE	00000
(6)	FEATURE INTERSECTED - DUCK CREEK BRANCH	
(7)	FACILITY CARRIED - BUCKMAN RD	
(9)	LOCATION - 0.8 MI N OF SR 4	
(11)	MILEPOINT/KILOMETERPOINT	0
(12)	BASE HIGHWAY NETWORK - NOT ON NET	0
(13)	LRS INVENTORY ROUTE & SUBROUTE	
(16)	LATITUDE	37 DEG 56 MIN 36 SEC
(17)	LONGITUDE	120 DEG 57 MIN 54 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

STRUCTURE TYPE AND MATERIAL

(43)	STRUCTURE TYPE MAIN: MATERIAL - WOOD OR TIMBER	
	TYPE - STRINGER/MULTI-BEAM OR GDR CODE	7 02
(44)	STRUCTURE TYPE APPR: MATERIAL - OTHER	
	TYPE - OTHER CODE	000
(45)	NUMBER OF SPANS IN MAIN UNIT	3
(46)	NUMBER OF APPROACH SPANS	0
(107)	DECK STRUCTURE TYPE TIMBER	CODE 8
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
A)	TYPE OF WEARING SURFACE - BITUMINOUS	CODE 6
B)	TYPE OF MEMBRANE - NONE	CODE 0
C)	TYPE OF DECK PROTECTION - NONE	CODE 0

AGE AND SERVICE

(27)	YEAR BUILT	1931
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON - HIGHWAY	1
	UNDER - WATERWAY	5
(28)	LANES: ON STRUCTURE 01 UNDER STRUCTURE	
(29)	AVERAGE DAILY TRAFFIC	50
(30)	YEAR OF ADT 1998 (109) TRUCK ADT	%
(19)	BYPASS, DETOUR LENGTH	14 KM

GEOMETRIC DATA

(48)	LENGTH OF MAXIMUM SPAN	4.3 M
(49)	STRUCTURE LENGTH	12.5 M
(50)	CURB OR SIDEWALK: LEFT 0 M RIGHT	0 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	5.2 M
(52)	DECK WIDTH OUT TO OUT	5.6 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	4.9 M
(33)	BRIDGE MEDIAN - NO MEDIAN	0
(34)	SKEW 35 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	5.2 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF - NOT H/RR	0 M
(55)	MIN LAT UNDERCLEAR RT REF - NOT H/RR	99.9 M
(56)	MIN LAT UNDERCLEAR LT	0 M

NAVIGATION DATA

(38)	NAVIGATION CONTROL - NO CONTROL	CODE 0
(111)	PIER PROTECTION -	CODE
(39)	NAVIGATION VERTICAL CLEARANCE	0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0

SUFFICIENCY RATING = 68.4

STATUS = FUNCTIONALLY OBSOLETE

HEALTH INDEX = 84.25

CLASSIFICATION

(112)	NBIS BRIDGE LENGTH - YES	Y
(104)	HIGHWAY SYSTEM - NOT ON NHS	0
(26)	FUNCTIONAL CLASS - LOCAL RURAL	09
(100)	DEFENSE HIGHWAY - NOT STRAHNET	0
(101)	PARALLEL STRUCTURE - NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC - 1 LANE, 2 WAY	3
(103)	TEMPORARY STRUCTURE -	
(105)	FEDERAL LANDS HIGHWAY -	
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL - ON FREE ROAD	3
(21)	MAINTAIN - COUNTY HIGHWAY AGENCY	2
(22)	OWNER - COUNTY HIGHWAY AGENCY	2
(37)	HISTORICAL SIGNIFICANCE - NOT ELIGIBLE	5

CONDITION

(58)	DECK	7
(59)	SUPERSTRUCTURE	7
(60)	SUBSTRUCTURE	5
(61)	CHANNEL & CHANNEL PROTECTION	5
(62)	CULVERTS	N

LOAD RATING AND POSTING

(31)	DESIGN LOAD - M - 13.5 OR H - 15	2
(63)	OPERATING RATING METHOD - ALLOWABLE STRESS	2
(64)	OPERATING RATING -	31.7
(65)	INVENTORY RATING METHOD - ALLOWABLE STRESS	2
(66)	INVENTORY RATING -	22.7
(70)	BRIDGE POSTING - Equal to or above legal loads	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED -	A
	DESCRIPTION - OPEN, NO RESTRICTION	

APPRAISAL

(67)	STRUCTURAL EVALUATION	5
(68)	DECK GEOMETRY	3
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	7
(72)	APPROACH ROADWAY ALIGNMENT	6
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	U

PROPOSED IMPROVEMENTS

(75)	TYPE OF WORK - SUP/SUB REHAB	CODE 35
(76)	LENGTH OF STRUCTURE IMPROVEMENT	12.5 M
(94)	BRIDGE IMPROVEMENT COST	$56,000
(95)	ROADWAY IMPROVEMENT COST	$6,000
(96)	TOTAL PROJECT COST	$84,000
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	1998
(114)	FUTURE ADT	60
(115)	YEAR OF FUTURE ADT	2015

INSPECTIONS

(90) INSPECTION DATE 11/98 (91) FREQUENCY 24 MO

(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE

A)	FRACTURE CRIT DETAIL -	NO	-1 MO A)
B)	UNDERWATER INSP -	NO	-1 MO B)
C)	OTHER SPECIAL INSP -	NO	-1 MO C)

Printed on : 04-JAN-1999 01:05:22 PM

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STREAM SECTION

DSM 0012

BRIDGE NUMBER	DIST./CO./RTE.	PM	BY
29C0307	10/SJ/CO. RD		Oscar Vasquez

BRIDGE NAME: Duck Creek Branch

PROFILE SIDE	MEASURED FROM	DATE
Upstream	DECK RT. UPSTREAM	11/10/98

From BB	Horizontal (m)	Vertical (m)	Comments
Abut. 1	+ 0	3.11	At Abut. Face
Pier 2	+ 4	3.00	
Pier 3	+ 8.2	3.04	
Abut 4	+ 12.2	3.04	At Abut. Face

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 29C-0307

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 10-SJ-Co.Rd.
Dist.,Co.,Rte.,PM,City

Date of Investigation 11-26-96

Name DUCK CREEK BRANCH (Buckman Rd., 0.8 mi. N. of S. R. 4)

RATINGS:

[71] **Waterway Adequacy** 7 [61] **Channel & Channel Protection** (5) [72] **Approach Rdwy Align.** 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Group A**		**Other**	
Damage		**Underwater**		**Office**	

WORK DONE

The deck has been replaced. The new deck is transverse 3x12's timber members covered by 25 mm of AC.

The stringers have been replaced. Each span has 16 girders which are 4x16's on 14inch centers.

CONDITION OF STRUCTURE

Abutment 4 is scoured to the face of the abutment diaphragm.

The timber cap at Bent 3 has a longitudinal split along the neutral axis.

WORK RECOMMENDED

Place protection at Abutment 4 to prevent further degradation of the abutment slope.

RJP.

Richard P. Jorgensen
Registered Civil Engineer

RPJ:pg

********** STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION **********

ELEMENT LEVEL INSPECTION-(ELI)

BRIDGE NUMBER: 29C0307 (1–8) | FRAME: 01 (9) | INSPECTION DATE: ~~10/25/94~~ 11/26/96 (11–16)

INFORMATION ONLY - NOT FOR UPDATE

SCOUR CRITICAL..... NO
GROUP A INVESTIGATION..... NO
FRACTURE CRITICAL..... NO
ELIGIBLE FOR RAIL UPGRADE.. NO
UNDERWATER INVESTIGATION... NO

DISTRICT: 10
COUNTY: SJ
ROUTE:
POSTMILE:
NAME:

DEL	ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
	32	WOOD DECK - WITH AC OVERLAY		1	EA	1			1	
	215	REINFORCED CONCRETE ABUTMENT		13	M		7	6		
D	331	CONCRETE BRIDGE RAILING		42	M			42		
	361	Scour		1	EA		1			
	117	Timber Stringers		20.0	M	20.0				
	235	Brkt's ~~timber~~ cap		24	M	24				
	206	Timber column		6	EA	6				
	332	Timber Rail		42	M		42			

18 19 | 22 23 | 28 | 33 | 38 | 43 | 48

01/31/96 04C RICHARD JORGENSEN

BY: R. Jorgensen

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Bridge No. 29C-0307

Location 10-SJ-C.R.
Dist.,Co.,Rte.,PM,City

Date of Investigation 10/25/94

Name DUCK CREEK BRANCH (Buckman Rd., 0.8 mi. N. of S. R. 4)

RATINGS:

[71] **Waterway Adequacy** 7 [61] **Channel & Channel Protection** 7 [72] **Approach Rdwy Align.** 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	**Group A**		**Other**	
Damage		**Underwater**		**Office**	

REVISIONS
The lateral movement of the wingwalls at Abutment 1 has been arrested by looping a steel cable between the two wingwalls.

WORK DONE
The debris has been removed from Bents 2 and 3.

CONDITION OF STRUCTURE
The deck has many large transverse cracks, loose and rotted timbers, and loose nails.

The wood bridge rail is loose and could be rocked back and forth by hand.

The stringers and substructure could not be inspected due to soft mud in the streambed at the bottom of the bridge. Viewed from a distance, some of the timber stringers looked split, as did Post 3 in Bent 3.

There was excessive movement of the structure when a vehicle passed over the bridge.

This bridge is in poor condition.

WORK RECOMMENDED
1. Repair the deck.

2. Thoroughly inspect the timber stringers and the substructure during the dry season when the soils under the bridge are dry. Replace or supplement any rotted or split timber members.

3. Tighten the bolted connections of the timber bridge rail. Provide additional support posts if necessary. This work should be done as a temporary measure until a standard bridge rail can be provided.

4. Tighten all structural connections in the bridge and provide additional bolts as necessary to reduce the excessive vibration of the bridge.

PONTIS INSPECTION
A PONTIS inspection form for this investigation is attached.

Saleem Mithwani

Mohamed Saleem Mithwani
Registered Civil Engineer

MSM/pfa

REGISTERED PROFESSIONAL ENGINEER
MOHAMED SALEEM MITHWANI
No. C47625
Exp. 12/31/95
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION (ATTACHMENT A)

PONTIS DATA FORM - PIA

BRIDGE NUMBER	FRAME	INSPECTION DATE
29C0307	01	10/25/94
1 8	9	11 16

INFORMATION ONLY - NOT FOR UPDATE	
SCOUR CRITICAL	NO
CATEGORY A	NO
FRACTURE CRITICAL	NO
ELIGIBLE FOR RAIL UPGRADE	NO
UNDERWATER INSPECTION	NO

DISTRICT	10
COUNTY	SJ
ROUTE	
POSTMILE	
NAME	

DEL	ELE #	ELEMENT DESCRIPTION	ENV	TOTAL QUANTITY	UNITS	QUANT CONDITION STATE 1	QUANT CONDITION STATE 2	QUANT CONDITION STATE 3	QUANT CONDITION STATE 4	QUANT CONDITION STATE 5
D	49	CONCRETE PIER WALL		7	M					
	51	CONCRETE ABUTMENT		13	M		7	6		
	102	CONCRETE BRIDGE RAILING		42	M			42		
D	139	CONCRETE SLAB - UNPROTECTED W/ AC OVERLAY		1	EA					
	132	Timber Dk.							1	

18 19 22 23 28 33 38 43 48

09/12/94 04C T. HA

11-2-94

BY:

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 29C-0307

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 10-SJ-C, R.
Dist.,Co.,Rte.,PM,City

Date of Investigation 3-16-93

Name DUCK CREEK BRANCH (Buckman Rd., 0.8 mi. N. of S. R. 4)

RATINGS:

58 Deck 4 | 59 Superstructure 4 | 60 Substructure 4 | 71 Waterway Adequacy 7

61 Channel & Channel Protection 7 | 62 Culvert N | 72 Approach Rdwy Align. 6

TYPE OF INVESTIGATION/REPORT

Biennial	X	Category A		Other	
Damage		Underwater		Office	

CONDITION OF STRUCTURE

The Stringer No. 8 in Span 3 has split off, it needs to be replaced as soon as possible.

The deck has many large cracks.

Debris has collected at columns of Bents 2 and 3.

This structure in fair condition.

WORK RECOMMENDED

1. Replace the Stringer No. 8 in Span 3. SUPL
2. Repair the deck surface. DEKH
3. Remove debris from columns of Bents 2 and 3.

Tuong Nhu Ha
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
TUONG NHU HA
No. 44431
Exp. 3-31-94
CIVIL
STATE OF CALIFORNIA

TH/wb-07793

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 29C-0309

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 10-SJ-C, R.
Dist.,Co.,Rte.,PM,City

Date of Investigation 3-16-93

Name DUCK CREEK BRANCH (Waverly Rd., 1.2 mi. N. of S. R. 4)

RATINGS:

58 Deck 5 59 Superstructure (4) 60 Substructure 5 71 Waterway Adequacy 8

61 Channel & Channel Protection 7 62 Culvert N 72 Approach Rdwy Align. 8

TYPE OF INVESTIGATION/REPORT

Biennial	X	Category A		Other	
Damage		Underwater		Office	

CONDITION OF STRUCTURE

The Stringer No. 15 in Span 3 has split.

Nails for wedges tacking in many stringers have been loose.

This structure is in fair condition.

WORK RECOMMENDED

Replace the Stringer No. 15 in Span 3 and tack wedges again with double headed nails for other stringers where needed. SUPL

Tuong Nhu Ha
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
TUONG NHU HA
No. 44431
Exp. 3-31-94
CIVIL
STATE OF CALIFORNIA

TH/wb-07793

10-SJ-Co.Rd. # 29C-307

DUCK CREEK BRANCH

SPLIT ON STRINGER #8 OF SPAN 3
3-16-93.17
TH-4

SPLIT ON STRINGER #8 OF SPAN 3
3-16-93.18
TH-4

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

Bridge No. 29C-0307

SUPPLEMENTARY BRIDGE REPORT

DS-M19(REV.1-90)

Location 10-SJ-C.R.
Dist.,Co.,Rte.,PM,City

Date of Investigation 2-22-90

Name DUCK CREEK BRANCH (Buckman Rd., 0.8 mi. N. of S.R. 4)

RATINGS:

58 Deck 4 | 59 Superstructure 4 | 60 Substructure 4 | 71 Waterway Adequacy 7

61 Channel & Channel Protection (7) | 62 Culvert N | 72 Approach Rdwy Align. 6

CODES:

21 Custodian [02] | 22 Owner [02] | 26 Functional Classification: Deck [09] Under [N]

41 Str Open, Posted or Closed [A] | 107 Deck Type [8] | 108 Wearing Surface/Prot Sys [600]

Max Col/Pier Ht. [0-20'] | 111 Pier/Abut. Prot. [ ]

55 Min Lat Underclr on Rt. [NA] | 54 Min Vert Underclr [NA] | 112 NBIS Bridge Length [Y]

DATA:

51 Bridge Width (NET) 18.0' | 114 Future ADT 60 | 115 Yr. of Future ADT 2010

9 Average Daily Trucks (% of ADT): Deck _____ Under _____

Number of Intermediate Joints: @ Hinges 0 @ Bents 2

TYPE OF INVESTIGATION/REPORT

Biennial	X	Category A		Other	
Damage		Underwater		Office	

CONDITION OF STRUCTURE

The AC pavement on both approaches is cracked at the structure and lower than the deck grade. This condition does not require any immediate repairs.

No other significant changes are noted during this inspection.

WORK RECOMMENDED

NONE

Ram Kalia

Ram L. Kalia, P.E., C017928

RLK/ms

REGISTERED PROFESSIONAL ENGINEER
RAM LUBHAYA KALIA
No. 17,928
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTARY BRIDGE REPORT
DS-M19 (REV 7/87)

Bridge No. 29C-307

Location 10-SJ-Co.Rd.
Dist-Co-Rte-PM-City

Date of Investigation June 24, 1988

Name DUCK CREEK BRANCH (Buckman Rd., 0.8 mile north of SR 41)

CONDITION RATING: **APPRAISAL RATING:**

Deck 4 Superstructure 4 Substr. & Pipes 4 Overall 3

Channel & Channel Protection 6 Retaining Walls N

Widenable? Yes ___ No X Conditional ___

Action Required Yes X No ___

PREVIOUS INVESTIGATION October 7, 1986

CONDITION OF STRUCTURE

Thee is a large (1/8") diagonal crack near the center of Abutment 1.

The right half of the Abutment 1 approach has settled 2".

No other significant changes were noted.

WORK RECOMMENDED

Repair the approach at Abutment 1.

Robert R. Reynaga

RRR/sr

REGISTERED PROFESSIONAL ENGINEER
ROBERT R. REYNAGA
NO. C 30805
Exp: 3/31/92
CIVIL
STATE OF CALIFORNIA

10-SJ-Co.Rd.

29C-307

DUCK CREEK BRANCH

NORTHERLY ON BUCKMAN ROAD
6-24-88.20
RRR-20

WESTERLY
6-24-88.21
RRR-20

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTARY BRIDGE REPORT
DS-M19 (REV. 2/75)

Bridge No. 29C-307

Location 10-SJ-Co.Rd.
Dist - Co - Rte - PM - City

Date of Investigation September 23, 1986 (initial)
October 7, 1986 (follow-up)

Name DUCK CREEK BRANCH (on Buckman Rd., 0.8 mi. N. of S.R. 4)

CONDITION RATING: **APPRAISAL RATING:**

Deck 4 Superstructure 4 Substr. & Pipes (4) Overall 3

Channel & Channel Protection 6 Retaining Walls N

Widenable? Yes ☐ No ☒ Conditional ☐

Action Required by ~~District~~ County: Yes ☐ No ☒

CONDITION OF STRUCTURE:

Two planks in span 3 are deteriorating.

The left A-1 wingwall is split and pulling out ±9" from the abutment. The split in the wall has been temporarily repaired.

The following table represents the condition of the stringers before the follow-up investigation.

SPAN	STRINGER	CONDITION	RECOMMENDATION
1	all	good	none
2	10	Supplemented	none
3	5	Supplemented	none
3	6	Supplemented	none
3	7	broken supplement*	replace or repair supplement
3	13	broken supplement*	replace or repair supplement

*After contacting the county about the two broken supplement stringers, the follow-up investigation showed that both broken supplements had been replaced.

The structure is now in fair condition.

RECOMMENDATIONS:

None

Gary R. Goff
Reviewed & approved by

G. Poole C37034
GRG/GP/nlc

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTARY BRIDGE REPORT
DS-M18 (REV. 2/75)

Bridge No. 29C-307 (#1535)

Location 10-SJ-CR
Dist - Co - Rte - PM - City

Date of Investigation October 10, 1984

Name DUCK CREEK BRANCH (at Beckman Rd., 0.8 mi. N. of S.P.4)

CONDITION RATING:

Deck 4 Superstructure 4 Substr. & Pipes 5

Channel & Channel Protection 6 Retaining Walls N

APPRAISAL RATING:

Overall 3

Widenable? Yes ☐ No ☒ County Conditional ☐

Action Required by District: Yes ☒ No ☐

PREVIOUS INVESTIGATION: April 26, 1982

CONDITION OF STRUCTURE:

There were several broken stringers at the time of inspection. Stringer #2 in Span #1 as well as stringer #5 and 7 in Span #3.

RECOMMENDATIONS:

Supplement the broken stringers as soon as possible.

Craig A. Copelan
C 36301

CAC/nlc

REGISTERED PROFESSIONAL ENGINEER
CRAIG A. COPELAN
No. 36301
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTARY BRIDGE REPORT
DS-M19 (REV. 2/75)

Bridge No. 29C-307 (#1535)

Location 10-SJ-Co. Rd.
Dist - Co - Rte - PM - City

Date of Investigation April 26, 1982

Name DUCK CREEK BRANCH (at Buckman Rd., 0.8 mi. N. of S.R. 4)

CONDITION RATING: **APPRAISAL RATING:**

Deck (4) Superstructure 4 Substr. & Pipes 5 Overall (3)

Channel & Channel Protection (6) Retaining Walls N

Widenable? Yes ☐ No ☒ Conditional ☐

Action Required by ~~District~~ County Yes ☐ No ☒

PREVIOUS REPORT: June 16, 1978

REVISIONS TO ORIGINAL REPORT: Deck Geometry 3

CONDITION OF STRUCTURE

The hole in the deck mentioned in the previous report has been repaired.

The soffit of the deck planks shows mold forming which will cause deterioration requiring posting in the future,

Stringers 12 and 13 are broken and supplemented in Span #3. The rest of the structure remains in the same general condition as it was in during the previous report.

Frank C. Heggli

REGISTERED PROFESSIONAL ENGINEER
FRANK C. HEGGLI
No. 11248
CIVIL
STATE OF CALIFORNIA

FCH/ls

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
BRIDGE REPORT
DS-M58 (REV. 1/75)

Bridge No. 29C-307

Other No. Co. No. 1535

P.U.C. No.

Location 10-SJ-CR
Dist - Co - Rte - PM - City

Date of Investigation June 16, 1978

Name DUCK CREEK BRANCH (on Buckman Rd., 0.8 mi. N. of S.R. 4)

Lat. 37° -56.6' Long. 120° -57.9'

STRUCTURAL DATA AND HISTORY

Year Built 1957 By S. J. Co. Contract No. ---

Date of Revisions

Designed by: B.D. ☐ --- Plans Avail. @ DOT

Description: Timber stringers on DF cap and post bents on PCC footings and on PCC abutment walls.

Spans 11.5', 14.4', 13.2' c/c

Length 41.1' Skew 35° Lt. Design LL H 15 (assumed)

Ratings: Inventory H 14 Operating H 20 Permit GGGGG

DESCRIPTION – ON STRUCTURE

Bridge Width 0.6'c-17.1'-0.6'c

Total Width 18.3' Lanes 1 Tracks N

Median N Rail Type C.L. (0000)

Vert. Clearance over deck Unimpaired Appr. Rdwy. Width 16.0

Wearing Surface N Deck Seal N

Alignment Tangent

DESCRIPTION – UNDER STRUCTURE

Roadway Section N

Clearances: Vert. --- Horiz.; Lt. Rt.

Lanes N Tracks N Pumpplant: None ☒ See Br. No.

Facilities Crossed N

cc:

(1) CON'T.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
BRIDGE REPORT
DS-M58A (REV. 1/75)

Bridge No. 29C-307

Date June 16, 1978

DESCRIPTION – HYDRAULICS

Channel U-shaped; grass lined; water ponded

Navigable: Yes ☐ No ☒ Clearances: Vert. ..... Horiz. .....

MAINTENANCE

Custodian S. J. Co. Owner S. J. Co.

ORIGINAL CONDITION RATING		ORIGINAL APPRAISAL	
Deck	2 (rotted)	Overall	2
Superstructure	4	Deck Geometry	4
Substructure & Pipes	5	Underclearances Vert.	N
Channel & Channel Protection	7	Horiz.	N
Retaining Walls	N	Safe Load Capacity	
Approach Rdwy. Alignment	8	Waterway Adequacy	6
Estimated Remaining Life	5	Approach Rdwy. Alignment	8

Average Daily Traffic = 50
Bypass Detour Length = none

Widenable? Yes ☐ No ☒ Conditional ☐

Action Required by District: Yes ☐ No ☒

CONDITION OF STRUCTURE:

The deck planks are severely deteriorated. In one place there is a gaping hole about 1' in dia. The bridge is open to traffic, but the north approach is barred by a land owner's gate about 200' north.

EARTHQUAKE RETROFITTING:

None is required.

LOAD CAPACITY:

By observation, the deck has failed and must be repaired. The ratings are derived from an analysis of the remainder of the bridge, of which the stringers are the most stressed member. A judgement of 1800 psi was used for the stringers.

DS-M18 (REV. 6/75)

BRIDGE NO. 29C-307	
SHEET 3	DATE June 16, 1978

RECOMMENDATIONS:

Repair rotted and broken deck planking.

R W Burgan

R. W. Burgan, P.E.

CE 9268

RWB/nlc

cc: Dist. 10
S. J. Co. 2

BY RW Bunza Br. Name: Duck Cr. Branch — Co. # 1535

DATE 6-16-78

CHKD BY TJH DATE 7-27-78

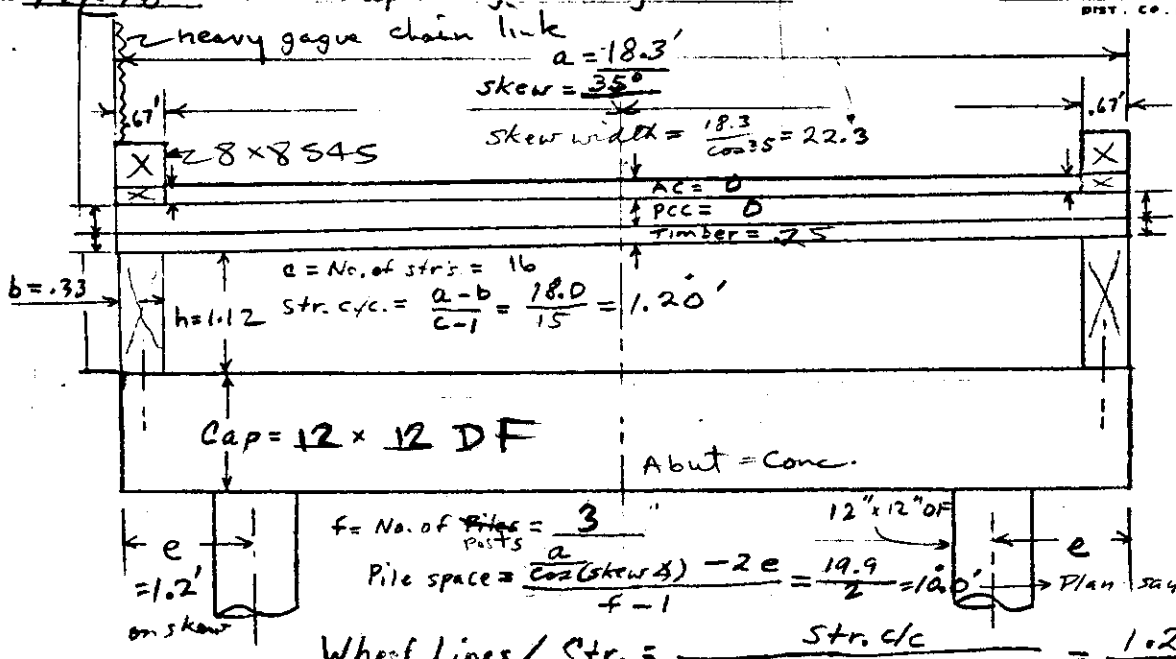
SUBJECT Capacity Rating

SHEET 1 OF 3

BR. NO. 29C-307

10-SJ-C R
DIST. CO. RTE PM

1535



Wheel Lines / Str. = Str. c/c / Value fr. AASHO Table 1.3.1(B) = 1.20 / 4.00 = 0.30

DECK CAPACITY

By comparison with calc's on similar bridges, using 1800 psi as stress, planks are OK. However, a few planks have failed here and so capacity is zero.

STRINGER CAPACITY

Span = 14.4'; Area = 0.37'²; I/c = 119"²

Judgement of Operating Stress = 1800 psi (F_{b_0})

Inventory " = 1300 psi (F_{b_I})

Dead Loads over Heaviest Loaded Str.:

		#/L.F. of Str.
AC =	0	
PCC =	0	
Timber floor =	50 pcf x 0.25' x 1.20' =	15.0
Stringer =	50 pcf x 0.37'² =	18.5
	Total = w =	33.5 #/LF

Dead Load Mom. = $\frac{1}{8}\frac{wl^2}{1000}$ = 0.87'K

Resisting Mom. = $\frac{F_b I}{c}$

	Operating	Inventory
R.M. =	$\frac{1800\text{ psi} \times 119^{43}}{1000 \times 12}$ = 17.85'K	$\frac{1300 \times 119}{12000}$ = 12.89'K
— D.L.M. =	— 0.87	— 0.87
Available Mom. =	16.98'K	12.02'K

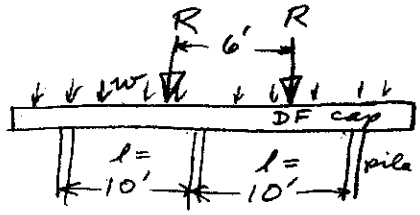
Stringer Capacity (Cont.)

Rating Factor for Type 3 Truck (Has greatest LLM. See Plate 2):

$$R.F. = \frac{16.98\ ^{K}/_{str.}}{\frac{49.2}{40.2}\ ^{K}/_{WL} \times 0.30\ ^{WL}/_{str.}} = \frac{1.25}{1.15} > 1.00;\ \therefore OK$$

for all Legal Truck types.

BENT CAP CAPACITY



$$I/c = \frac{12(12^2)}{6} = 288\ ^{in^3}$$

R = 14.6 $^{K}/_{WL}$ for Type 3 Tr. See Plate 3, AASHO Manual.
(Using str. span of 14')

Dead Load

Stringer Load = ± 33.5 $^{\#}/_{ft.\ of\ str.}$ (from Sh. 1) $\times \frac{\frac{1}{2}(14.4'\ span + 13.2'\ span)}{1.20'\ str.\ space} = 385\ ^{\#}/_{ft.\ of\ cap}$

Cap load = 50 pcf x 1' x 1' = $^{50}/_{435\ ^{\#}/_{ft.\ of\ cap}}$ = w

Cap in SHEAR

Operating Stress = 85 psi x 1.33 x 2.0 (no splits) = 226 psi
Place R at point x, where x is lessor of $l/4$ or 3d. Use $l/4$ = 2.5'

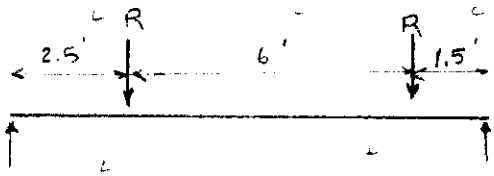
Resisting Shear (from $v = \frac{3}{2}\frac{V}{A}$): $\frac{2}{3} \times \frac{226\ psi}{1000\ ^{\#}/_{K}} \times (12" \times 12") = 21.7\ ^{K}$

D.L. Shear = $\frac{wl}{2} - wx = 0.435\ ^{K}/_{ft}\left(\frac{5.0}{10.0} - 2.5'\right) = \frac{-1.1}{3.3\ ^{K}}$

$\frac{20.6}{18.4\ ^{K}}$

Actual Shear = Type 3 Truck shear, R = 14.7 ^{K} from Plate 3, AASHO.
" " $= R\left(\frac{l-x}{l}\right) = 14.7^{K}\left(\frac{0.9}{7.5'}{10.0'}\right) = \frac{13.2}{11.0\ ^{K}}$

Rating Factor = $\frac{18.4\ ^{K}}{11.0\ ^{K}} \geq 1.67$, $\therefore$ OK



$V_{max} = (0.75 + 0.15)\,R = 0.9\,R$
@ 4/4

Bent Cap Capacity (Cont.)

Cap in BENDING

Use Operating stress on Sh.1. Use sketch, w, and R on Sh.2.

$$I/c = \frac{12" (12")^2}{6} = 288 \text{ in}^3$$

$$\text{Resis. Mom.} = \frac{1800 \text{ psi} \times 288 \text{ in}^3}{1000 \text{ \#/K} \times 12 \text{ in/ft}} = 43.20 \text{ ft-K}$$

$$DLM = \frac{wl^2}{10} = \frac{0.435 \text{ K/ft} (10.0')^2}{10} = \frac{8}{}$$

5.44
− 4.35
37.76
~~38.85~~ K

Available Mom. =

Actual LLM: Assume cont. over 2 spans & use $\frac{Pl}{\cancel{8}5}$.

" " $= 0.4 \times R \times l = 0.4 \times 14.7^K \times 10.0' = 29.4$ ~~44.1~~ K

$$\text{Rating Factor} = \frac{37.8}{\cancel{38.85}^K} = 1.28 = 2.64; \quad \therefore \text{OK}$$

$$\cancel{44.1}^K \quad 29.4$$

Conclusions

Capacity limited by stringers (which are OK for all legal truck loads) and by deck (see report).

$$\text{H15 Inventory Rating} = 15T \times \frac{12.0^K}{43.2^K/\text{WL} \times 0.30 \text{ WL/str}} = \text{H } 13.9$$

$$\text{H15 Operating Rating} = 15T \times \frac{17.0^K}{43.2 \times 0.30} = \text{H } 19.7$$

$$\text{Permit Truck R.F.} = \frac{17.0^K}{62.0^K \times 0.30} = 0.91$$

(from chart)

0.91 is in Green range. All trucks give same LLM for this span. Rating = G G G G G

10-SJ #29C-307

DUCK CREEK BRANCH

ROADWAY LOOKING NORTH

SIDE LOOKING NW'LY

SECTION A-A OF ABUTMENT SHOWING REENFORCEMENT OF 6'x36" WALL TO BE BUILT

CROSS - SECTION

PLAN

ELEVATION

DETAIL OF FELLOE-GUARD BOLT
Scale: 1"=1'0"

4"x6" RE-ENFORCING STEEL
45 pcs. 3"x3"x3'
3 " 3"x3"x20'-0" Bent
3 " 3"x3"x33'-3" Bent

6"x36" Concrete wall built against existing abutment to level of top of flooring

Existing Abutment to be used

"AS BUILT" COPIES TO BRIDGE FILE 4/25/78

Br # 29C-203
Duck Creek
10-SJ-Buckman
County # 1535

AS BUILT PLANS
Contract No. UNKNOWN
Date Completed
Document No. 20003398

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION

SAN JOAQUIN COUNTY CALIFORNIA
OFFICE OF THE COUNTY SURVEYOR, STOCKTON
PLANS FOR A BRIDGE
TO BE BUILT OVER DUCK CREEK ON THE BUCKMAN R
J.B. Manthey, County Surveyor
Scale: 1"=1'0"
Date: Oct. 6, 1931
K.T. Pennebaker Mech. Eng.

SCSJ

APPENDIX G:

HYDRAULIC STUDY REPORT

Buckman Road Bridge Replacement Project
San Joaquin County, California
Federal-Aid Project No. BRLO-5929(241)
Existing Bridge No. 29C0307

Draft Bridge Design Hydraulic Study Report

Prepared for:

San Joaquin County

Prepared by:

WRECO

September 2017

Buckman Road Bridge Replacement Project
San Joaquin County, California
Federal-Aid Project No. BRLO-5929(241)
Existing Bridge No. 29C0307

Draft Bridge Design Hydraulic Study Report

Submitted to:
San Joaquin County Department of Public Works

This report has been prepared by or under the supervision of the following Registered Engineer. The Registered Civil Engineer attests to the technical information contained herein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

_____
Han-Bin Liang, Ph.D., P.E.
Registered Civil Engineer

_____
Date

September 2017

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Executive Summary

San Joaquin County (County) is proposing to replace the existing Buckman Road bridge over North Fork Duck Creek. The Buckman Road Bridge Replacement Project (Project) is located approximately 16.7 mi east of City of Stockton. The existing bridge carries Buckman Road over the North Fork Duck Creek. This segment of Buckman Road is a single-lane roadway classified as "Local (07)" in the San Joaquin County's maintained mileage record. The roadway ends approximately 200-ft north of the existing bridge. The road services multiple agricultural field accesses as well as a couple of residences beyond the bridge.

As a result of the National Bridge Inventory item (68) "Deck Geometry" having a rating of 3, Buckman Road bridge has been rated as Functionally Obsolete and has a sufficiency rating of 68.4. In addition, the bridge railings have been removed without permission or damaged multiple times by wide agricultural equipment using the narrow bridge. The bridge is on the eligible bridge list and qualifies for federal funding under the Highway Bridge Program. The purpose of this Project is to replace the existing Functionally Obsolete bridge with a wider new bridge that would allow agricultural equipment to utilize the proposed structure.

The proposed clear-span bridge would have one 10-ft lane and 6-ft shoulders on both sides. The concrete bridge railings, approach shoulders, and end terminals would be designed to meet current standards. Rock slope protection (RSP) would be installed in the channel to prevent future scour on the new structure.

The purpose of this report is to present the design flow characteristics for the existing and proposed Buckman Road bridge. This report provides the calculated scour potential and recommendations on the need for scour countermeasures for the proposed bridge.

The Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) version 4.0; HEC-HMS is a hydrologic modeling software developed by the U.S. Army Corps of Engineers (USACE) and was used to estimate the peak 50- and 100-year flow of North Fork Duck Creek for the hydraulic analysis. The 50- and 100-year flows used in the hydraulic analysis were 1,590 cfs and 1,860 cfs, respectively.

The hydraulics of the existing and proposed conditions were analyzed using the Hydrologic Engineering Center River Analysis System (HEC-RAS) Version 4.1.0, which is hydraulic modeling software developed by the United Stated Army Corps of Engineers (USACE). The hydraulic model for existing and proposed conditions were developed using the survey and proposed bridge general plans provided by San Joaquin County.

The existing and proposed water surface elevations (WSEs) in the Project vicinity with the design flow are summarized in the following tables. In comparison to the existing three-span bridge, the proposed clear-span bridge would have minimal backwater effect to the profile of North Fork Duck Creek, because: 1) proposed channel grading would

increase the opening area for the flood flow to pass through; 2) bridge soffit elevation is raised above the 50- and 100-year flood profile; and 3) piers that would obstruct the flood flow would be removed from the Project location.

Hydraulic Summary, 50-year Storm Event

River Station (RS)/ Distance from Existing Bridge Centerline	Existing (ft NAVD 88)	Proposed (ft NAVD 88)	WSE Change (ft)
RS 625.27 234 ft Upstream, Model Upstream Limit	118.8	117.6	-1.1
RS 413.58 22 ft Upstream	118.5	116.5	-2.0
RS 405.88 15 ft Upstream	118.1	116.3	-1.8
Bridge Upstream Face	117.6	116.3	-1.3
Bridge Downstream Face	115.7	116.2	0.4
RS 376.25 15 ft Downstream	115.8	116.1	0.3
RS 365.51 26 ft Downstream	116.4	116.1	-0.3

Notes:

- Elevations are rounded to the nearest 0.1 ft.
- NAVD 88=North American Vertical Datum of 1988.

Hydraulic Summary, 100-year Storm Event

River Station (RS)/ Distance from Existing Bridge Centerline	Existing (ft NAVD 88)	Proposed (ft NAVD 88)	WSE Change (ft)
RS 625.27 234 ft Upstream, Model Upstream Limit	119.7	118.3	-1.4
RS 413.58 22 ft Upstream	119.5	117.1	-2.3
RS 405.88 15 ft Upstream	119.1	116.9	-2.2
Bridge Upstream Face	118.2	116.9	-1.3
Bridge Downstream Face	116.2	116.7	0.5
RS 376.25 15 ft Downstream	116.4	116.7	0.3
RS 365.51 26 ft Downstream	117.0	116.7	-0.3

Note: elevations are rounded to the nearest 0.1 ft.

The freeboard heights of the existing and proposed bridges during the 50- and 100-year storm events are summarized in the following table. The existing bridges would have not have a freeboard during the 50- and 100-year storm event to meet the applicable freeboard criteria from the Federal Highway Administration and California Department of Transportation. The proposed bridge would have freeboard during the 50- and 100-

year storm event, but the freeboard height is less than 2 ft, which is recommended by Caltrans for the preliminary bridge design.

Summary of Existing and Proposed Bridge Freeboards

Recurrence Interval (yr)	Model Condition	Bridge Soffit (ft NAVD 88)	WSE at Bridge Upstream Face (ft NAVD 88)	Freeboard (ft)
50	Existing	117.50	117.6	No Freeboard
	Proposed	118.25	116.3	1.9
100	Existing	117.50	118.2	No Freeboard
	Proposed	118.25	116.9	1.4

Note: elevations are rounded to the nearest 0.1 ft.

Scour calculations were performed based on the Federal Highway Administration's Hydraulic Engineering Circular No. 18, "Evaluating Scour at Bridges" (HEC-18). The results of the hydraulic analysis and the grain size distribution from the *Draft Foundation Report* prepared by Taber Consultants were used to compute the scour depths. Total estimated scour depths reflect the sum of the long-term bed degradation, channel contraction scour, and local scour at bridge abutments. The total calculated scour depths are shown in the following table.

Total Scour Depths

Proposed Bridge Structure	Scour Depth (ft)			
	Long-Term	Contraction	Local	Total
Abutment 1	0.0	6.2	7.0	13.2
Abutment 2	0.0	6.2	3.3	9.4

Note: scour depths are rounded to the nearest 0.1 ft.

According to a Caltrans memorandum dated October 23, 2015, "Scour Data Table on Foundation Plan," a scour data table should also present a long-term scour elevation based upon the long-term bed degradation and contraction scour depths, and a short-term depth based upon the local scour depth. The scour elevations were based upon the local channel/ground elevations at each of the supports, which assumes that the embankment material at the abutment is stable. This requires that scour countermeasures be included to protect the embankments in front of the abutments.

The elevation of the channel/ground at each of the supports and the scour data table summary for the proposed bridge is presented in the following table.

Scour Data Table for the Proposed Bridge

Proposed Bridge Structure	Channel Finished Grade Elevation (ft NAVD 88)	Long-Term Scour Elevation (ft NAVD 88)	Local Scour Depth (ft)
Abutment 1	112.1	105.9	7.0
Abutment 2	114.8	108.7	3.3

Note: scour elevations and depths are rounded to the nearest 0.1 ft.

Rock slope protection (RSP) is proposed at the proposed bridge abutments and at the culvert upstream/downstream faces to protect the channel banks from scouring and to reduce erosion potential.

The median diameter of the RSP for the bridge abutments were computed using the calculations following the methods outlined in the Federal Highway Administration's (FHWA) *Hydraulic Engineering Circular No. 23*, "Bridge Scour and Stream Instability Countermeasures – Experience, Selection, and Design Guidance" and Caltrans' Highway Design Manual. The RSP class was calculated to be Class V using FHWA methods, which provided more conservative RSP class than the Caltrans method.

Class V RSP has a median particle weight of ¼ Ton and a median particle diameter of 18 in (Caltrans 2016). The minimum thickness for Class V RSP is 3.0 ft. The RSP should be placed using Method B, which involves dumping rock near its planned location, and working the rock to its final position with machinery. It is also recommended to install a gravel filter composed of coarse gravel, coarse sand, and fine sand below the Class V RSP. The minimum thickness of the gravel filter should be 1.5 ft. Class 8 RSP geotextile filter fabric should be placed on the bank as the initial filter separator material between the layer and RSP.

Acronyms

AASHTO	American Association of State Highway and Transportation Officials
APN	Accessor's Parcel Number
BFE	Base Flood Elevation
BIR	Bridge Inspection Report
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
CN	Curve Number
CVFPB	Central Valley Flood Protection Board
D_{50}	Median Particle Diameter
DOT	Department of Transportation
DWR	Department of Water Resources
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GIS	Geographic Information System
HDM	Highway Design Manual
HEC-HMS	Hydrologic Engineering Center Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center River Analysis System
HSG	Hydrologic Soil Group
LULC	Land Use Land Coverage
NAVD 88	North American Vertical Datum of 1988
NBI	National Bridge Inventory
NFIP	National Flood Insurance Program
NOAA	National Oceanic Atmospheric Administration
NRCS	Natural Resources Conservation Service
PCC	Portland Cement Concrete
RSP	Rock Slope Protection
SCS	Soil Conservation Service
SR	Sufficiency Rating
SSURGO	Soil Survey Geographic Database
TCE	Temporary Construction Easement
TR-55	Technical Release 55
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WSE	Water Surface Elevation

1 GENERAL DESCRIPTION

San Joaquin County is proposing to replace existing Buckman Road bridge over North Fork Duck Creek. The Buckman Road Bridge Replacement Project (Project) is located approximately 16.7 mi east of City of Stockton. See Figure 1 for the Project Location Map and Figure 2 for the Vicinity Map.

1.1 Project Description

The existing bridge carries Buckman Road over the North Duck Creek Branch. This segment of Buckman Road is a single lane roadway classified as "Local (07)" in the San Joaquin County's (County) maintained mileage record. The roadway ends approximately 200-ft north of the existing bridge. The road services multiple agricultural field accesses as well as a couple of residences beyond the bridge.

The bridge was constructed in 1931 and consists of timber deck planks on timber stringers on Douglas-Fir caps and the substructure is comprised of Portland Cement Concrete (PCC) abutment walls and post bents on PCC pedestal footings. The abutment foundation is unknown. Duck Creek Branch at the Project location is a natural U-shaped channel with grass lined slopes.

The California Department of Transportation's (Caltrans') Bridge Inspection Report (BIR) dated November 14, 2012, stated that the timber cap at Bent 3 has a check half its length along the neutral axis. The asphalt concrete in the timber deck has cracks along each deck plank. The left wingwall at Abutment 1 has moved laterally. There is a large gap measuring 7 inches at the top of the wall between abutment and the left wingwall. A cable to help reduce the lateral movement was placed behind abutment #1 and is attached from the left to the right wingwall.

Although there are as-built plans available for this structure, Caltrans has determined that there is not enough data included to evaluate the scour potential. This structure has a National Bridge Inventory (NBI) 113 scour code of "U" meaning unknown foundation.

In addition, the bridge railings have been removed without permission or damaged multiple times by wide agricultural equipment using the narrow bridge.

As a result of the NBI item (68) "Deck Geometry" having a rating of 3, Buckman Road Bridge has been rated as Functionally Obsolete and has a sufficiency rating (SR) of 68.4. The bridge is on the eligible bridge list and qualifies for federal funding under the Highway Bridge Program.

The proposed work for this Project consists following components:

1. Completely remove the existing single-lane bridge and replace with a new clear span one lane bridge. The bridge will have one 10-ft lane and 6-ft shoulders to allow agricultural equipment to utilize the structure.

2. A temporary low water crossing would be placed to the west of the existing bridge that will utilize a single, 72-in, corrugated, metal pipes covered with fill to provide access for residences and agricultural field entrances during construction.
3. Construct concrete bridge railings, approach shoulders and end terminals that meet current standards.
4. Place rock protection in the channel to prevent future scour on the new structure.

The County does not propose to acquire any right-of-way; however, a total of 0.98 acres will act as a temporary construction easement (TCE). The TCE is also from three separate parcels; APN: 187-310-09 (west of Buckman Road) is 0.93 acre, APN: 187-310-15 (south of North Fork Duck Creek and east of Buckman Road) is 0.027 acres, and APN: 187-310-16 (northeast of the project site) is 0.026 acres.

The bridge will be closed to traffic for the duration of the construction period. A temporary low water crossing adjacent to the bridge will be constructed for traffic along Buckman Road. Once the new bridge is constructed, the temporary bridge or low water crossing will be removed. Everything in the channel will be restored to its original condition. The driving public will benefit from an accessible transportation route, and reduced road and vehicle hazards.

In this portion of San Joaquin County, land usage is rural. There are many large trees adjacent to the project area. Nesting and migratory birds, protected by the Migratory Bird Treaty Act, may nest within these trees. Furthermore, the Swainson's Hawk, a raptor species of concern within the State of California and listed as threatened may nest adjacent to or within the project area. A pre-construction survey for nesting Swainson's Hawks and other migratory birds is recommended if construction is scheduled to occur from March 1st to September 1st.

1.2 Purpose

The purpose of this Bridge Design Hydraulic Study is to present the design flow characteristics for the existing and proposed bridges. This report provides the calculated scour potential and recommendations on the need for scour countermeasures for the proposed bridge. This report presents the hydraulic characteristics and scour potential and recommendations for proposed bridge.

1.3 Key Tasks

Key tasks performed in this study included: 1) a review of available hydrologic data, 2) a hydrologic study, 3) a hydraulic analysis to determine design water surface elevations (WSEs) and flow velocities for the existing and proposed bridges, 4) a scour analysis to estimate potential scour depths for proposed bridge, and 5) scour countermeasure analyses and recommendations for proposed bridge.

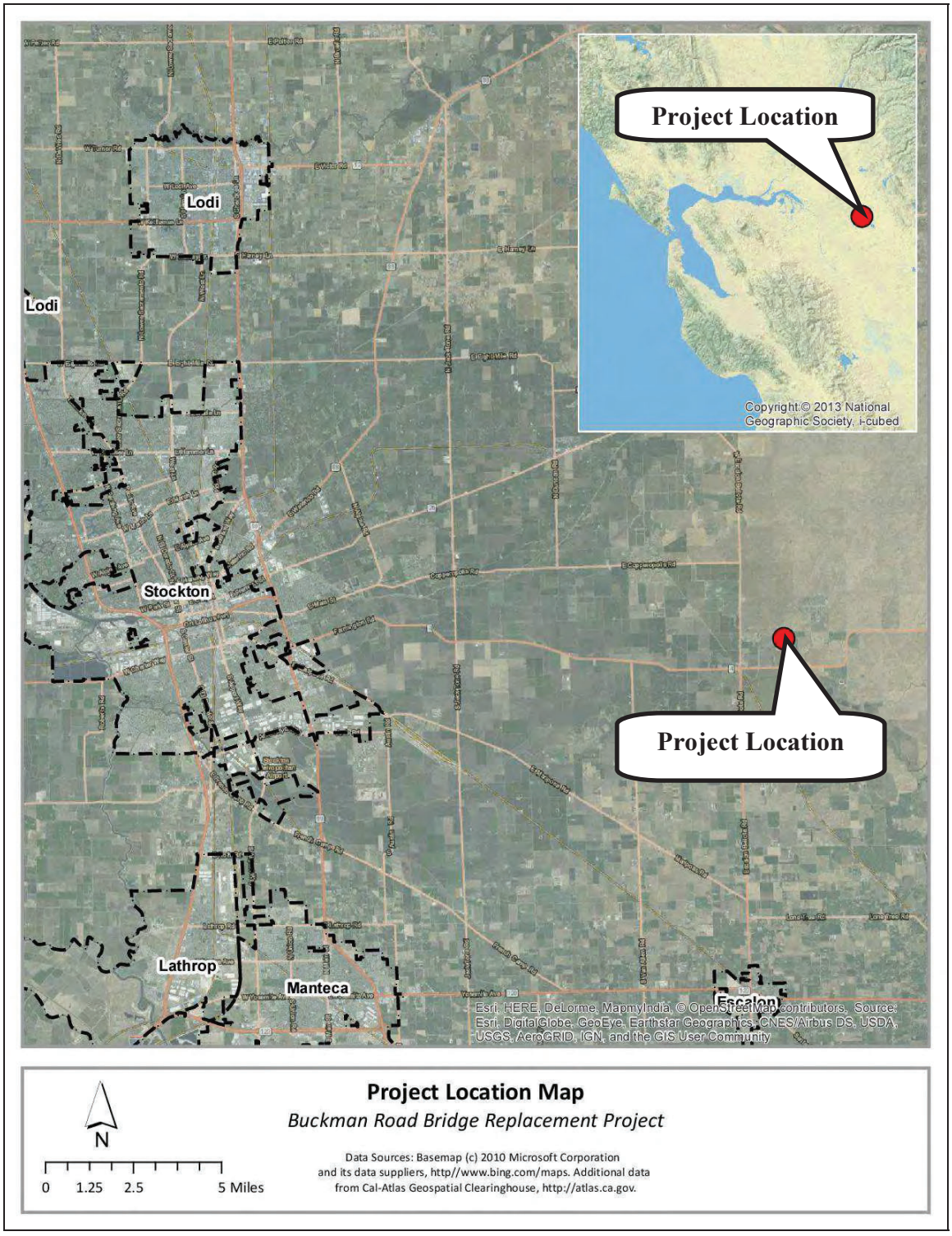

Figure 1. Project Location Map

Sources: United States Geological Survey (USGS) and ESRI

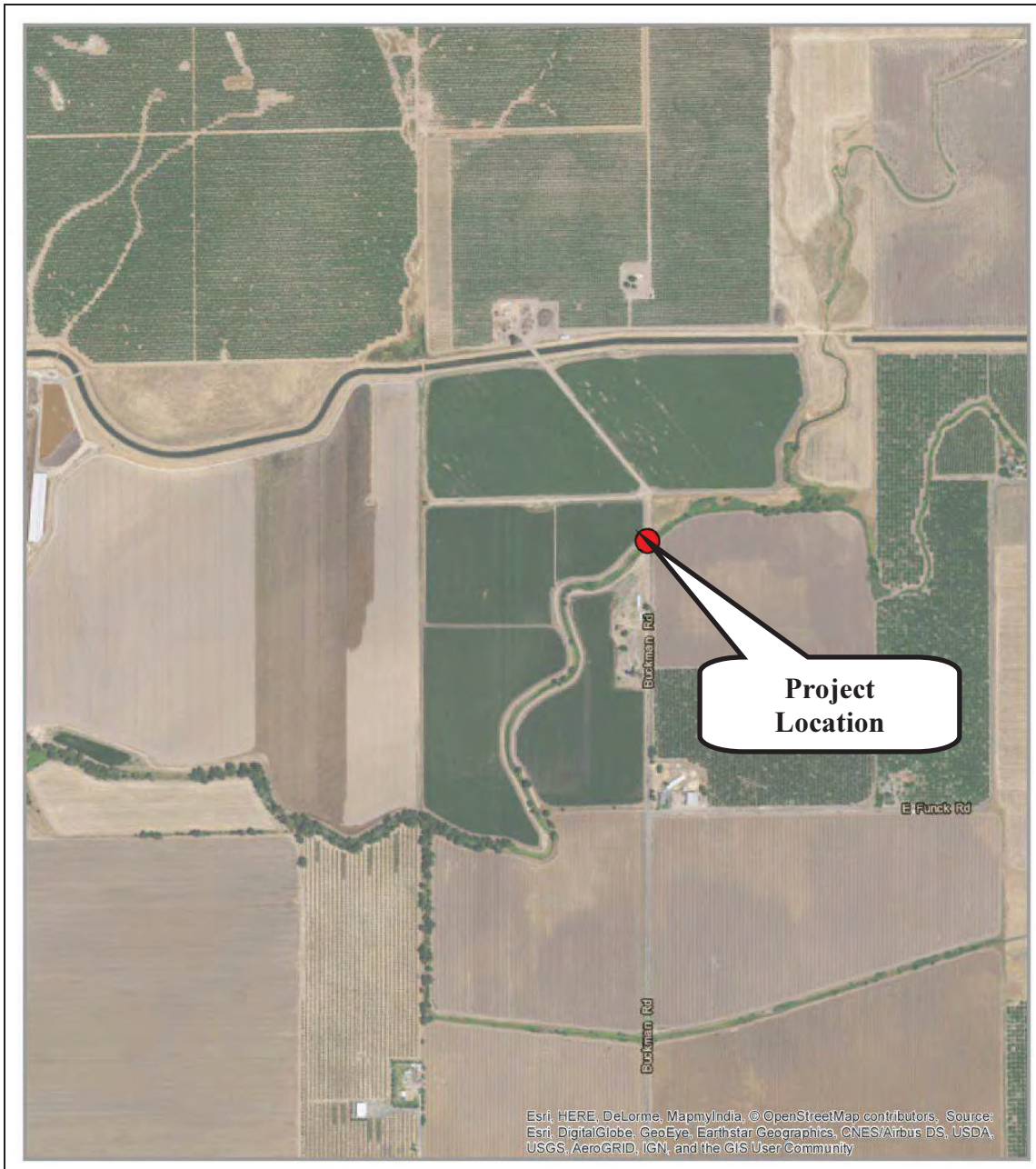

Figure 2. Project Vicinity Map

Sources: USGS and ESRI

1.4 Existing Bridge

The existing bridge is 41-ft long, 19-ft wide, single span bridge with timber plank deck on timber 3-column bents and reinforced concrete abutments with monolithic windwalls (see Photo 1).

Caltrans BIR dated July 5, 2011 identifies structural deteriorations of the bridge. Accordingly, the left rail was found to have checks and splits throughout its length. Transverse cracks along the timber deck plank edges were observed on the timber deck. Also, water staining and fungus were observed on the soffit side of the timber deck. The edges of the timber planks were found to be deteriorating.

The left wingwall at Abutment 1 has moved laterally. The wingwall had been moving laterally as shown by measurements reported in the October 10, 2006 BIR and in the November 4, 2008 BIR; the left and right wingwalls were tied together with steel cables to impede further movement. The BIR of 2011 reports that the vertical gap between wingwalls appears to remain stable since the 2008 inspection.

Photo 1. Existing Buckman Road Bridge, Upstream Face

1.5 Proposed Bridge

The Project proposes to replace the existing bridge structure with a new clear-span single lane bridge. The proposed bridge would have one 10-ft lane and 6-ft shoulders on both sides to allow agricultural equipment to utilize the proposed structure (see Figure 3). The concrete bridge railings, approach shoulders and end terminals would be designed to meet current standards. Rock slope protection (RSP) would be installed in the channel to prevent future scour on the new structure.

1.6 Channel Properties

North Fork Duck Creek at the Project location is natural trapezoidal channel with vegetation growth in the channel bottom and channel side slopes (see Photo 2). The top and bottom width of the channel at the Project location is approximately 50 ft and 20 ft, respectively.

Photo 2. North Fork Duck Creek, Looking Downstream (West) from Existing Buckman Road Bridge

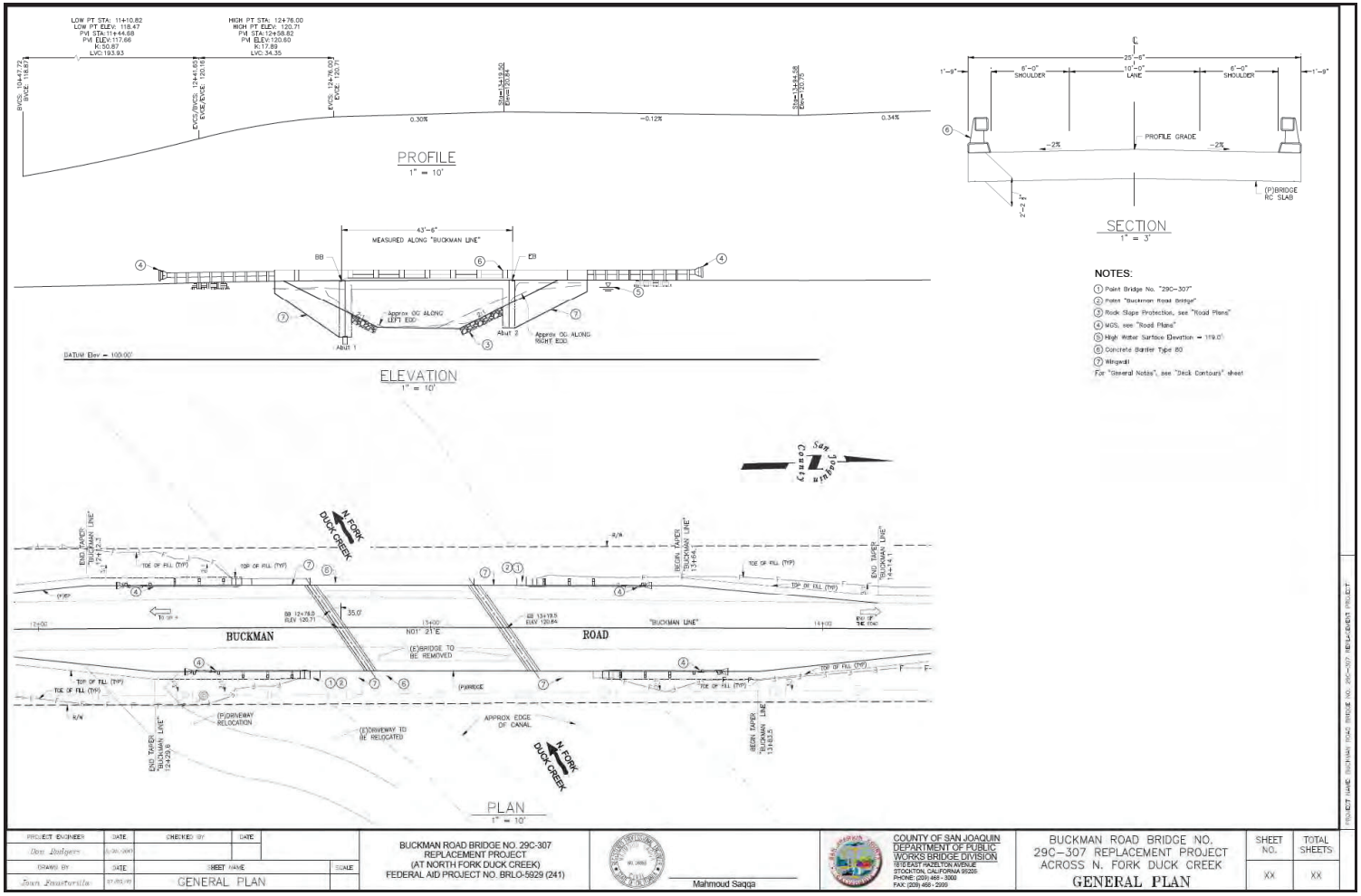

Figure 3. Proposed Bridge General Plan

Source: San Joaquin County

1.7 Design Criteria

The following criteria were used in the design of the proposed bridge.

1.7.1 Hydraulic Design Criteria

1.7.1.1 FHWA Standards

The FHWA criterion refers to the California Amendments to AASHTO Load and Resistance Factor Design Bridge Design Specifications (2014), which indicates that the proposed bridge profile should provide adequate freeboard to pass anticipated drift for the 50-year design flood, to pass the 100-year base flood without freeboard, or the flood of record without freeboard, whichever is greater.

1.7.1.2 Caltrans Standards

The Caltrans criteria for the hydraulic design of bridges is that they be designed to pass the 2% probability of annual exceedance flow (50-year design discharge) or the flood of record, whichever is greater, with adequate freeboard to pass anticipated drift. Two feet (2 ft) of freeboard is commonly used in bridge designs. The bridge should also be designed to pass the 1% probability of annual exceedance flow (100-year design discharge, or base flood). No freeboard is added to the base flood.

1.7.2 Central Valley Flood Protection Board Standards

Streams regulated by the Central Valley Flood Protection Board (CVFPB) must adhere to the design criteria from Title 23 of the California Code of Regulations. North Fork Duck Creek is not included in the CVFPB's list of regulated streams. However, the Project may be within the jurisdiction of the CVFPB, because CVFPB's list of regulated streams includes Duck Creek at upstream and downstream of the confluence with North Fork Duck Creek, and they maintain non-permissible work periods during the flood season from November 1 through April 15.

1.7.3 San Joaquin County Standards

Following is the hydraulic design standard for bridges specified in San Joaquin County's *Improvement Standards*, last revised in July 1, 2016,

> Bridges over water courses shall be designed to meet the freeboard requirements in accordance with County and FEMA Standards for Flood Hazard Reduction. Detailed hydrologic and hydraulic calculations shall be submitted by a Registered Civil Engineer to document the 100-year flood water surface elevations corresponding to in-water pile bents/piers configuration and calculated potential scour depth on all in-water components.

1.7.4 Scour Design Criteria

The evaluation of potential scour at the proposed bridge followed the criteria described in the FHWA's *Hydraulic Engineering Circular No. 18 (HEC-18)*, "Evaluating Scour at

Bridges" (Fifth Edition). The evaluation of potential scour was based on hydraulic characteristics of the 100-year design discharge. The total scour was estimated based upon the cumulative effects of the long-term bed elevation change, general (contraction) scour, and local scour. The life expectancy of the bridge was considered in determining the long-term bed elevation change of the waterway; it was based on an assumed 75-year design life for a new replacement bridge

1.7.5 Rock Slope Protection Design Criteria

Two procedures for determining rock slope protection (RSP) design were considered: the FHWA's *Hydraulic Engineering Circular No. 23* (HEC-23), "Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance" (Third Edition) (2009), and Caltrans' *Highway Design Manual* (Caltrans 2016). The final selection considers both of these procedures and is based on engineering judgment.

1.8 Vertical Datum

The Project references the North American Vertical Datum of 1988 (NAVD 88).

2 GEOGRAPHIC SETTING

2.1 Geographic Location

The Buckman Road Bridge Replacement Project (Project) is located approximately 16.7 mi east of City of Stockton. The existing Buckman Road bridge over the North is located at latitude 37°56'30.11" N and longitude 120°58'37.22" W.

2.2 Watershed Description

North Fork Duck Creek originates in Bunker Hill, which is situated in northern Stanislaus County between San Joaquin County and Calaveras County. The North Fork Duck Creek watershed draining to the Project site (see Figure 4) originates northeast of the city of Farmington. The watershed draining to the site is approximately 14.4 sq. mi. and flow within the watershed is in a southwesterly direction at Buckman Road bridge crossing. The watershed encompasses both Stanislaus and San Joaquin counties.

Approximately 2,100 ft southeast of the Project site, North Fork Duck Creek outfalls to Duck Creek. Duck Creek travels west along State Route 4 and outfalls to San Joaquin River in the City of Stockton approximately 20 mi west of the Project location.

2.3 Land Use

The land use designated within the watershed of North Fork Duck Creek is shown in Figure 5.

According to the *San Joaquin County General Plan Policy Document* released in December 2016, the land use designated to the watershed of North Fork Duck Creek within San Joaquin County is General Agriculture (A/G). This designation is for large-scale agricultural production and it generally applies to areas outside of the urban development area.

According to the Stanislaus County's Zoning District Map created in November 12, 2010 and Stanislaus County's GIS Central web-based interactive map, the zoning district assigned to the watershed of North Fork Duck Creek is A-2-40, which is defined as general agricultural area with minimum lot size of 40 acres.

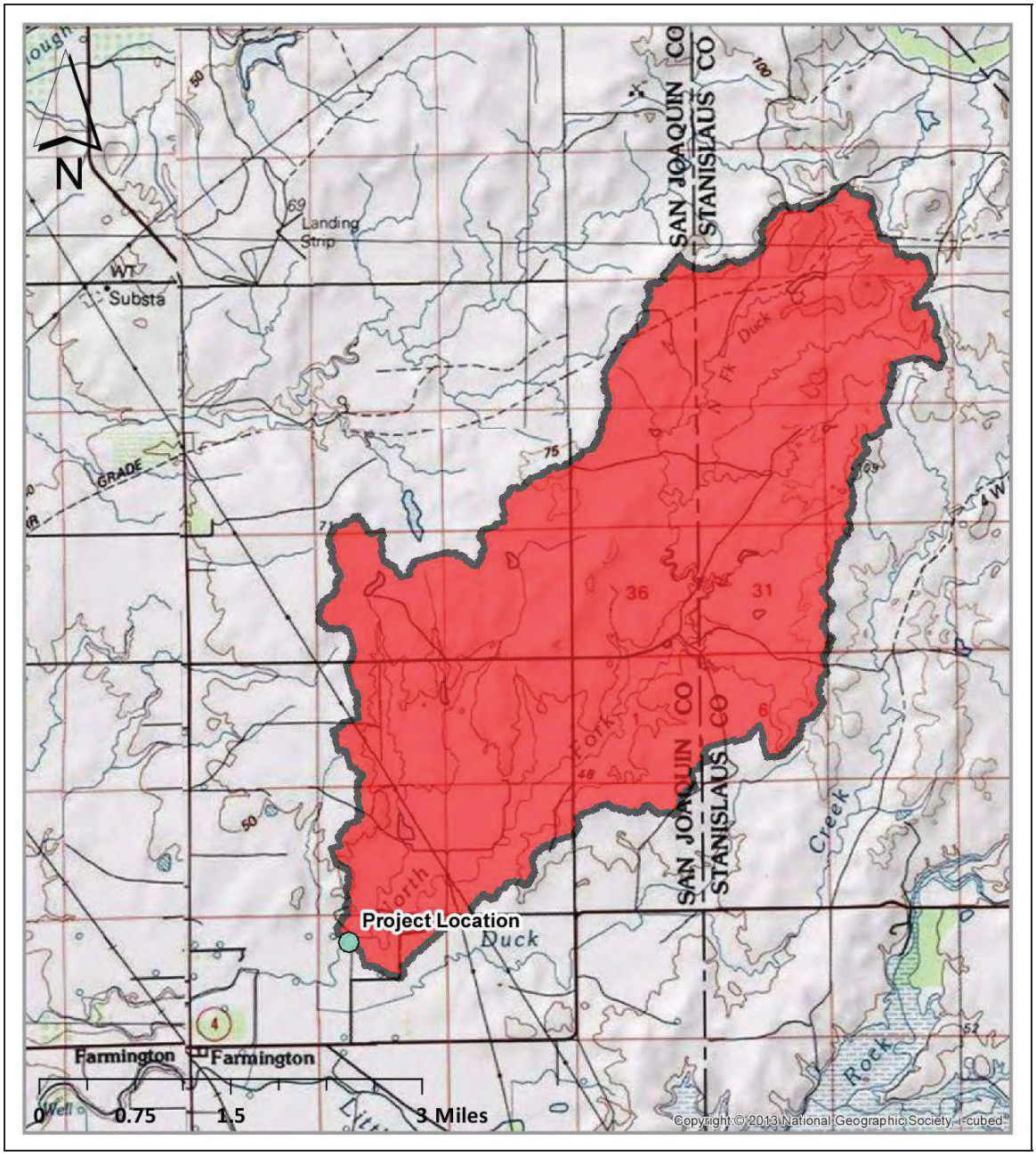

Figure 4. North Fork Duck Creek Watershed Map at Project Location

Source: USGS and Esri

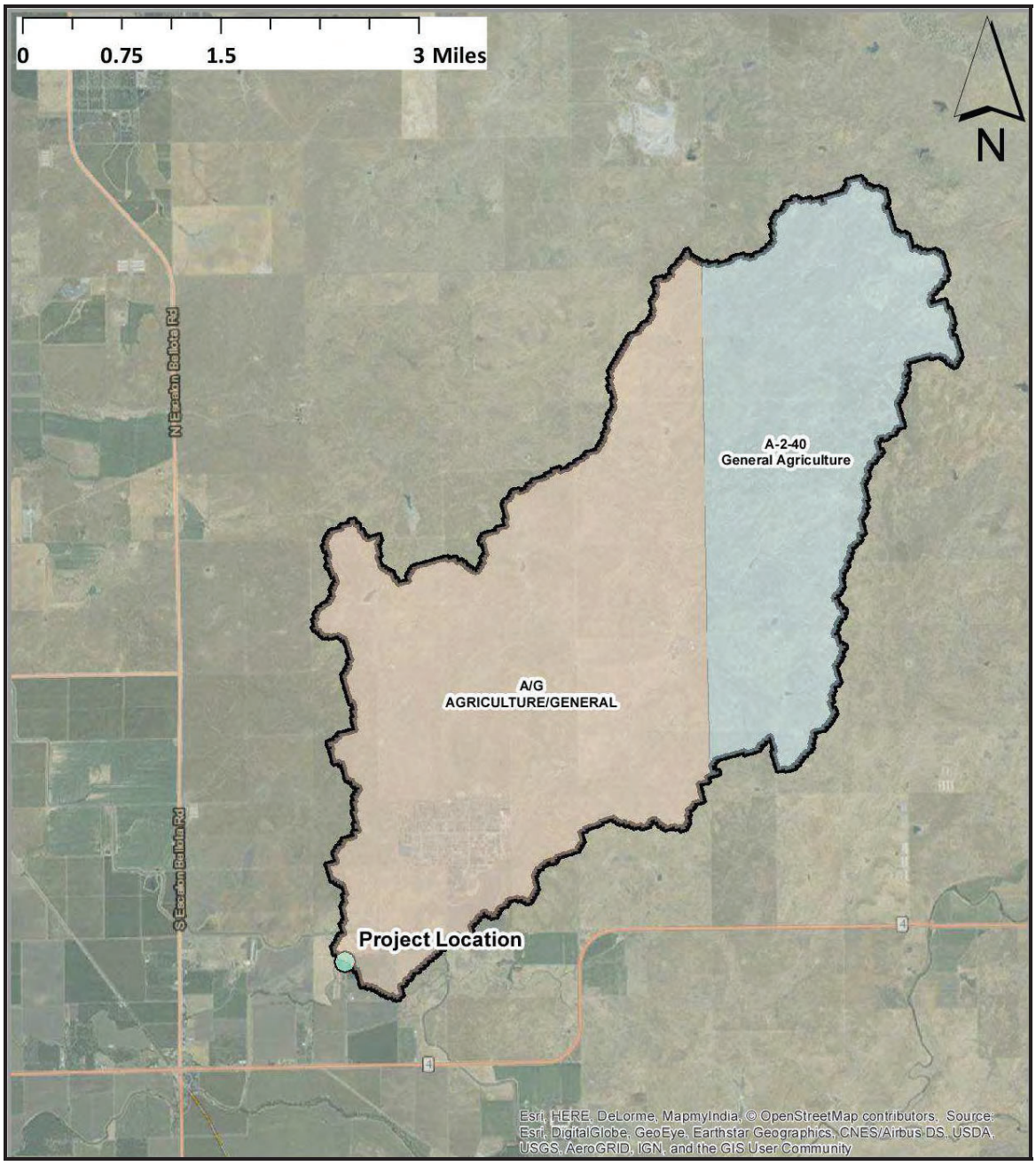

Figure 5. Land Use within North Fork Duck Creek Watershed at Project Location
Sources: USGS, Esri, San Joaquin County, and Stanislaus County

3 HYDROLOGIC ANALYSIS

The following sub-sections describe the hydrologic data sources that were used to estimate the flows for the Project site.

3.1 Hydrologic Design Methods

Two methods were used to determine design discharges at the Project site: USGS Regional Flood-Frequency equations and the Soil Conservation Service's (SCS) unit hydrograph method.

3.1.1 USGS Regional Flood-Frequency Equations

Flood-frequency equations were developed by the USGS and are based on analysis of data from gage stations. USGS has divided California into six hydrologic regions; the Project site is within the Sierra Nevada region. These flood frequency equations are generally used to estimate stream flow for ungagged sites that are not affected by substantial urban development and that are natural (unregulated) streams.

This method follows the equations that are also outlined in Caltrans' *HDM* Section 819.2C (2016). The equation used is based on the location of the Project, which is within the Sierra Nevada region (Region 3).

On July 18, 2012, the USGS issued *Methods for Determining Magnitude and Frequency of Floods in California, Based on Data through Water Year 2006* (Gotvald et. al. 2012), which contains updated regional flood-frequency equations, and revised the boundaries of the six unique regions within California. These equations are based on annual peak-flow data through water year 2006 for 771 streamflow-gaging stations in California having 10 or more years of data. The updated equations were used in support of the Project's hydrologic analysis.

The regional regression equations were developed for the Sierra Nevada region using data from sites with a wide range of basin characteristics: drainage areas ranging from 0.07 to 2,000 square miles (sq. mi), mean annual precipitation ranging from 15 to 100 in., and mean basin elevation ranging from 90 to 11,000 ft (Gotvald et al. 2012).

The flood-frequency equation is as follows (Gotvald et. al., 2012):

$$Q_{50} = 21.1(DRNAREA)^{0.879}(ELEV)^{-0.316}(PRECIP)^{1.31}$$

$$Q_{100} = 20.6(DRNAREA)^{0.874}(ELEV)^{-0.25}(PRECIP)^{1.24}$$

Where:

Q_x = peak discharge for a storm event with a return period of x years, cubic feet per second (cfs)

DRNAREA = drainage area, sq. mi
ELEV = mean basin elevation, ft
PRECIP = mean annual precipitation, in.

The parameters used in the regional regression equation were obtained from USGS StreamStats, and are summarized in Table 1. The range of basin characteristics of the sites that were used to develop the equations are also presented in the table. Using the values presented in Table 1, the 50- and 100-year discharge was estimated to be 1,400 cfs and 1,590 cfs, respectively.

Table 1. Regional Regression Equation Parameters

Parameter	Value for Project	Range of Characteristics
Drainage Area (sq mi)	14.4	0.07 to 2,000
Mean Basin Elevation (ft)	211	90 to 11,000
Mean Annual Precipitation (in.)	14.9	15 to 100

Source: USGS

3.1.2 SCS Unit Hydrograph Method

The Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) version 4.0; HEC-HMS is a hydrologic modeling software developed by the U.S. Army Corps of Engineers (USACE) and was used to estimate the peak 50- and 100-year flow of North Fork Duck Creek.

The input parameters were estimated following the procedures in the Technical Release 55 (TR-55), the *Urban Hydrology for Small Watersheds* manual (Natural Resources Conservation Service [NRCS] 1986) and *A Guide to Hydraulic Analysis Using SCS Methods* (McCuen, 1982).

The watershed area that drains to the project site was measures to be 14.4 square miles (see Figure 4). For the purpose of determining the peak 100-year flood flow, the watershed was divided into 12 subwatersheds (see Figure 6). The subwatershed basins were modeled using the SCS Curve Number loss method and the SCS Unit Hydrograph Transform Method.

The hydrologic soil groups (HSG) of the subwatershed were researched using the Soil Survey Geographic Database (SSURGO) (2014), which consists of digital soils data produced and distributed by the NRCS (see Appendix B). The Land Use Land Coverage (LULC) was researched using the USGS online *Data Viewer Map* (2014) and subsequently Geographic Information Systems (GIS) (see Appendix C). Based on LULC and HSG, the composite curve number (CN) values were estimated to represent each subwatershed. Based on the SSURGO dataset, HSG C, and D soils were present; however the predominant soil group is D soils which have a high runoff potential and low infiltration rates. Table 1 presents a summary of CN values, initial abstraction and lag time.

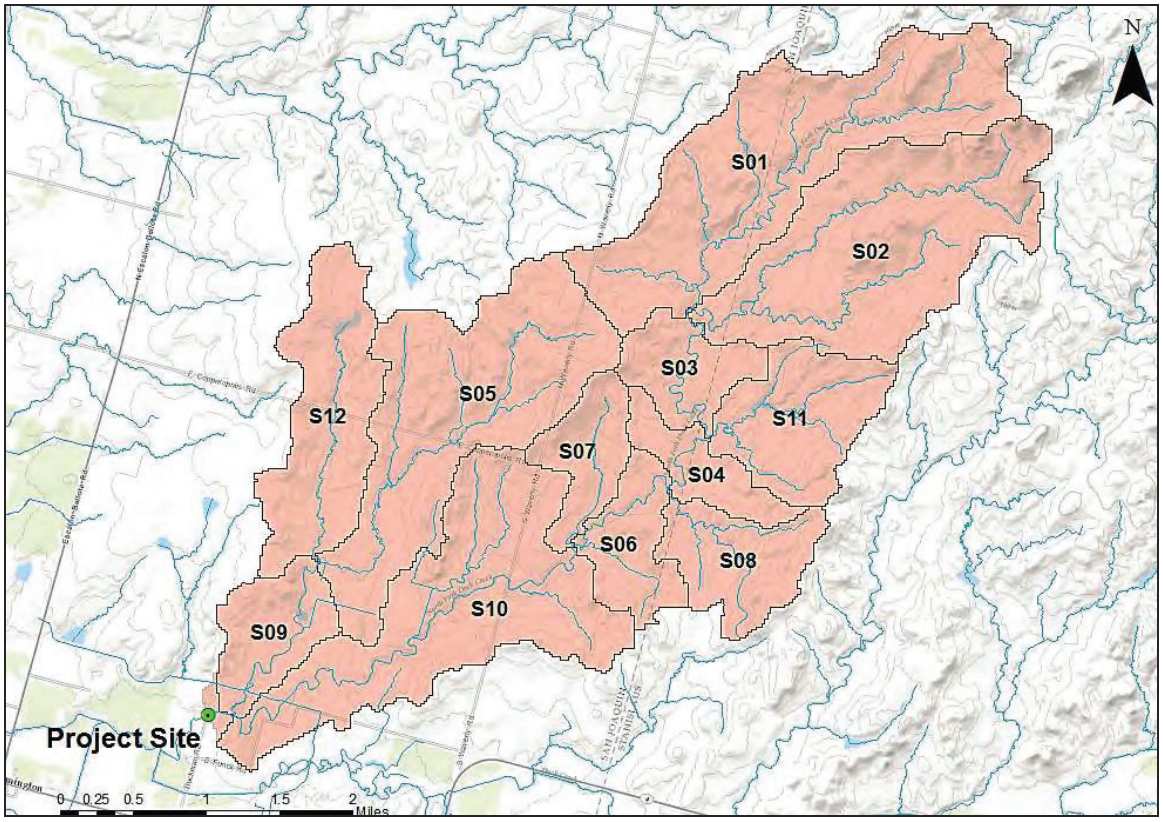

Figure 6. Duck Creek Subwatersheds

Sources: background topo – ESRI ArcGIS, and United States Geological Survey

Table 2 Tabulation of SCS Loss Method Parameters

Subwatershed	CN	Initial Abstraction (in.)	Time Lag (min)
S01	88	0.247	73.9
S02	88	0.247	71.7
S03	87	0.299	43.5
S04	87	0.273	22.6
S05	87	0.299	78.9
S06	87	0.273	30.2
S07	87	0.273	35.9
S08	88	0.247	39.1
S09	85	0.326	55.9
S10	85	0.326	107.9
S11	88	0.247	37.9
S12	88	0.247	65.9

The precipitation depths were obtained from the National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 website for California Precipitation Frequency Data using the longitude and latitude coordinates of the approximate watershed centroid. With

latitude 37.9417 and Longitude: -120.9768, the 100-year 24-hour precipitation depth is 3.89 inches and the 50-year 24-hour precipitation depth is 3.47 inches (see Appendix D). Based on the rainfall distribution map from the NRCS, the project is within the Type I rainfall distribution area (1986).

The Muskingum method was used to route hydrographs through stream reaches (McCuen, 2004). The Muskingum method uses a simple finite difference approximation of the continuity equation:

$$\frac{1}{2}(I_1 + I_2) - \frac{1}{2}(O_1 + O_2) = \frac{S_1 + S_2}{\Delta t}$$

The Muskingum routing equation is expressed as:

$$\frac{1}{2}(I_1 + I_2) - \frac{1}{2}(O_1 + O_2) = \frac{K[xI_2 + (1-x)O_2] - K[xI_1 + (1-x)O_1]}{\Delta t}$$

Where:

I_1 and I_2 = Inflow at times t_1 and t_2
O_1 and O_2 = Outflow at times t_1 and t_2
S_1 and S_2 = Storage at times t_1 and t_2
Δt = Incremental time step (t_1 - t_2)

The parameter K can be estimated by the travel time through the reach. The Upland method was used to find the velocity in the channel based on the channel slope and the assumption that the channel was a grassed waterway. The Velocity method was used to estimate the travel time in hours (2004, see Appendix E).

The parameter x is a value that suggests inflow-outflow weighting. A value of x= 0.2 is commonly assumed (2004). Table 2 below presents the estimated values of K for each routing stream.

Table 3 Estimates of Parameter K per Reach

HMS	Channel Length (ft)	Channel Slope (%)	Flow Velocity (ft/sec)	K (hr)
R01	9,610	1.27	1.7	1.57
R02	3,606	1.25	1.7	0.59
R03	6,375	1.24	1.7	1.04
R04	21,584	0.90	1.5	4.00
R05	9,193	0.62	1.4	1.82

The peak discharge was estimated to be 1,560 cfs and 1,890 cfs for the 50- and 100-year 24-hour design storms. This peak discharge were more conservative than the flows estimated using USGS regional regression and was implemented into the hydraulic analysis. The output results of the HEC-HMS model are included in Appendix F.

4 HYDRAULIC ANALYSIS

The following sections discuss the development of the hydraulic models and summarize the results for the existing and proposed conditions. The water surface profile plots, hydraulic summary tables, and channel cross sections are included in Appendix G for the existing bridge and Appendix H for the proposed bridge.

4.1 Design Tools

The hydraulic analyses were performed for the existing and proposed conditions using the USACE's Hydrologic Engineering Centers River Analysis System (HEC-RAS) modeling software, Version 5.0.3.

4.2 Cross Section Data

A total of nine cross sections along the 540-ft reach of the North Fork Duck Creek were delineated using a topographic survey provided by the County of San Joaquin Department of Public Works (see Figure 7). The upstream and downstream limits of the hydraulic model are approximately 235 ft. and 305 ft. away from the existing Buckman Road bridge over North Fork Duck Creek.

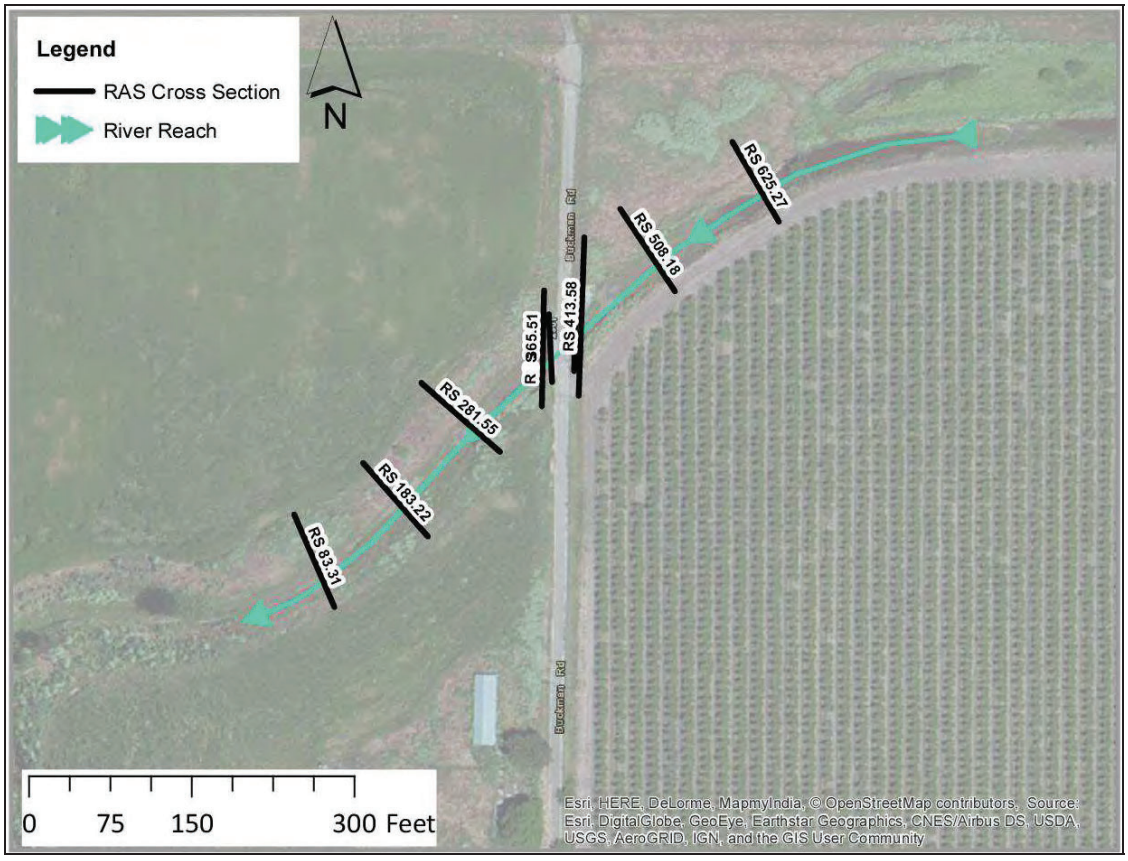

Figure 7. Plan View of HEC-RAS Hydraulic Model

4.3 Modeled Hydraulic Structures

The design parameter of the existing Buckman Road bridge in the hydraulic model was based on the information found in the Caltrans BIR and observations from the field visit performed on October 8, 2014. The design parameter of the proposed Buckman Road bridge was based on the bridge general plans provided by San Joaquin County Department of Public Works (see Figure 3).

4.4 Model Boundary Condition

There were no existing studies that provided the 100-year water surface elevation (WSE) of North Fork Duck Creek at the The analysis was performed for the existing Buckman Road Bridge. A normal depth downstream boundary condition was selected with a slope of 0.0084ft/ft based on the slope of the channel.

4.5 Manning's Roughness Coefficients

Manning's roughness coefficients were used in the hydraulic model to estimate energy losses in the flow due to friction. A roughness coefficient of 0.055 was selected for both the left and right channel banks a roughness coefficient of 0.035 was selected for the main channel. These were selected to best describe the existing channel characteristics of North Fork Duck creek at the Project location based review of aerial imagery, street view imagery, and site observations from the field visit.

4.6 Expansion and Contraction Coefficients

Expansion and contraction coefficients were used in the hydraulic model to estimate hydraulic losses at transitions between cross sections. The expansion and contraction coefficients used in the channel were 0.3 and 0.1, respectively. These values represent a channel with gradual transitions between cross sections. The expansion and contraction coefficients used in the vicinity of the bridge were 0.5 and 0.3, respectively. These values represent the flow interference caused by the bridge.

4.7 Water Surface Elevations

The existing and proposed condition 50- and 100-year WSEs of North Fork Duck Creek and changes to the 100-year WSEs are summarized in Table 4 and Table 5. The cross sectional views of the existing and proposed bridges are shown in Figure 8 and Figure 9. The existing and proposed condition 50- and 100-year flood profiles are shown in Figure 10 and Figure 11.

The existing bridge includes a pier that obstructs flow, increases channel velocity, and lowers the WSE just downstream of the bridge. The proposed clear-span bridge with a slightly longer hydraulic bridge opening length and larger opening area from the proposed channel grading would reduce this obstruction and return the channel to a more natural state, causing a decrease in WSE upstream of the bridge and a slight increase in WSE just downstream of the bridge from the existing condition.

Table 4. 50-Year Water Surface Elevations

River Station (RS)/ Distance from Existing Bridge Centerline	Existing (ft NAVD 88)	Proposed (ft NAVD 88)	WSE Change (ft)
RS 625.27 234 ft Upstream, Model Upstream Limit	118.8	117.6	-1.1
RS 413.58 22 ft Upstream	118.5	116.5	-2.0
RS 405.88 15 ft Upstream	118.1	116.3	-1.8
Bridge Upstream Face	117.6	116.3	-1.3
Bridge Downstream Face	115.7	116.2	0.4
RS 376.25 15 ft Downstream	115.8	116.1	0.3
RS 365.51 26 ft Downstream	116.4	116.1	-0.3

Note: elevations are rounded to the nearest 0.1 ft.

Table 5. 100-Year Water Surface Elevations

River Station (RS)/ Distance from Existing Bridge Centerline	Existing (ft NAVD 88)	Proposed (ft NAVD 88)	WSE Change (ft)
RS 625.27 234 ft Upstream, Model Upstream Limit	119.7	118.3	-1.4
RS 413.58 22 ft Upstream	119.5	117.1	-2.3
RS 405.88 15 ft Upstream	119.1	116.9	-2.2
Bridge Upstream Face	118.2	116.9	-1.3
Bridge Downstream Face	116.2	116.7	0.5
RS 376.25 15 ft Downstream	116.4	116.7	0.3
RS 365.51 26 ft Downstream	117.0	116.7	-0.3

Note: elevations are rounded to the nearest 0.1 ft.

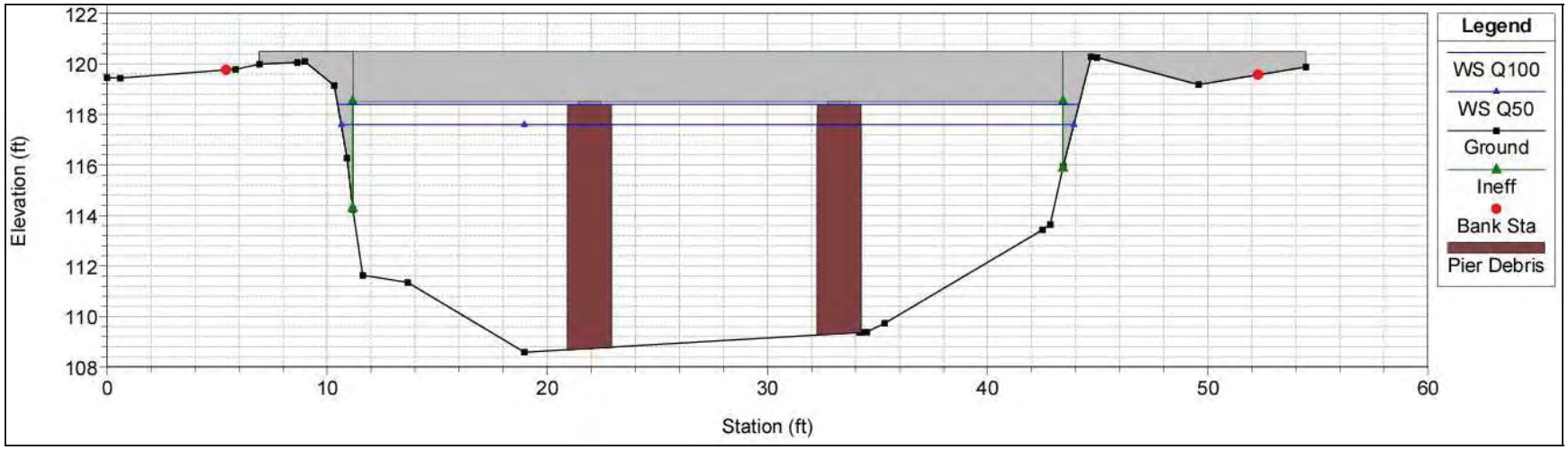

Figure 8. Upstream Face of Existing Bridge, Looking Downstream

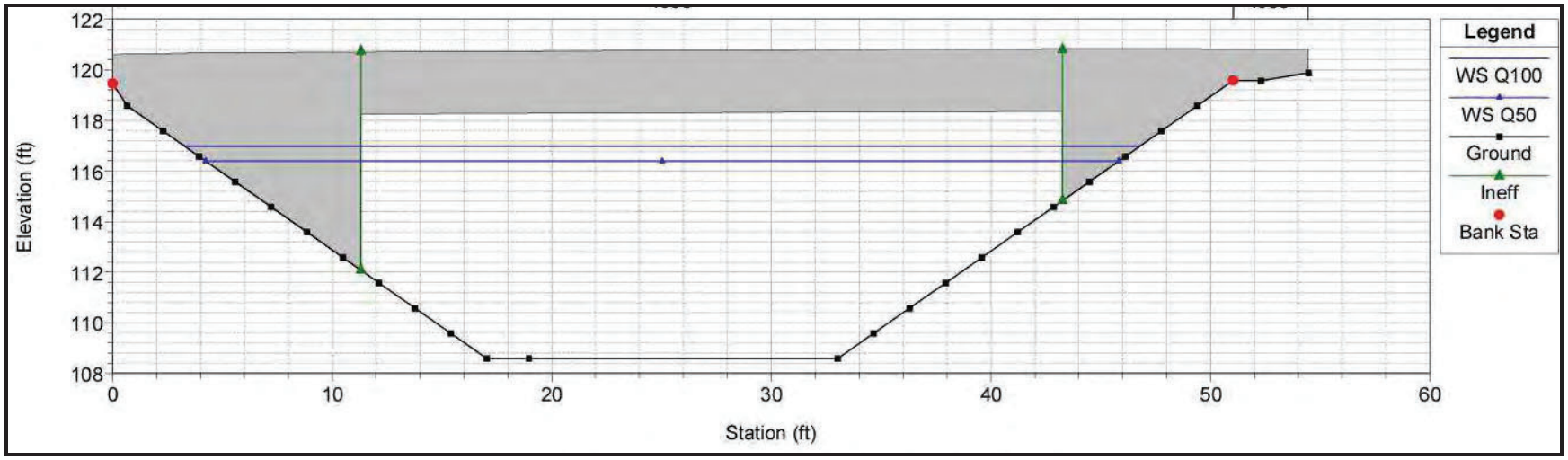

Figure 9. Upstream Face of Proposed Bridge, Looking Downstream

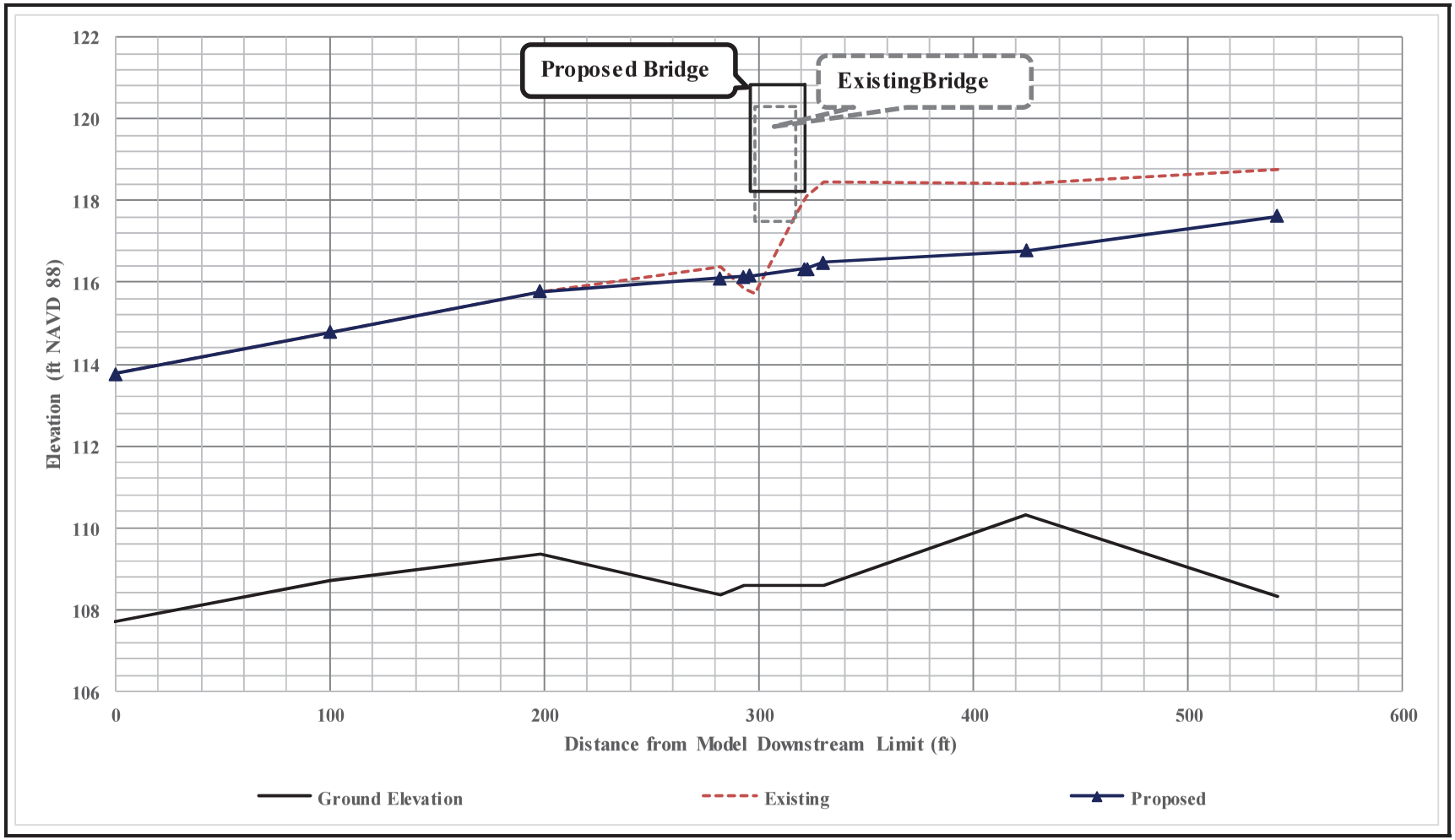

Figure 10. 50-year Flood Profile, Existing and Proposed Conditions

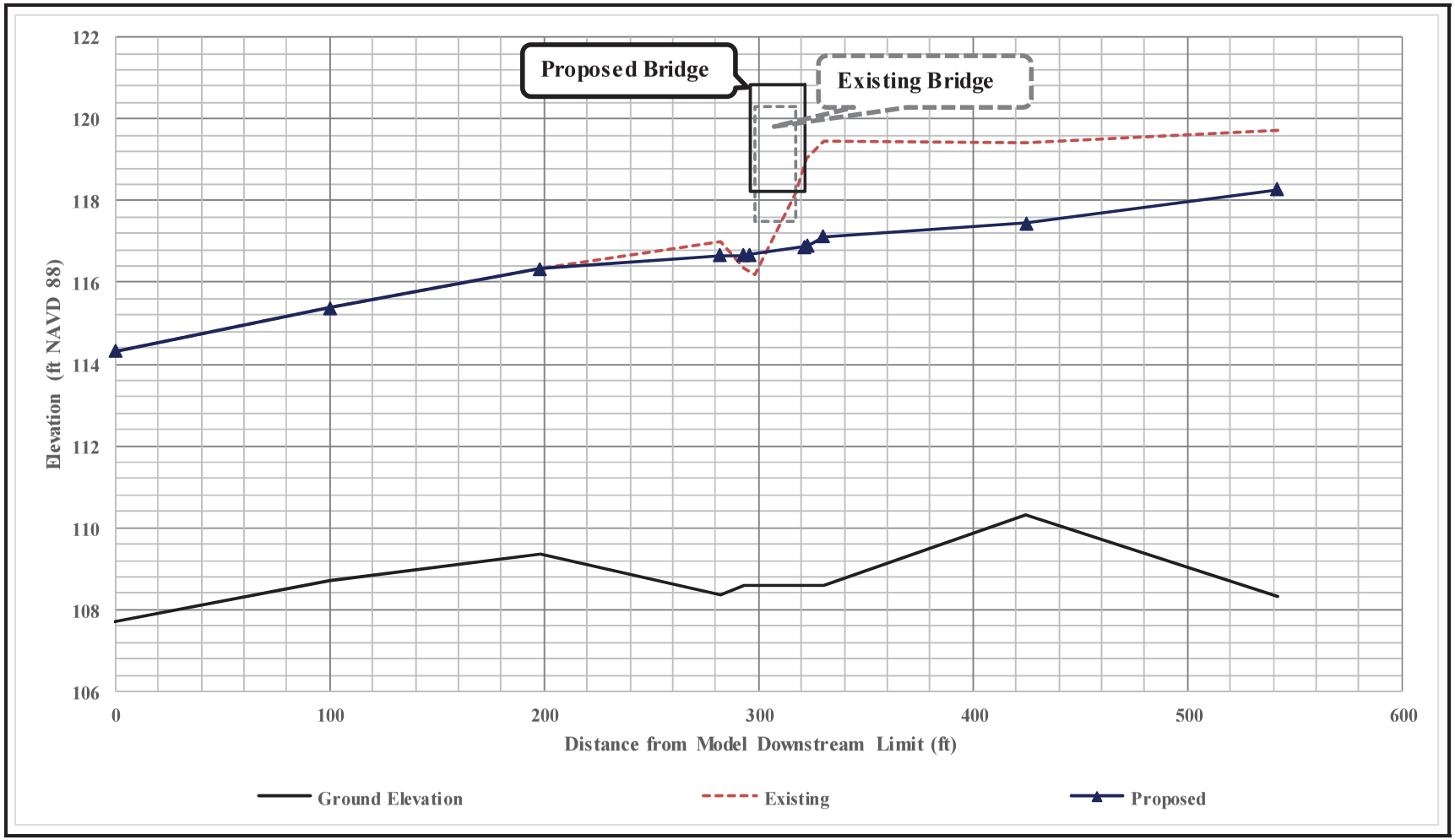

Figure 11. 100-year Flood Profile, Existing and Proposed Conditions

4.8 Freeboard

The freeboard requirements applicable to the Project are discussed in Section 1.7. To summarize, the FHWA criteria requires that the proposed bridge provide adequate freeboard to pass anticipated drift for the 50-year flood, to pass the 100-year flood without freeboard, or the flood of record without freeboard, whichever is greater. The Caltrans criterion recommends 2 ft of freeboard for preliminary designs, and the capability to pass the 100-year flood.

Table 6 presents the available freeboard for the existing and proposed bridges based on the minimum soffit elevation of the bridges and the 50- and 100-year flood flow profiles from the hydraulic analysis. The existing bridge would be under pressure during the 50- and 100-year storm events and would not meet the freeboard criteria. The proposed bridge would pass 50- and 100-year flow with freeboard.

Table 6. 50- and 100-Year Water Surface Elevations and Freeboard

Recurrence Interval (yr)	Model Condition	Bridge Soffit (ft NAVD 88)	WSE at Bridge Upstream Face (ft NAVD 88)	Freeboard (ft)
50	Existing	117.50	117.6	No Freeboard
	Proposed	118.25	116.3	1.9
100	Existing	117.50	118.2	No Freeboard
	Proposed	118.25	116.9	1.4

Note: elevations are rounded to the nearest 0.1 ft.

4.9 Flow Velocities

The 50- and 100-year flow velocities of North Fork Duck Creek estimated from the hydraulic analysis are summarized in Table 7. Based on the results from the existing and proposed condition hydraulic analysis, removal of existing 3-span bridge with proposed clear-span bridge with wider channel opening would increase the average channel flow velocity upstream of the bridge crossing, decrease the flow velocity at the bridge downstream face. There would be an increase in flow velocity upstream of the bridge because proposed bridge would no longer cause significant backwater when compared to the existing bridge. Because flood flow would return to more natural state at the downstream face of the proposed bridge and immediately downstream of the proposed bridge, there would be decrease in the average channel flow velocity.

Table 7. 50- and 100-Year Average Channel Flow Velocities

River Station (RS)/ Distance from Existing Bridge Centerline	50-Year Storm Event		100-Year Storm Event	
	Existing (ft/sec)	Proposed (ft/sec)	Existing (ft/sec)	Proposed (ft/sec)
RS 625.27 234 ft Upstream, Model Upstream Limit	4.9	5.9	5.0	6.3
RS 413.58 22 ft Upstream	4.3	7.2	4.4	7.7
RS 405.88 15 ft Upstream	6.2	7.7	6.6	8.5
Bridge Upstream Face	7.8	7.7	9.2	8.5
Bridge Downstream Face	11.7	8.0	12.7	8.7
RS 376.25 15 ft Downstream	10.6	8.0	11.4	8.8
RS 365.51 26 ft Downstream	6.1	8.0	6.4	8.4

Note: flow velocities are rounded to the nearest 0.1 ft/sec.

4.10 Rock Slope Protection for Erosion Protection at Slope Embankments

The average 100-year channel flow velocity at the proposed bridge would be approximately 8.4 ft/sec (see Table 7), which would be faster than the permissible velocity for soils used as lining material for waterways (Caltrans 2016). The size of the rock slope protection (RSP) to protect the channel bank from erosion would be required as part of the Project. The minimum RSP class required for this Project are discussed in details in Section 5.7.

5 SCOUR ANALYSIS

WRECO evaluated bridge scour per the criteria described in "Evaluating Scour at Bridges" (FHWA 2012). The minimum design criterion for bridge scour is the 100-year design storm. WRECO evaluated the scour potential and scour countermeasure analysis using the results of the steady-state flow analysis from HEC-RAS for the proposed bridge. The scour calculations assume that the channel bed material is erodible. The following sub-sections summarize the results of the analysis.

5.1 Caltrans Bridge Inspection Reports

The Caltrans BIRs for the existing bridge were reviewed in support of the scour analysis. The channel cross section data was obtained from the BIR with inspections dated November 10, 1998, November 4, 2008, and November 23, 2015.

According to the BIR dated November 3, 2016, the bridge was determined to have a National Bridge Inventory Item 113 Code "Vulnerability to Scour" rating of "U", meaning, "bridge with "unknown" foundation that has not been evaluated for scour."

5.2 Existing Channel Bed

Based on the Log of Test Borings and Particle Size Distribution at the Project site provided by San Joaquin County on August 28, 2014, the bed material is noted as dark yellowish brown sandy silt (see Appendix I).

Soils with fine grains that pass the #200 sieve are considered cohesive soils. While there is not a clear division between cohesive and cohesionless soils, soils are divided into these two groups for the purposes of analyzing scour. Per HEC-18, a rule of thumb is that soils with 10% fines will exhibit some cohesion while soils with 35% fines will be dominated by cohesion. In general, the threshold for cohesive bed materials is a median grain size diameter that is 0.2 mm or less.

A particle size distribution includes two samples with depth of approximately 11 ft and 20 ft below the overbank area. For both samples, the median gran size diameter (D_{50}) was smaller than 0.2 mm. Therefore, the channel contraction scour was calculated using the cohesive scour equation.

5.3 Long-Term Bed Elevation Change

The channel bed elevation may fluctuate over time as a result of changes in local sediment transport capacity and availability. When more sediment is supplied by watershed erosion and upstream channel flow than can be transported locally, the channel bed aggrades. Channel degradation occurs when sediment transport capacity exceeds supply. Only channel degradation is considered for the purposes of analyzing scour.

The Caltrans BIRs included channel survey at the upstream face of the existing bridge performed on inspections from November 10, 1998 and November 4, 2008. The

inspection on November 23, 2015 only listed note indicating no significant changes in channel cross sections were observed in comparison to the channel cross section from November 4, 2008. The cross sectional view of the two surveys and channel cross section from the hydraulic analysis are shown in Figure 12. The changes in channel cross section from 1998 to 2008 at abutment 4 is from the placement of riprap as noted in the BIR dated October 25, 2006. Similar to the inspection notes in the 2015 BIR, there were no significant changes to the channel between Caltrans 2008 survey and San Joaquin County's 2014 survey. Based on the channel information from the 2008 and 2015 BIR and San Joaquin County's 2014 survey, it was assumed that proposed bridge would not encounter long-term degradation over the lifespan of the proposed bridge.

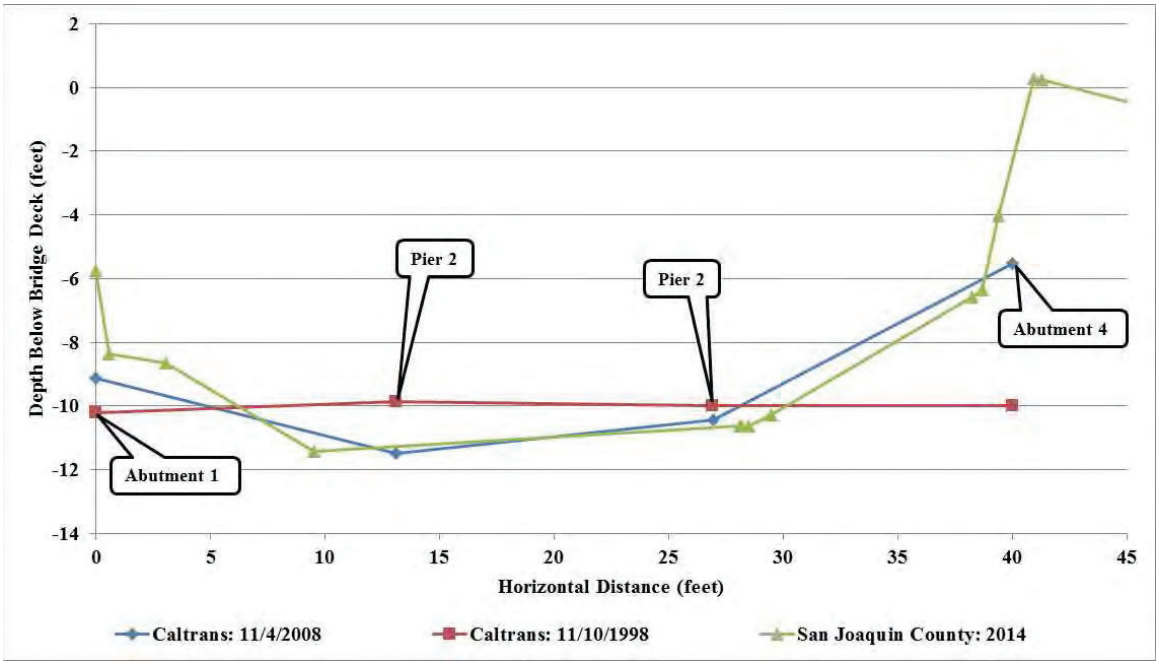

Figure 12. Historical Channel Cross Sections, Upstream Face of Existing Buckman Road Bridge

Sources: Caltrans 1998 and 2008

5.4 Contraction Scour

Contraction scour occurs when the flow area of a stream is reduced by: 1) the natural contraction of the stream channel; 2) by a bridge structure; or 3) the overbank flow forced back to the channel by roadway embankments at the roadway approach to a bridge. From the continuity equation, a decrease in flow area results in an increase in average velocity and bed shear stress through the contraction. Hence, there is an increase in erosive forces in the contraction section, and more bed material is removed from the contracted reach than is transported into the reach. This increase in transport of bed material from the reach lowers the natural bed elevation. As the bed elevation is lowered, the flow area increases. Thus, the velocity and shear stress decrease until relative equilibrium is reached; i.e., the quantity of bed material that is transported into the reach is equal to that removed from the reach, or the bed shear stress is decreased to a value such that no sediment is transported out of the reach. Contraction scour, in a natural channel or at a bridge crossing, involves removal of material from the bed across all or most of the channel width (FHWA 2012).

HEC-18 recommends an equation presented by *The SRICOS-EFA Method* by J.L. Briaud (2004) for estimating the contraction scour for cohesive bed materials (referred to as "ultimate contraction scour"). The equation is as follows:

$$y_{s-ult} = 0.94 y_1 \left(\frac{1.83 V_2}{\sqrt{g y_1}} - \frac{K_u \sqrt{\frac{\tau_c}{\rho}}}{g n y_1^{1/3}} \right)$$

Where:

y_{s-ult} = scour depth for cohesive soils (ft)
y_1 = average depth in the upstream main channel (ft)
V_2 = average flow velocity in the contracted section (ft/s)
g = gravitational acceleration (32.2 ft/s^2)
K_u = 1.486 (for U.S. customary units)
τ_c = critical shear stress (lb/ft^2)
ρ = sediment density (slugs/ft^3)
n = Manning's roughness coefficient

The contraction scour for the proposed bridge was calculated to be 6.2 ft.

5.5 Abutment Scour

Abutment scour occurs when the bridge abutments block approaching flow. Abutment scour is commonly evaluated using either the Froehlich or HIRE live-bed scour equations. The HIRE equation is applicable when the ratio of the projected abutment length (the L parameter) to the flow depth (the y_1 parameter) is greater than 25. The Froehlich equation is applicable when the ratio of the projected abutment length to the flow depth is less than 25. Both equations assume that the bed material around bridge abutment is erodible during the 100-year storm event.

The Froehlich equation was used for this scour analysis because the ratio of the projected abutment length to the flow depth was less than 25 at both abutments. The Froehlich equation is given below:

$$y_s = y_a \left[2.27 K_1 K_2 \left(\frac{L'}{y_a} \right)^{0.43} Fr^{0.61} + 1 \right]$$

Where:

y_s = scour depth (ft)
K_1 = Coefficient for abutment shape (from Table 8.1 of HEC-18)
K_2 = Coefficient for angle of embankment to flow
L' = Length of active flow obstructed by the embankment (ft)
Fr = Froude number, based on the velocity and depth adjacent to and upstream of the abutment
y_a = Average depth of flow at the abutment = A_e/L (ft)
  L = Length of embankment projected normal to the flow (ft)
  A_e = Flow area of the approach cross section obstructed by the embankment (ft^2)

The local abutment scour depth for the Abutment 1 was calculated to be 7.0 ft and the local abutment scour depth for the Abutment 2 was calculated to be 3.3 ft.

5.6 Total Scour

The total scour is the sum of the long-term bed elevation change, contraction scour, and local (abutment) scour. Table 8 presents the scour depths calculated for the proposed bridge.

Table 8. Total Scour Depth Summary

Proposed Bridge Structure	Scour Depth (ft)			
	Long-Term	Contraction	Local	Total
Abutment 1	0.0	6.2	7.0	13.2
Abutment 2	0.0	6.2	3.3	9.4

Note: scour depths are rounded to the nearest 0.1 ft.

According to a Caltrans memorandum dated October 23, 2015, "Scour Data Table on Foundation Plan," a scour data table should also present a long-term scour elevation based upon the long-term bed degradation and contraction scour depths, and a short-term depth based upon the local scour depth. The scour elevations were based upon the local channel/ground elevations at each of the supports, which assumes that the embankment material at the abutment is stable. This requires that scour countermeasures be included to protect the embankments in front of the abutments (see Section 5.7).

The elevation of the channel/ground at each of the supports and the scour data table summary for the proposed bridge is presented in Table 9. The detailed scour calculations are also included in Appendix J.

Table 9. Scour Data Table for the Proposed Bridge

Proposed Bridge Structure	Channel Finished Grade Elevation (ft NAVD 88)	Long-Term Scour Elevation (ft NAVD 88)	Local Scour Depth (ft)
Abutment 1	112.1	105.9	7.0
Abutment 2	114.8	108.7	3.3

Note: scour elevations and depths are rounded to the nearest 0.1 ft.

5.7 Rock Slope Protection Analysis

This section presents results of an evaluation of the size of the RSP that would be required along the channel bank slopes at the Project location to protect the channel banks from potential erosion. RSP is a typical scour countermeasure installed at the channel bank slopes, and it generally consists of rocks on channel and structure boundaries to limit the effects of erosion. It is the most common type of scour countermeasure due to its general availability, ease of installation, and relatively low cost.

RSP calculations estimate a minimum recommended rock size/class to protect the embankment slopes at the abutments from scour and erosion. Two procedures were considered to determine the RSP size for the proposed bridge: HEC-23 (FHWA 2009) and the *HDM* (Caltrans 2016). The calculations following the methods outlined in HEC-23 resulted in a larger rock size class (compared to the methods outlined in the *HDM*). The HEC-23 calculations are presented in the following discussions.

The median stone diameter of the RSP was calculated using the Isbash relationship, which is Equation 14.1 from the HEC-23 Design Guideline 14, as follows:

$$D_{50} = \frac{yK}{(S_s - 1)}\left[\frac{V^2}{gy}\right]$$

Where:

D_{50} = median stone diameter (ft)
y = depth of flow in the contracted bridge opening (ft)
K = 0.89 for spill-through abutment and 1.02 for vertical-wall abutment
S_s = specific gravity of rock riprap (2.65)
V = characteristic average velocity in the contracted section (ft/s)
g = gravitational acceleration (32.2 ft/s^2)

The median stone diameter is a function of the velocity and depth. The average channel flow velocities and flow depths for the design flow, based on the hydraulic calculations, were used to calculate the median stone diameter. The median stone diameter for the RSP was calculated for the areas in the vicinity of the proposed bridge. The RSP class was calculated to be Class V.

Class V RSP has a median particle weight of ¼ Ton and a median particle diameter of 18 in (Caltrans 2016). The minimum thickness for Class V RSP is 3.0 ft. The RSP should be placed using Method B, which involves dumping rock near its planned location, and working the rock to its final position with machinery. It is also recommended to install a gravel filter composed of coarse gravel, coarse sand, and fine sand below the Class V RSP. The minimum thickness of the gravel filter should be 1.5 ft. Class 8 RSP geotextile filter fabric should be placed on the bank as the initial filter separator material between the layer and RSP. The detailed RSP calculations are in Appendix K.

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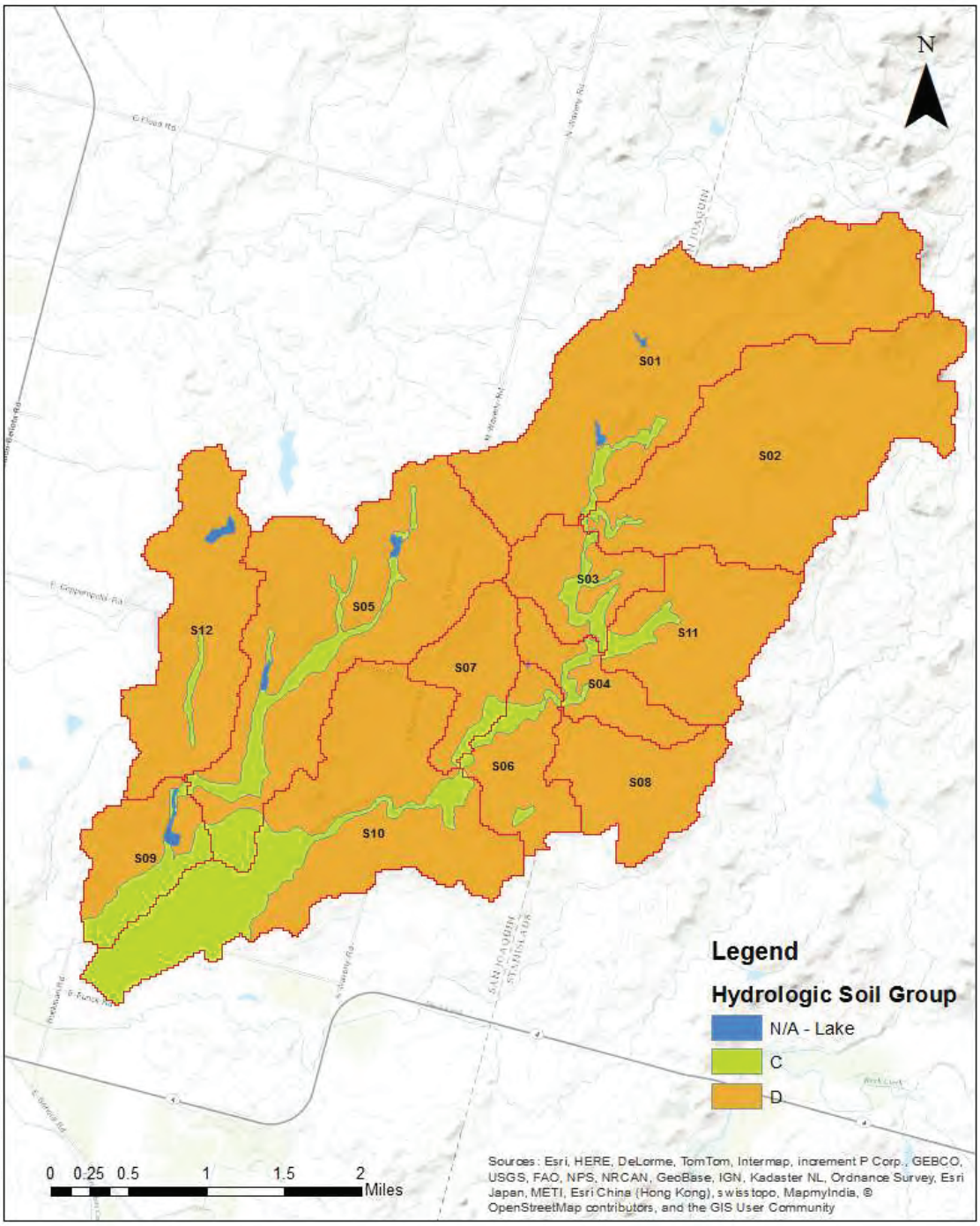
Appendix A Land Use Maps

Appendix A.1 San Joaquin County General Plan

Appendix A.2 Stanislaus County Zoning Map

Appendix B Hydrologic Soil Group


N
S01
S02
S03
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S05
S06
S07
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S09
S10
S11
S12
Legend
Hydrologic Soil Group
N/A - Lake
C
D
0 0.25 0.5 1 1.5 2
Miles
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Explanation of HSGs:

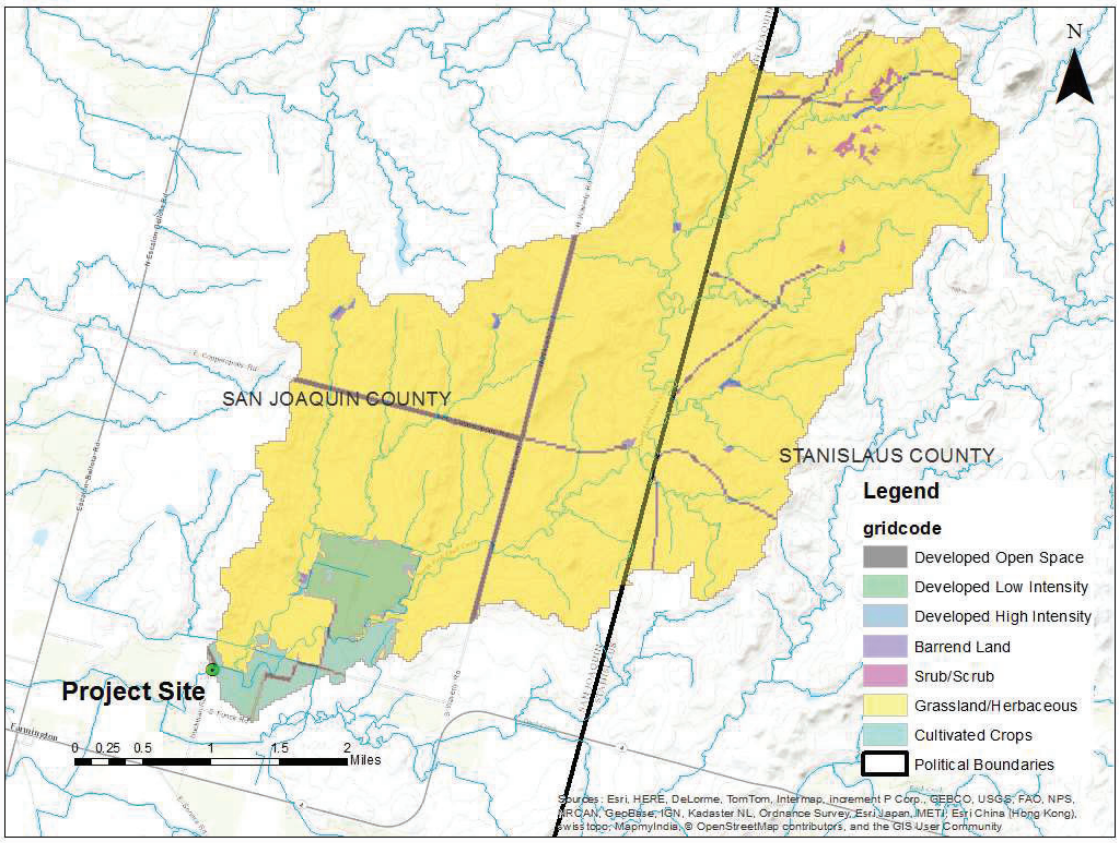
A: (Low runoff potential) Soils having high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well to excessively drained sands or gravels. These soils have a high rate of water transmission.

B: Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well-to-well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

C: Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

D: (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay pan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.

Appendix C USGS Land Use Land Cover


N
SAN JOAQUIN COUNTY
STANISLAUS COUNTY
Project Site
0 0.25 0.5 1 1.5 2
Miles
Legend
gridcode
Developed Open Space
Developed Low Intensity
Developed High Intensity
Barrend Land
Srub/Scrub
Grassland/Herbaceous
Cultivated Crops
Political Boundaries
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Appendix D Precipitation Frequency Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Farmington, California, US*
Latitude: 37.9417°, Longitude: -120.9768°
Elevation: 120 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

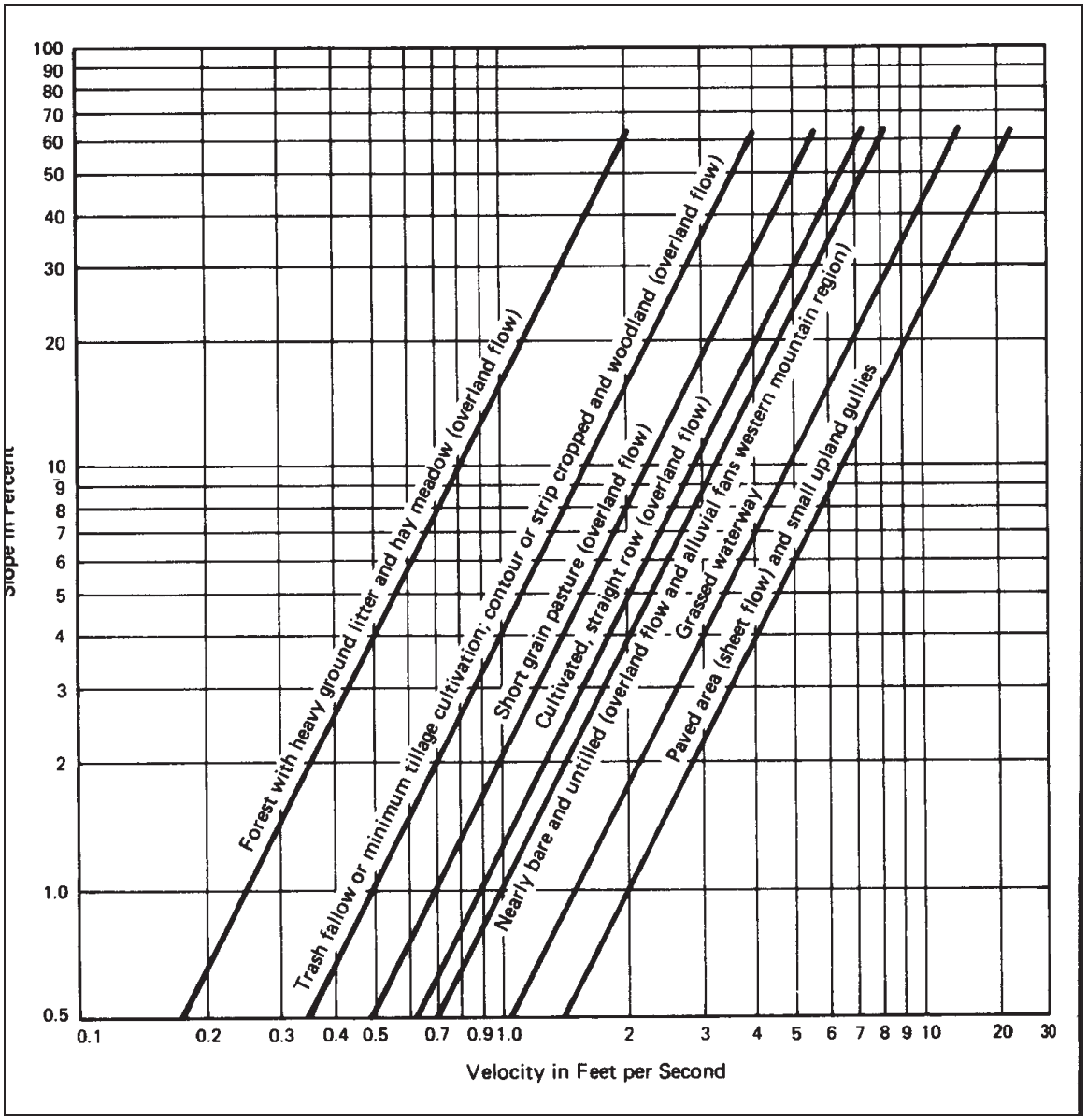
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.090 (0.079–0.104)	0.124 (0.109–0.143)	0.167 (0.146–0.193)	0.202 (0.175–0.236)	0.248 (0.206–0.301)	0.283 (0.230–0.352)	0.318 (0.251–0.407)	0.354 (0.270–0.468)	0.401 (0.292–0.557)	0.438 (0.307–0.632)
10-min	0.130 (0.114–0.149)	0.178 (0.156–0.205)	0.240 (0.209–0.277)	0.289 (0.250–0.335)	0.355 (0.296–0.431)	0.406 (0.329–0.504)	0.456 (0.360–0.584)	0.507 (0.388–0.670)	0.575 (0.419–0.798)	0.627 (0.439–0.905)
15-min	0.157 (0.138–0.180)	0.215 (0.189–0.248)	0.290 (0.253–0.335)	0.350 (0.303–0.408)	0.430 (0.358–0.522)	0.491 (0.398–0.610)	0.551 (0.436–0.706)	0.613 (0.469–0.811)	0.696 (0.507–0.965)	0.759 (0.531–1.10)
30-min	0.218 (0.191–0.251)	0.299 (0.262–0.344)	0.403 (0.352–0.466)	0.486 (0.421–0.567)	0.597 (0.497–0.725)	0.681 (0.554–0.848)	0.766 (0.605–0.980)	0.852 (0.651–1.13)	0.967 (0.704–1.34)	1.05 (0.738–1.52)
60-min	0.296 (0.260–0.341)	0.406 (0.356–0.468)	0.548 (0.479–0.633)	0.661 (0.572–0.771)	0.812 (0.676–0.986)	0.927 (0.753–1.15)	1.04 (0.823–1.33)	1.16 (0.886–1.53)	1.32 (0.958–1.82)	1.43 (1.00–2.07)
2-hr	0.421 (0.370–0.485)	0.549 (0.481–0.632)	0.717 (0.627–0.829)	0.857 (0.741–1.00)	1.05 (0.873–1.27)	1.20 (0.974–1.49)	1.35 (1.07–1.73)	1.51 (1.16–2.00)	1.74 (1.26–2.41)	1.91 (1.34–2.75)
3-hr	0.509 (0.447–0.586)	0.653 (0.572–0.752)	0.846 (0.739–0.978)	1.01 (0.871–1.17)	1.23 (1.02–1.49)	1.41 (1.14–1.75)	1.59 (1.26–2.04)	1.79 (1.37–2.36)	2.06 (1.50–2.85)	2.27 (1.59–3.26)
6-hr	0.687 (0.603–0.790)	0.871 (0.764–1.00)	1.12 (0.979–1.30)	1.33 (1.15–1.55)	1.62 (1.35–1.97)	1.85 (1.51–2.30)	2.10 (1.65–2.68)	2.35 (1.80–3.11)	2.71 (1.97–3.76)	3.00 (2.10–4.32)
12-hr	0.889 (0.780–1.02)	1.16 (1.02–1.33)	1.52 (1.32–1.75)	1.81 (1.57–2.11)	2.21 (1.84–2.69)	2.53 (2.05–3.14)	2.85 (2.25–3.64)	3.18 (2.43–4.21)	3.64 (2.65–5.04)	3.99 (2.80–5.76)
24-hr	1.17 (1.05–1.33)	1.57 (1.41–1.79)	2.09 (1.86–2.38)	2.50 (2.21–2.88)	3.05 (2.61–3.64)	3.47 (2.90–4.24)	3.89 (3.17–4.87)	4.32 (3.42–5.57)	4.89 (3.70–6.59)	5.32 (3.89–7.43)
2-day	1.47 (1.32–1.67)	1.94 (1.74–2.21)	2.54 (2.27–2.91)	3.02 (2.67–3.48)	3.65 (3.12–4.35)	4.11 (3.44–5.02)	4.57 (3.72–5.72)	5.03 (3.98–6.48)	5.63 (4.26–7.58)	6.07 (4.44–8.49)
3-day	1.69 (1.51–1.92)	2.21 (1.98–2.52)	2.87 (2.56–3.28)	3.38 (2.99–3.90)	4.05 (3.47–4.84)	4.55 (3.80–5.55)	5.03 (4.10–6.30)	5.52 (4.36–7.11)	6.14 (4.65–8.27)	6.60 (4.82–9.21)
4-day	1.83 (1.64–2.05)	2.38 (2.13–2.71)	3.07 (2.74–3.51)	3.62 (3.20–4.17)	4.32 (3.69–5.15)	4.83 (4.04–5.90)	5.33 (4.34–6.68)	5.83 (4.61–7.51)	6.46 (4.90–8.70)	6.93 (5.06–9.67)
7-day	2.22 (1.99–2.52)	2.84 (2.54–3.24)	3.63 (3.24–4.15)	4.25 (3.76–4.90)	5.05 (4.32–6.03)	5.64 (4.71–6.88)	6.20 (5.05–7.77)	6.76 (5.35–8.71)	7.47 (5.66–10.1)	7.98 (5.83–11.1)
10-day	2.47 (2.22–2.82)	3.15 (2.82–3.59)	4.01 (3.58–4.59)	4.68 (4.15–5.40)	5.56 (4.75–6.63)	6.19 (5.17–7.55)	6.80 (5.54–8.52)	7.40 (5.86–9.55)	8.17 (6.19–11.0)	8.73 (6.38–12.2)
20-day	3.28 (2.94–3.73)	4.18 (3.74–4.76)	5.31 (4.74–6.06)	6.18 (5.47–7.12)	7.30 (6.24–8.72)	8.12 (6.78–9.90)	8.90 (7.25–11.1)	9.65 (7.64–12.4)	10.6 (8.03–14.3)	11.3 (8.23–15.7)
30-day	3.89 (3.49–4.43)	4.98 (4.45–5.67)	6.32 (5.64–7.23)	7.36 (6.51–8.48)	8.68 (7.42–10.4)	9.63 (8.05–11.8)	10.5 (8.58–13.2)	11.4 (9.01–14.7)	12.5 (9.44–16.8)	13.2 (9.63–18.4)
45-day	4.76 (4.27–5.42)	6.11 (5.47–6.96)	7.75 (6.92–8.86)	9.01 (7.97–10.4)	10.6 (9.06–12.7)	11.7 (9.81–14.3)	12.8 (10.4–16.0)	13.8 (10.9–17.8)	15.0 (11.4–20.3)	15.9 (11.6–22.2)
60-day	5.75 (5.16–6.55)	7.37 (6.60–8.40)	9.33 (8.33–10.7)	10.8 (9.57–12.5)	12.7 (10.8–15.1)	14.0 (11.7–17.1)	15.2 (12.4–19.0)	16.4 (12.9–21.1)	17.7 (13.4–23.9)	18.7 (13.7–26.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Appendix E Upland Velocity Method


Slope in Percent
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1.0
0.5
0.1
0.2
0.3
0.4
0.5
0.7
0.9
1.0
2
3
4
5
6
7
8
9
10
20
30
Velocity in Feet per Second
Forest with heavy ground litter and hay meadow (overland flow)
Trash fallow or minimum tillage cultivation; contour or strip cropped and woodland (overland flow)
Short grain pasture (overland flow)
Cultivated, straight row (overland flow)
Grassed waterway
Nearly bare and untilled (overland flow and alluvial fans western mountain region)
Paved area (sheet flow) and small upland gullies

Appendix F HEC-HMS Outputs

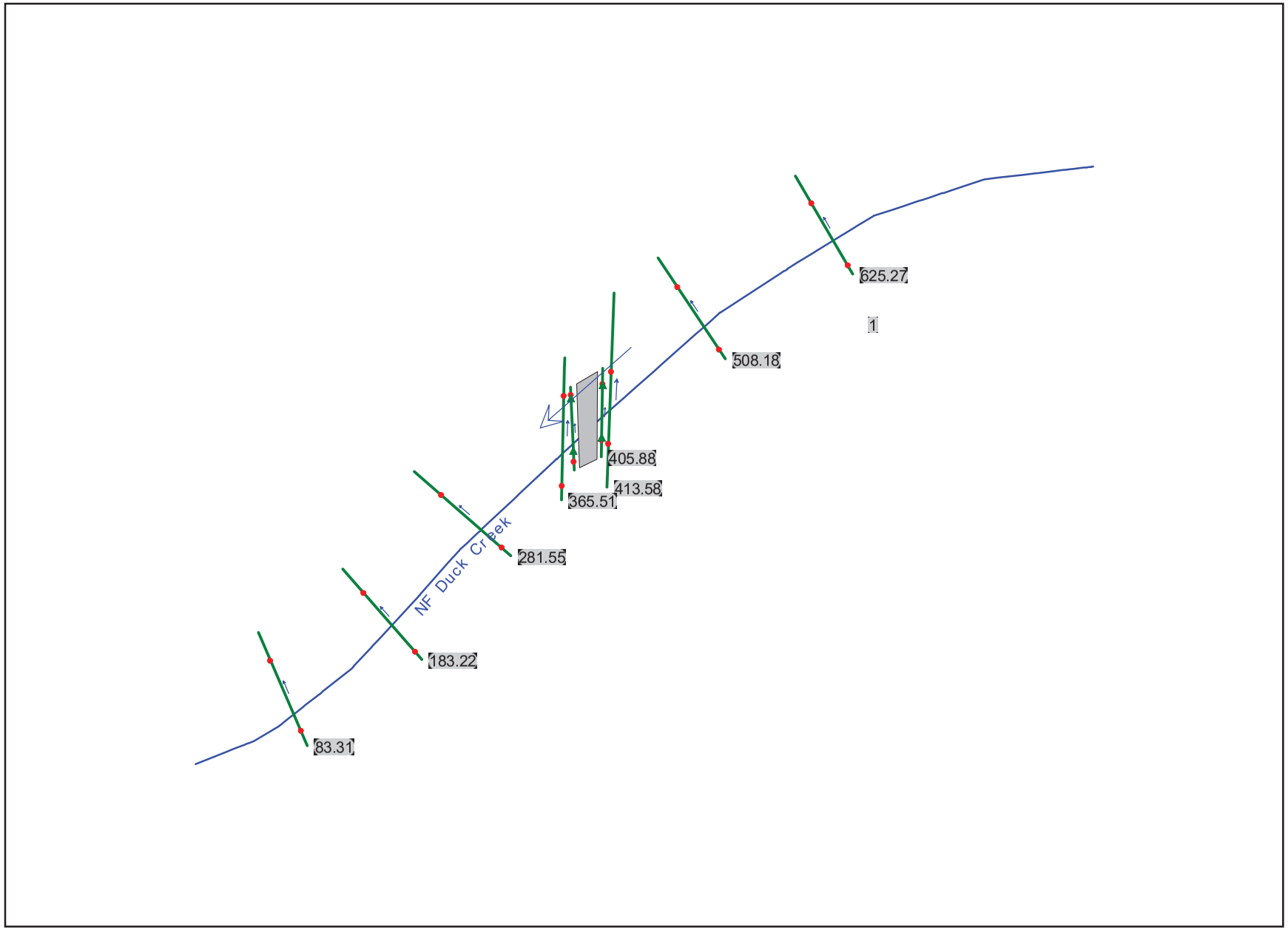
Project: P14017 Simulation Run: Q100

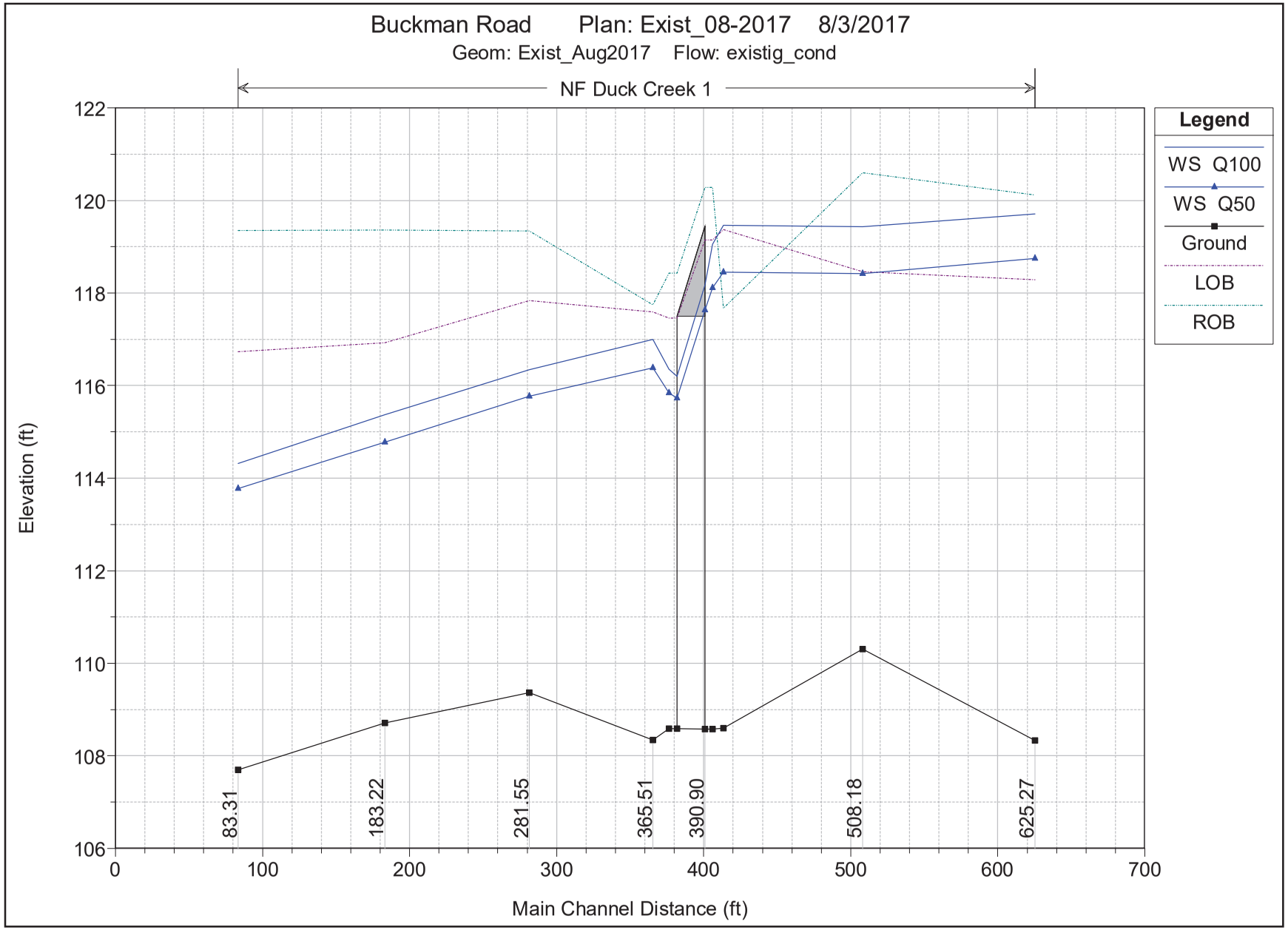
Start of Run: 05May2014, 00:00
End of Run: 06May2014, 00:05
Compute Time: 02Jun2014, 17:15:39

Basin Model: Existing
Meteorologic Model: Q100
Control Specifications: Q100

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
S01	2.45590	873.2	05May2014, 11:10	2.57
S02	2.26270	819.5	05May2014, 11:10	2.57
R01	4.71860	1273.6	05May2014, 12:40	2.47
S11	0.89855	471.7	05May2014, 10:30	2.61
S03	0.50213	232.8	05May2014, 10:40	2.49
J01	6.11928	1456.6	05May2014, 12:35	2.49
R02	6.11928	1422.4	05May2014, 13:10	2.45
S08	0.66536	343.5	05May2014, 10:35	2.61
S04	0.40551	271.9	05May2014, 10:15	2.54
J02	7.19015	1537.9	05May2014, 13:05	2.47
R03	7.19015	1468.5	05May2014, 14:05	2.40
S06	0.53131	304.3	05May2014, 10:25	2.53
S07	0.47186	246.2	05May2014, 10:30	2.53
J03	8.19332	1554.7	05May2014, 14:05	2.41
R04	8.19332	1150.4	05May2014, 16:35	2.01
S05	2.20160	726.1	05May2014, 11:20	2.49
S12	1.18930	452.9	05May2014, 11:05	2.58
R05	3.39090	841.2	05May2014, 12:55	2.40
S10	2.19950	559.8	05May2014, 11:50	2.31
S09	0.56707	214.3	05May2014, 10:50	2.37
Outlet	14.35079	1888.6	05May2014, 12:50	2.16

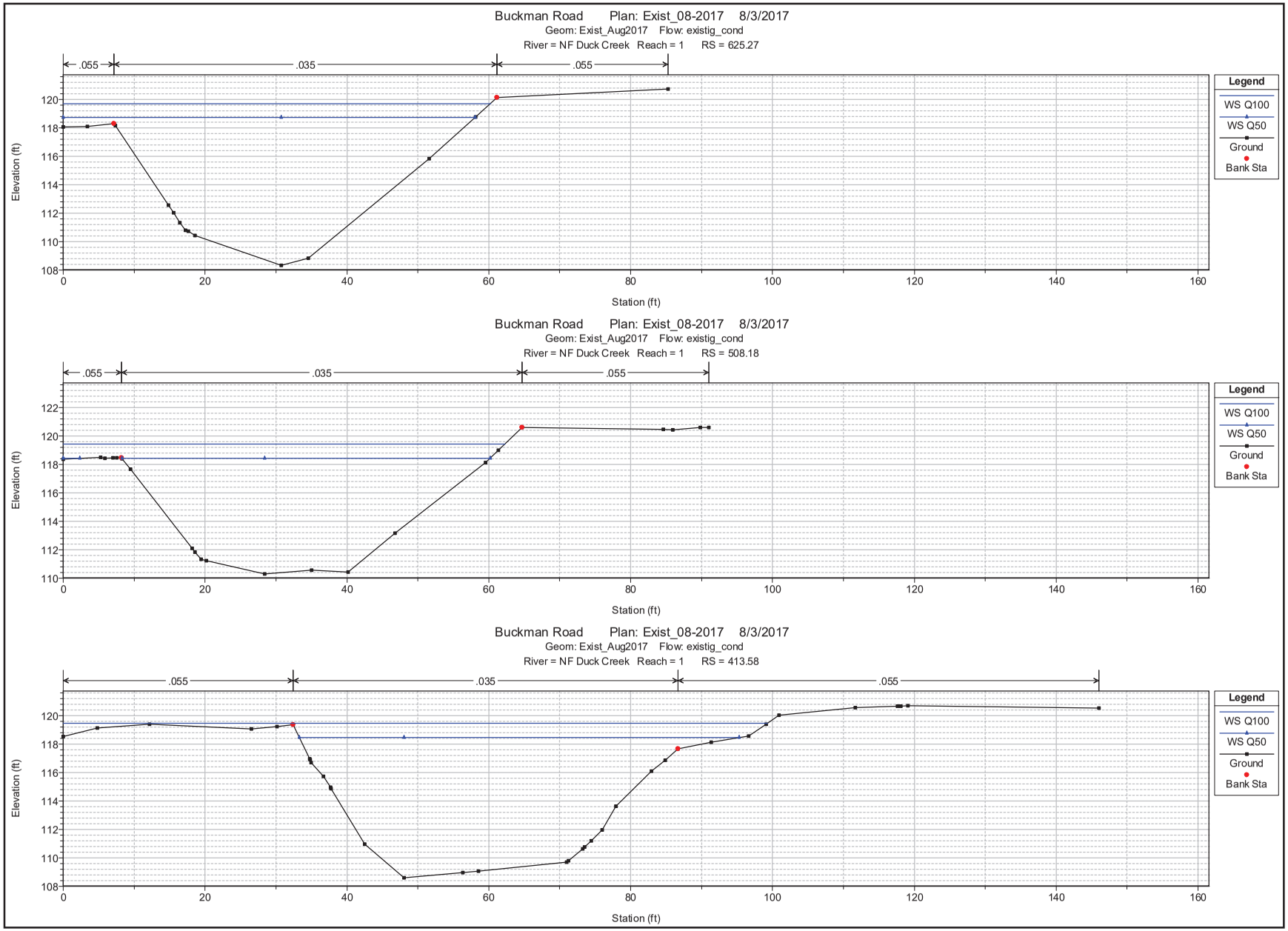
Appendix G Hydraulic Analysis, Existing Condition


625.27
1
508.18
405.88
413.58
365.51
281.55
NF Duck Creek
183.22
83.31

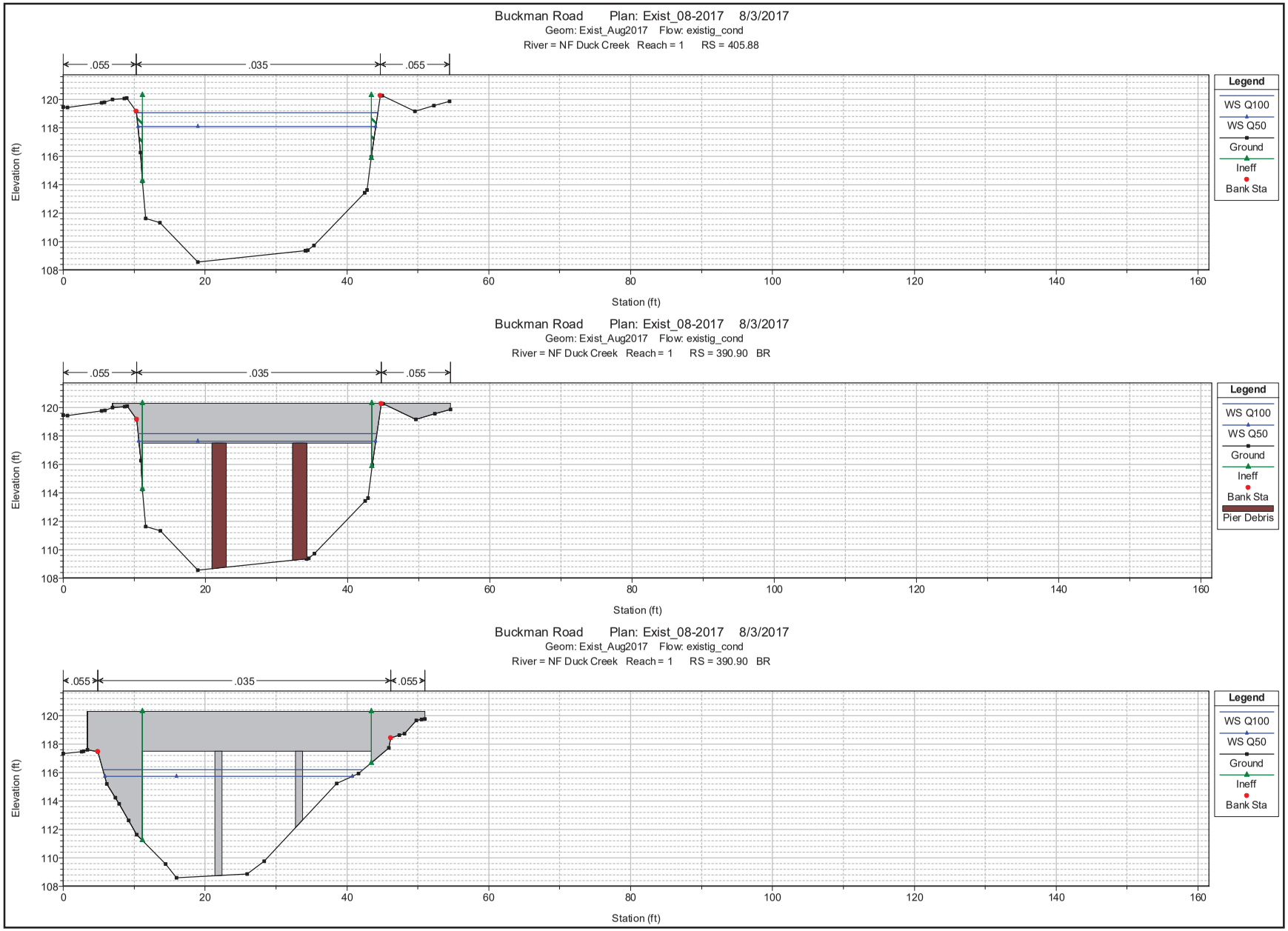

Buckman Road Plan: Exist_08-2017 8/3/2017
Geom: Exist_Aug2017 Flow: existig_cond
NF Duck Creek 1
Legend
WS Q100
WS Q50
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
122
120
118
116
114
112
110
108
106
0
100
200
300
400
500
600
700
83.31
183.22
281.55
365.51
390.90
508.18
625.27

HEC-RAS Plan: Exist River: NF Duck Creek Reach: 1

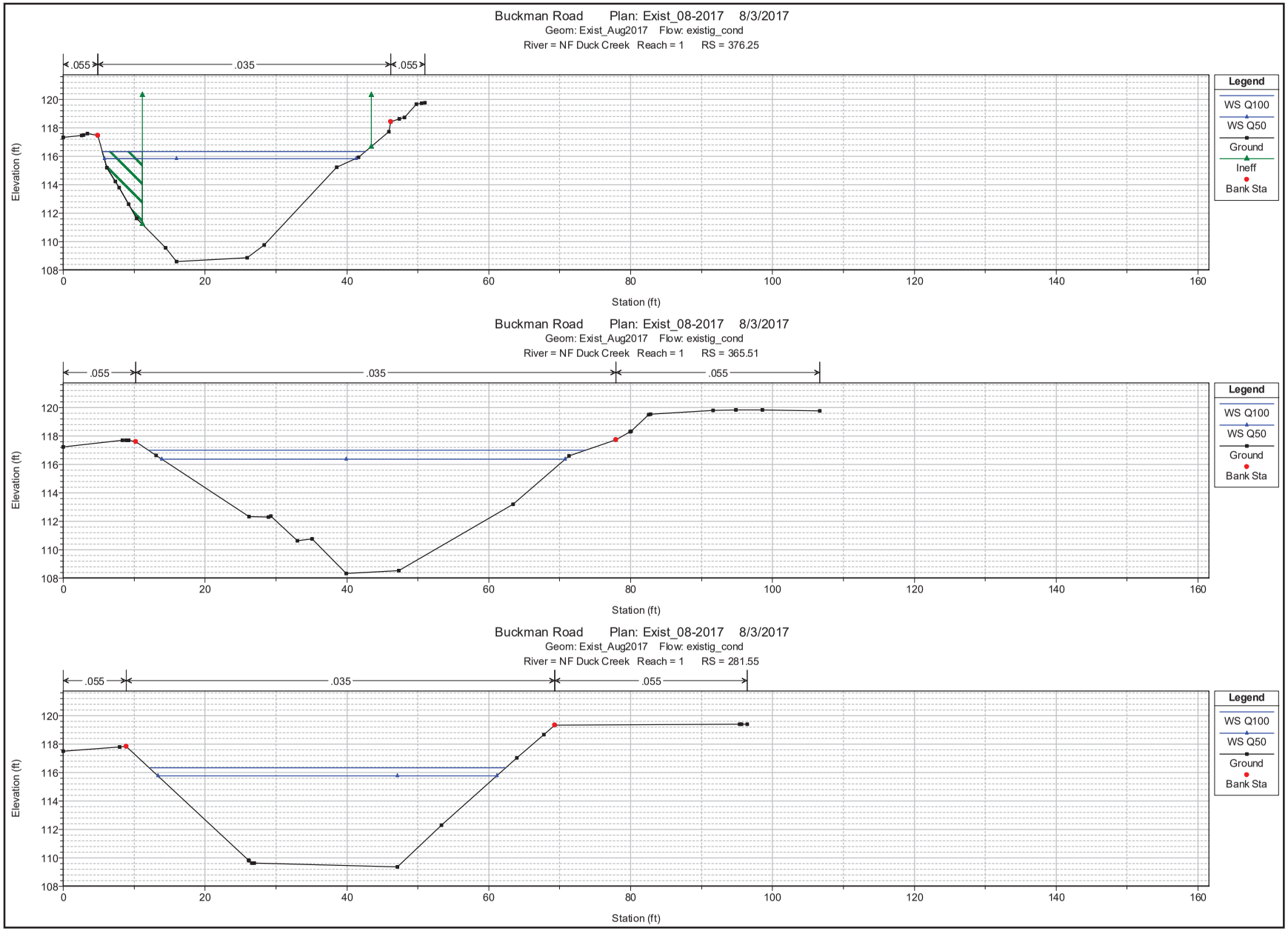
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	625.27	Q100	1890.00	108.33	119.71		120.10	0.001159	5.01	386.06	60.26	0.33
1	625.27	Q50	1590.00	108.33	118.75		119.12	0.001262	4.89	329.17	58.10	0.34
1	508.18	Q100	1890.00	110.31	119.44		119.93	0.001697	5.63	342.60	62.27	0.40
1	508.18	Q50	1590.00	110.31	118.42		118.92	0.002053	5.66	280.81	54.24	0.43
1	413.58	Q100	1890.00	108.60	119.46		119.76	0.000795	4.42	448.35	99.29	0.28
1	413.58	Q50	1590.00	108.60	118.45		118.74	0.000876	4.29	373.38	62.00	0.29
1	405.88	Q100	1890.00	108.58	119.05	114.83	119.72	0.001591	6.55	288.68	34.01	0.39
1	405.88	Q50	1590.00	108.58	118.11	114.30	118.70	0.001633	6.16	258.23	33.54	0.38
1	390.90 BR U	Q100	1890.00	108.58	118.17	115.43	119.50	0.023181	9.23	204.73		0.53
1	390.90 BR U	Q50	1590.00	108.58	117.64	114.85	118.57	0.016406	7.77	204.73		0.45
1	390.90 BR D	Q100	1890.00	108.59	116.20	116.14	118.69	0.025596	12.65	149.42	29.12	0.98
1	390.90 BR D	Q50	1590.00	108.59	115.73	115.39	117.85	0.022581	11.69	136.03	27.60	0.93
1	376.25	Q100	1890.00	108.59	116.35	115.83	118.38	0.008751	11.43	165.32	37.14	0.88
1	376.25	Q50	1590.00	108.59	115.84	115.11	117.60	0.008124	10.62	149.74	35.49	0.84
1	365.51	Q100	1890.00	108.34	117.00		117.63	0.002983	6.39	295.79	61.53	0.51
1	365.51	Q50	1590.00	108.34	116.38		116.96	0.002945	6.13	259.44	56.85	0.51
1	281.55	Q100	1890.00	109.37	116.34		117.29	0.004524	7.82	241.60	50.29	0.63
1	281.55	Q50	1590.00	109.37	115.77		116.63	0.004495	7.44	213.64	47.78	0.62
1	183.22	Q100	1890.00	108.71	115.37		116.70	0.007204	9.25	204.34	46.98	0.78
1	183.22	Q50	1590.00	108.71	114.78		116.03	0.007567	8.97	177.30	44.41	0.79
1	83.31	Q100	1890.00	107.70	114.31	113.72	115.90	0.008425	10.10	187.16	41.80	0.84
1	83.31	Q50	1590.00	107.70	113.77	113.19	115.21	0.008426	9.63	165.04	39.67	0.83



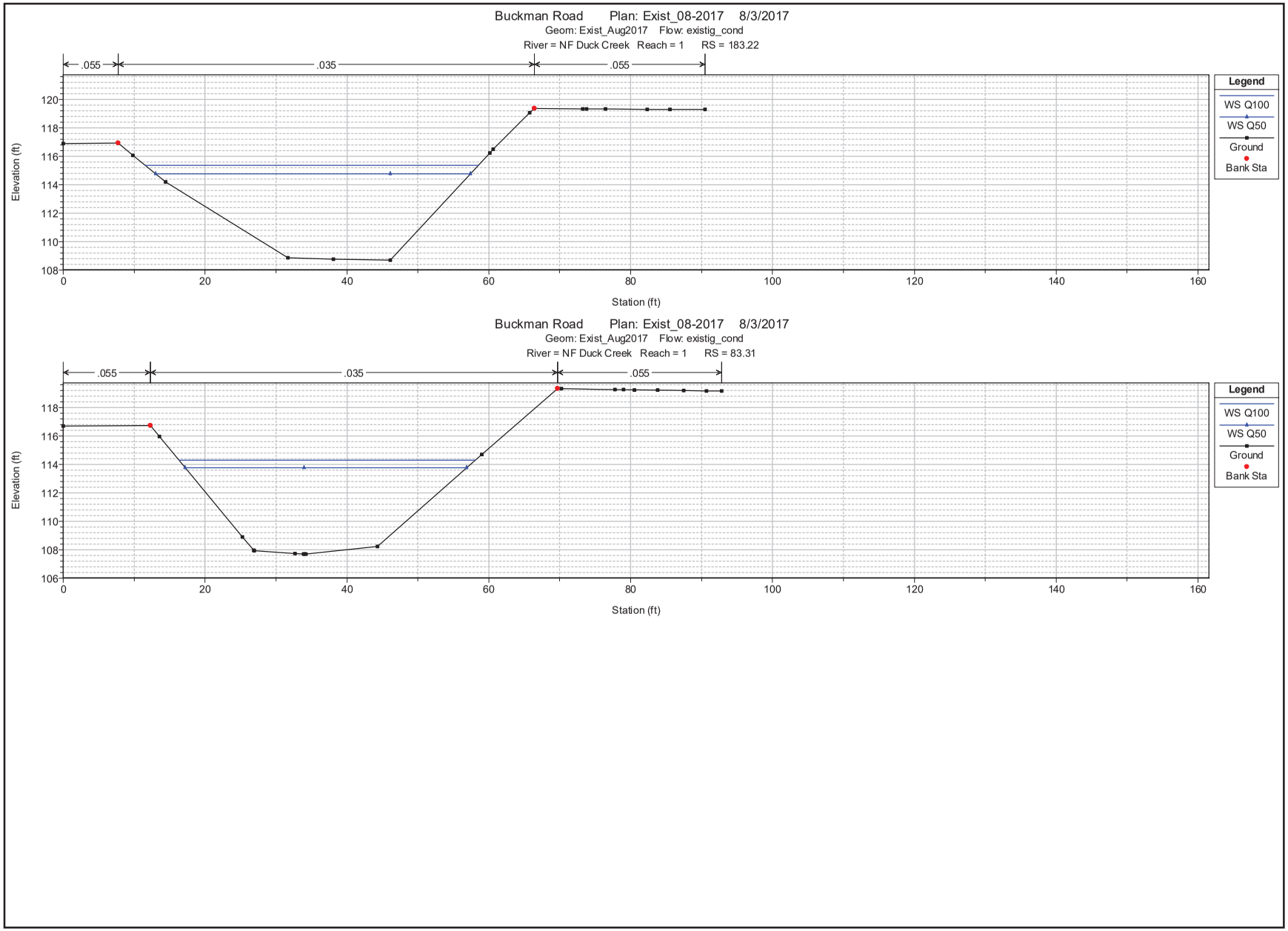
1 in Horiz. = 20 ft 1 in Vert. = 10 ft



1 in Horiz. = 20 ft 1 in Vert. = 10 ft

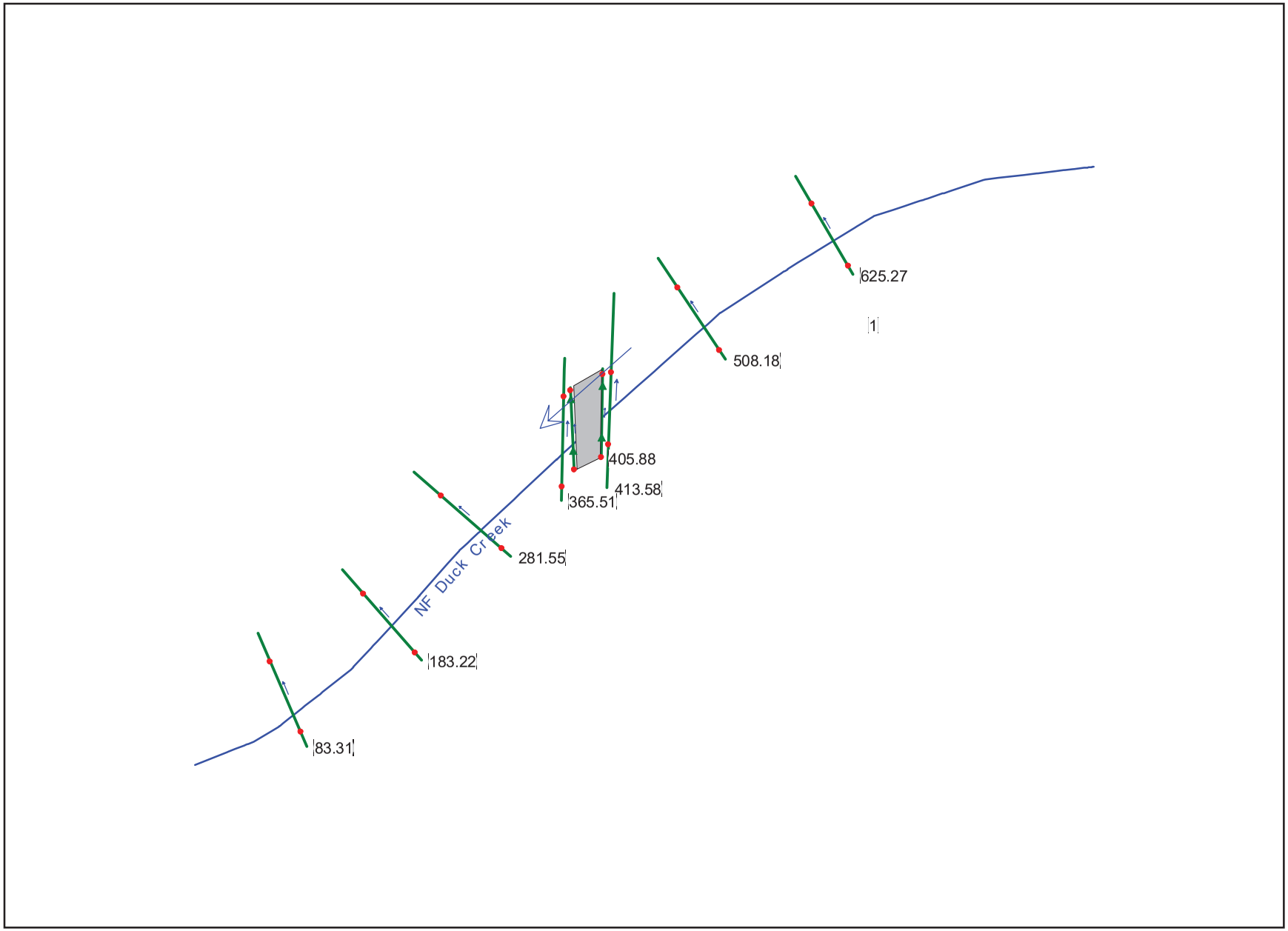


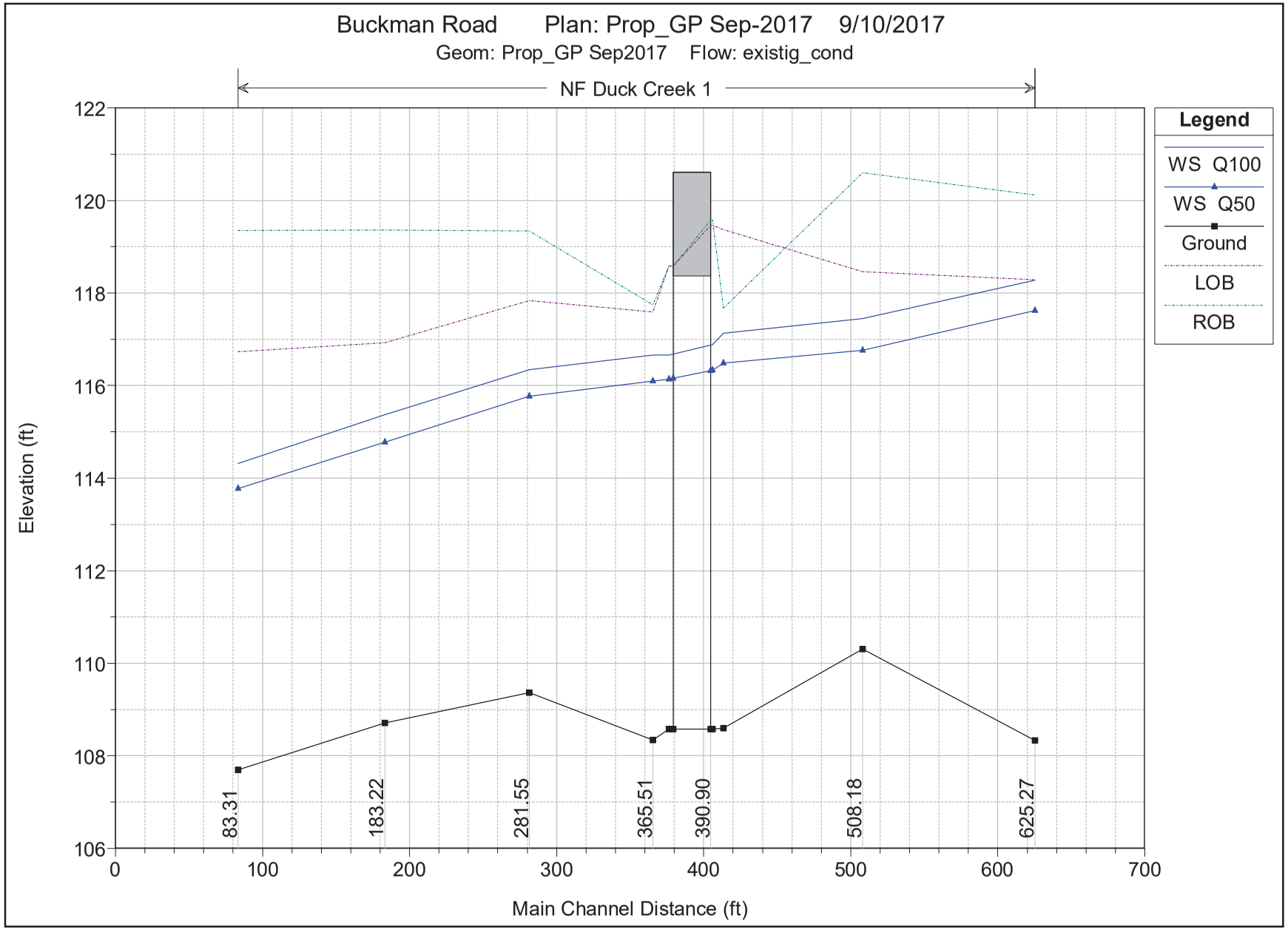
1 in Horiz. = 20 ft 1 in Vert. = 10 ft



1 in Horiz. = 20 ft 1 in Vert. = 10 ft

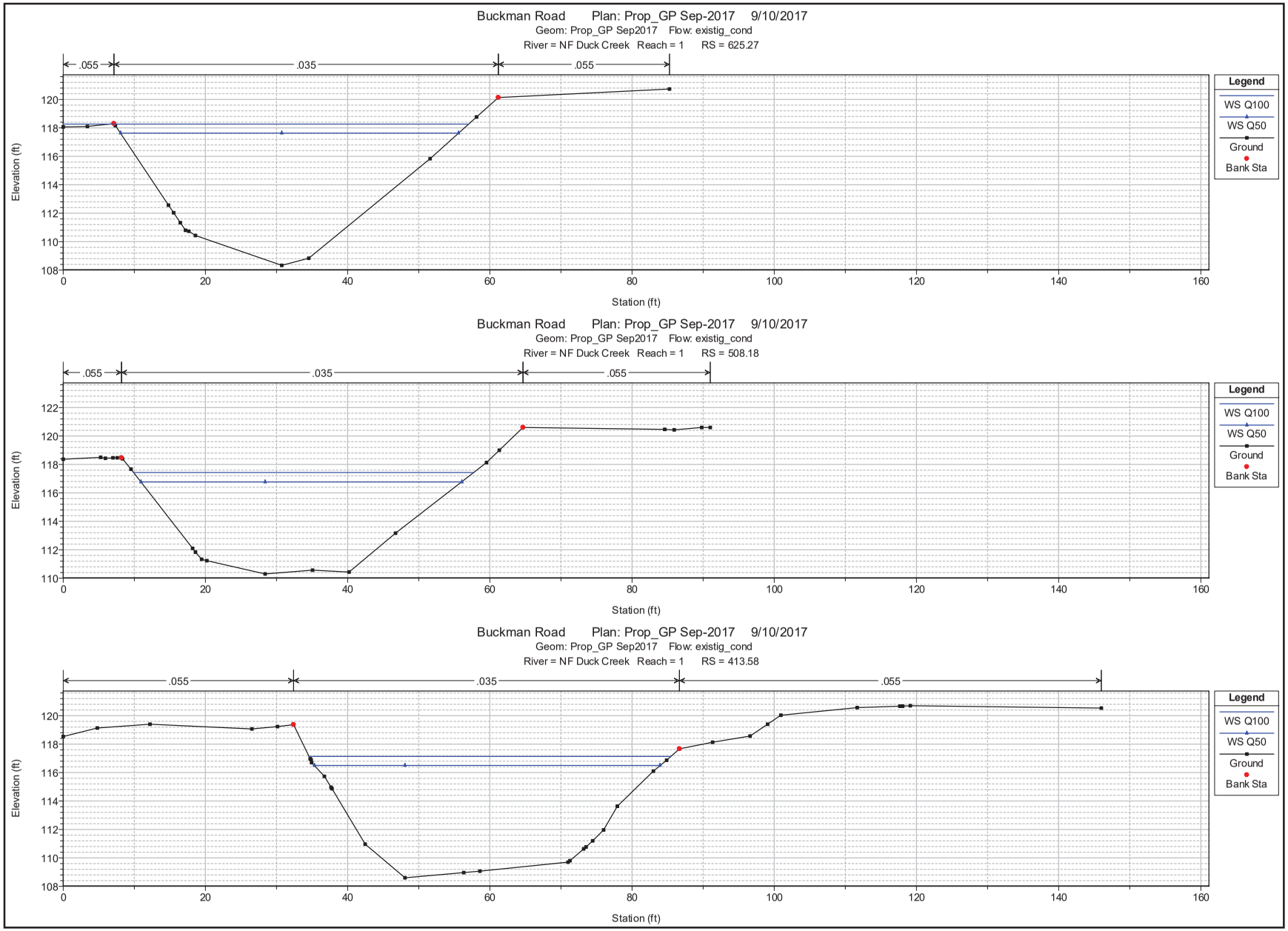
Appendix H Hydraulic Analysis, Proposed Condition


625.27
1
508.18
405.88
413.58
365.51
281.55
NF Duck Creek
183.22
83.31

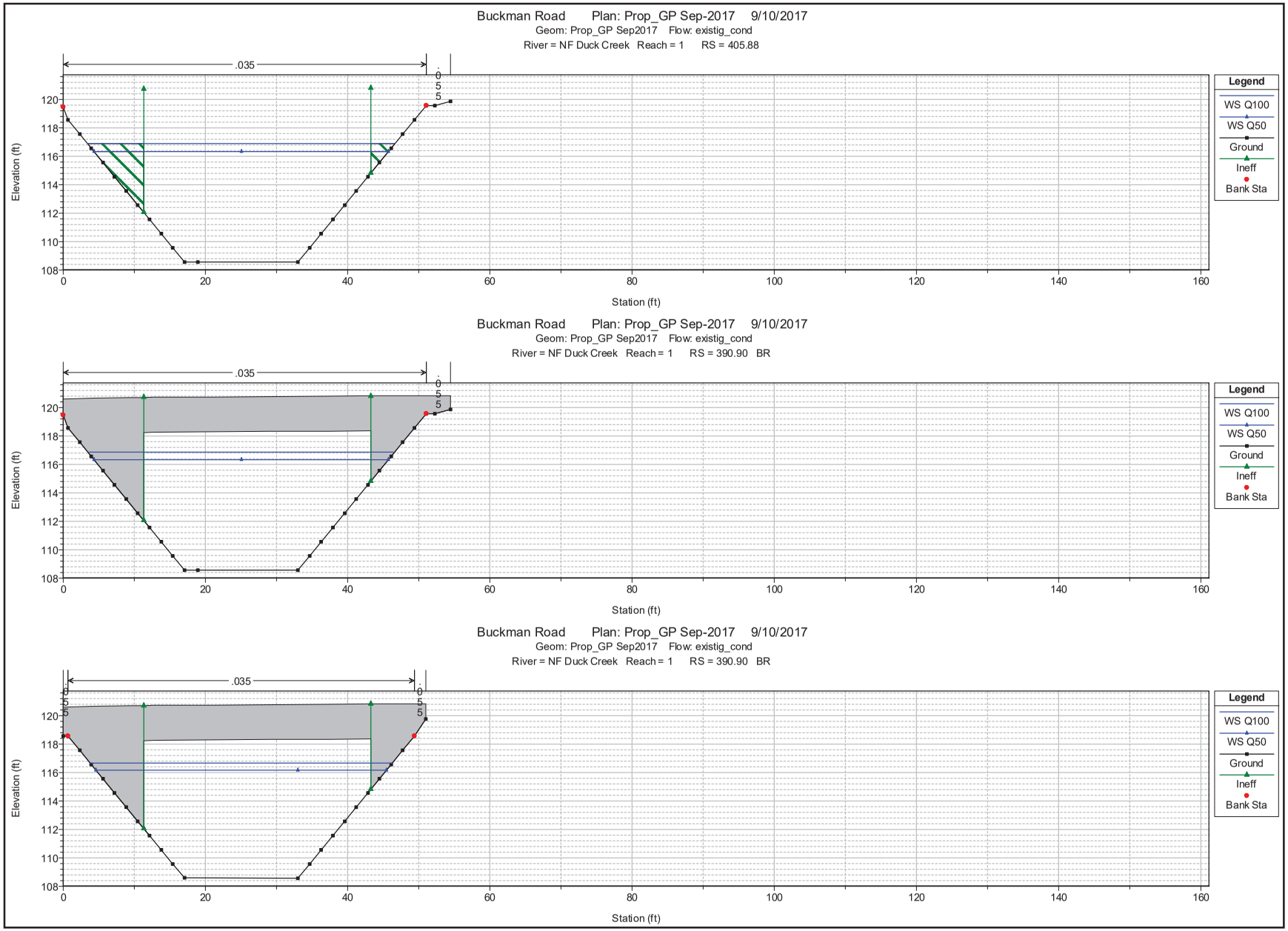

Buckman Road Plan: Prop_GP Sep-2017 9/10/2017
Geom: Prop_GP Sep2017 Flow: existig_cond
NF Duck Creek 1
Legend
WS Q100
WS Q50
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
122
120
118
116
114
112
110
108
106
0
100
200
300
400
500
600
700
83.31
183.22
281.55
365.51
390.90
508.18
625.27

HEC-RAS Plan: Prop_09-17 River: NF Duck Creek Reach: 1

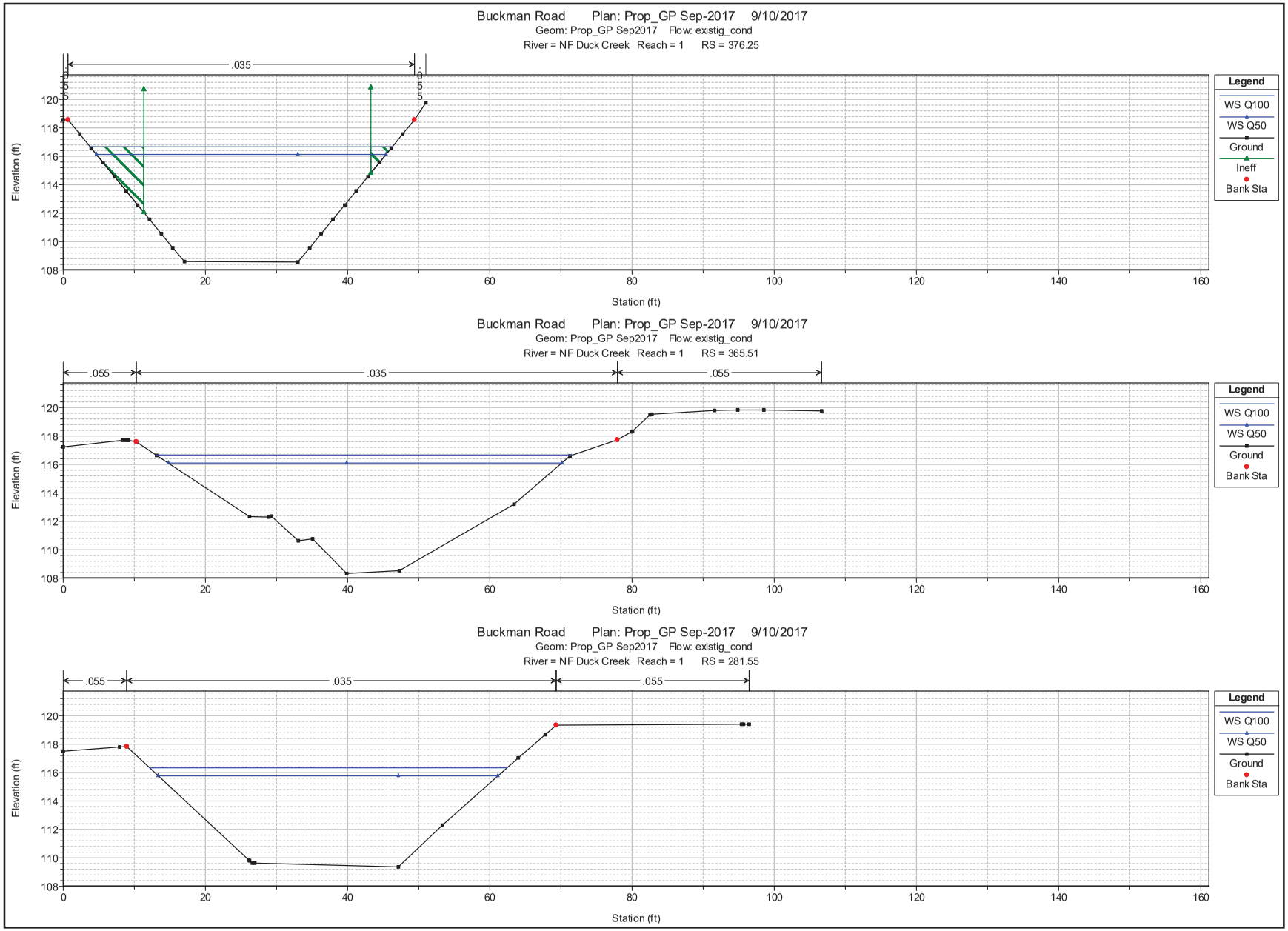
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	625.27	Q100	1890.00	108.33	118.28		118.89	0.002238	6.27	302.17	56.86	0.45
1	625.27	Q50	1590.00	108.33	117.62		118.16	0.002156	5.91	269.00	47.52	0.44
1	508.18	Q100	1890.00	110.31	117.44		118.48	0.004921	8.16	231.76	47.95	0.65
1	508.18	Q50	1590.00	110.31	116.77		117.75	0.005208	7.94	200.29	45.15	0.66
1	413.58	Q100	1890.00	108.60	117.13		118.05	0.003584	7.67	246.53	41.69	0.56
1	413.58	Q50	1590.00	108.60	116.49		117.30	0.003451	7.22	220.25	39.82	0.54
1	405.88	Q100	1890.00	108.58	116.89	114.64	118.00	0.003319	8.46	223.30	43.19	0.56
1	405.88	Q50	1590.00	108.58	116.33	114.08	117.26	0.003093	7.73	205.61	41.37	0.54
1	390.90 BR U	Q100	1890.00	108.58	116.88	114.66	117.99	0.004232	8.47	223.12	31.95	0.52
1	390.90 BR U	Q50	1590.00	108.58	116.33	114.08	117.26	0.003803	7.74	205.45	31.95	0.49
1	390.90 BR D	Q100	1890.00	108.58	116.68	114.66	117.86	0.004610	8.73	216.60	31.95	0.54
1	390.90 BR D	Q50	1590.00	108.58	116.16	114.09	117.14	0.004113	7.95	200.01	31.95	0.51
1	376.25	Q100	1890.00	108.58	116.66		117.85	0.003708	8.75	215.98	42.44	0.59
1	376.25	Q50	1590.00	108.58	116.14		117.13	0.003422	7.97	199.46	40.75	0.56
1	365.51	Q100	1890.00	108.34	116.66		117.75	0.005432	8.37	225.87	47.98	0.68
1	365.51	Q50	1590.00	108.34	116.10		117.08	0.005383	7.97	199.52	45.33	0.67
1	281.55	Q100	1890.00	109.37	116.34		117.29	0.004524	7.82	241.60	50.29	0.63
1	281.55	Q50	1590.00	109.37	115.77		116.63	0.004495	7.44	213.64	47.78	0.62
1	183.22	Q100	1890.00	108.71	115.37		116.70	0.007204	9.25	204.34	46.98	0.78
1	183.22	Q50	1590.00	108.71	114.78		116.03	0.007567	8.97	177.30	44.41	0.79
1	83.31	Q100	1890.00	107.70	114.31	113.72	115.90	0.008425	10.10	187.16	41.80	0.84
1	83.31	Q50	1590.00	107.70	113.77	113.20	115.21	0.008426	9.63	165.04	39.67	0.83



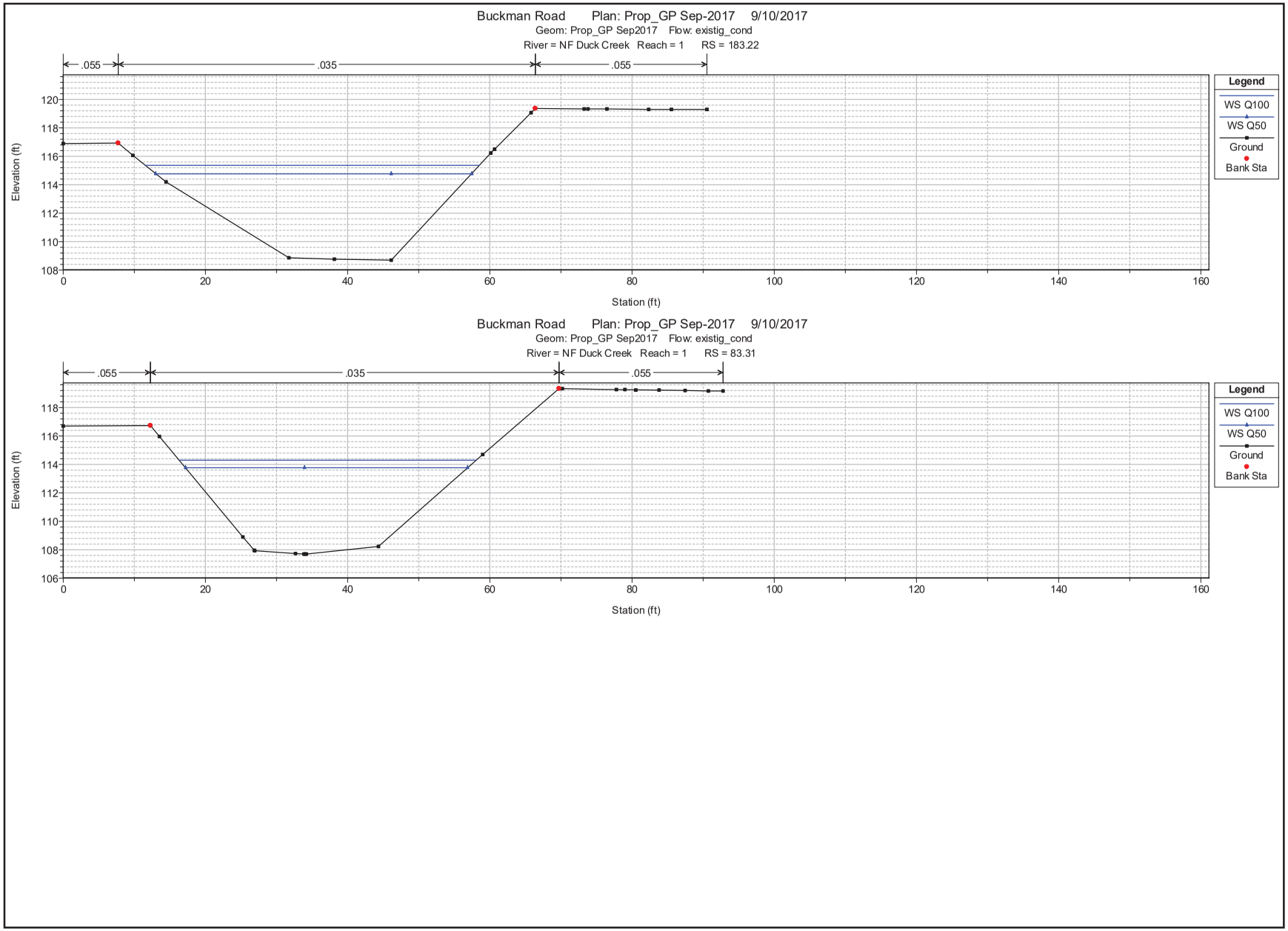
1 in Horiz. = 20 ft 1 in Vert. = 10 ft



1 in Horiz. = 20 ft 1 in Vert. = 10 ft

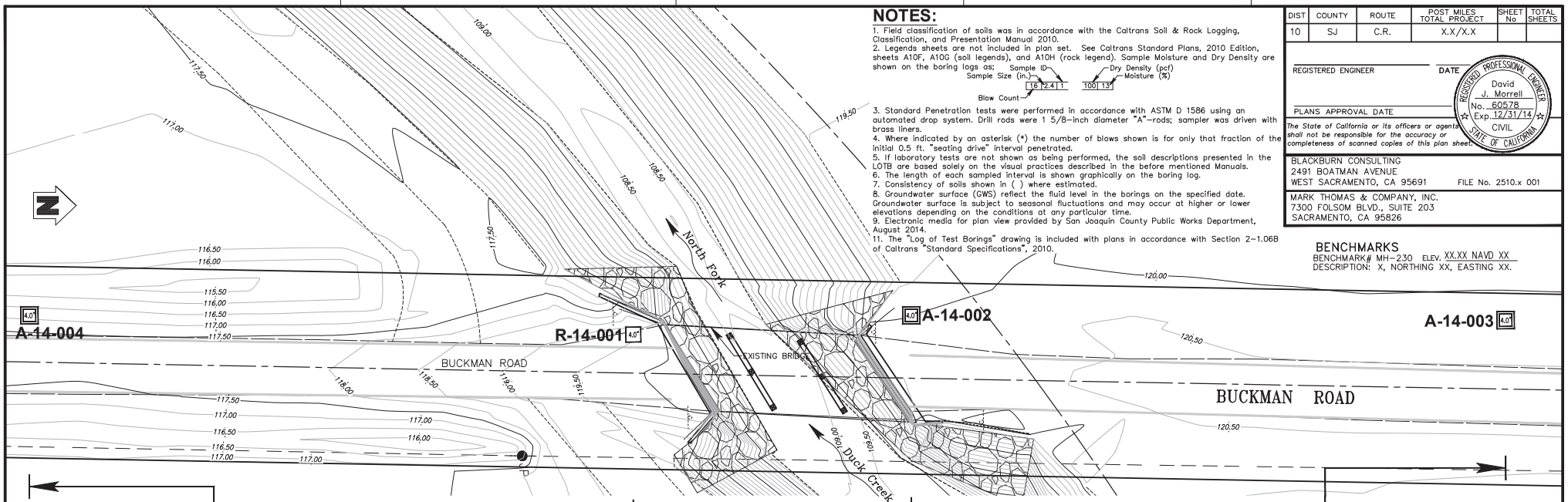


1 in Horiz. = 20 ft 1 in Vert. = 10 ft

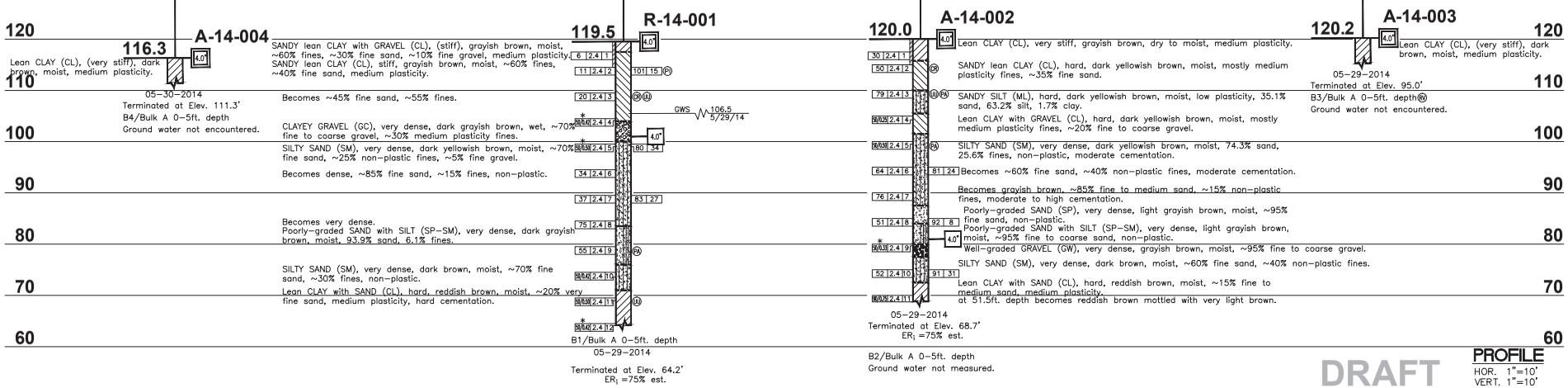


1 in Horiz. = 20 ft 1 in Vert. = 10 ft

Appendix I Log of Test Borings and Particle Size Distribution



PLAN
1" = 10'



DRAFT

PROFILE
HOR. 1"=10'
VERT. 1"=10'

NOTES:

1. Field classification of soils was in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual 2010.
2. Legends sheets are not included in plan set. See Caltrans Standard Plans, 2010 Edition, sheets A10F, A10G (soil legends), and A10H (rock legend). Sample Moisture and Dry Density are shown on the boring logs as; Sample ID, Sample Size (in.), Blow Count, Dry Density (pcf), Moisture (%)
3. Standard Penetration tests were performed in accordance with ASTM D 1586 using an automated drop system. Drill rods were 1 5/8-inch diameter "A"-rods; sampler was driven with brass liners.
4. Where indicated by an asterisk (*) the number of blows shown is for only that fraction of the initial 0.5 ft. "seating drive" interval penetrated.
5. If laboratory tests are not shown as being performed, the soil descriptions presented in the LOTB are based solely on the visual practices described in the before mentioned Manuals.
6. The length of each sampled interval is shown graphically on the boring log.
7. Consistency of soils shown in ( ) where estimated.
8. Groundwater surface (GWS) reflect the fluid level in the borings on the specified date. Groundwater surface is subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at any particular time.
9. Electronic media for plan view provided by San Joaquin County Public Works Department, August 2014.
11. The "Log of Test Borings" drawing is included with plans in accordance with Section 2-1.06B of Caltrans "Standard Specifications", 2010.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
10	SJ	C.R.	X.X/X.X		

REGISTERED ENGINEER — DATE

REGISTERED PROFESSIONAL ENGINEER — David J. Morrell — No. 60578 — Exp. 12/31/14 — CIVIL — STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of scanned copies of this plan sheet.

BLACKBURN CONSULTING
2491 BOATMAN AVENUE
WEST SACRAMENTO, CA 95691 FILE No. 2510.x 001

MARK THOMAS & COMPANY, INC.
7300 FOLSOM BLVD., SUITE 203
SACRAMENTO, CA 95826

BENCHMARKS

BENCHMARK# MH-230 ELEV. XX.XX NAVD XX
DESCRIPTION: X, NORTHING XX, EASTING XX.

X DESIGN OVERSIGHT XX/XX/XX SIGN OFF DATE	DRAWN BY M. ROBERTSON	K. A. CHAPMAN FIELD INVESTIGATION BY: DATE: MAY 2014	PREPARED FOR THE COUNTY OF SAN JOAQUIN DEPARTMENT OF PUBLIC WORKS	X PROJECT ENGINEER	BRIDGE NO. XXC-XXXX POST MILE XX.X
	CHECKED BY D. MORRELL				BUCKMAN ROAD BRIDGE AT NORTH FORK DUCK CREEK
					LOG OF TEST BORINGS

GS CIVIL LOG OF TEST BORINGS SHEET (ENGLISH) (REV. 7/16/10)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES

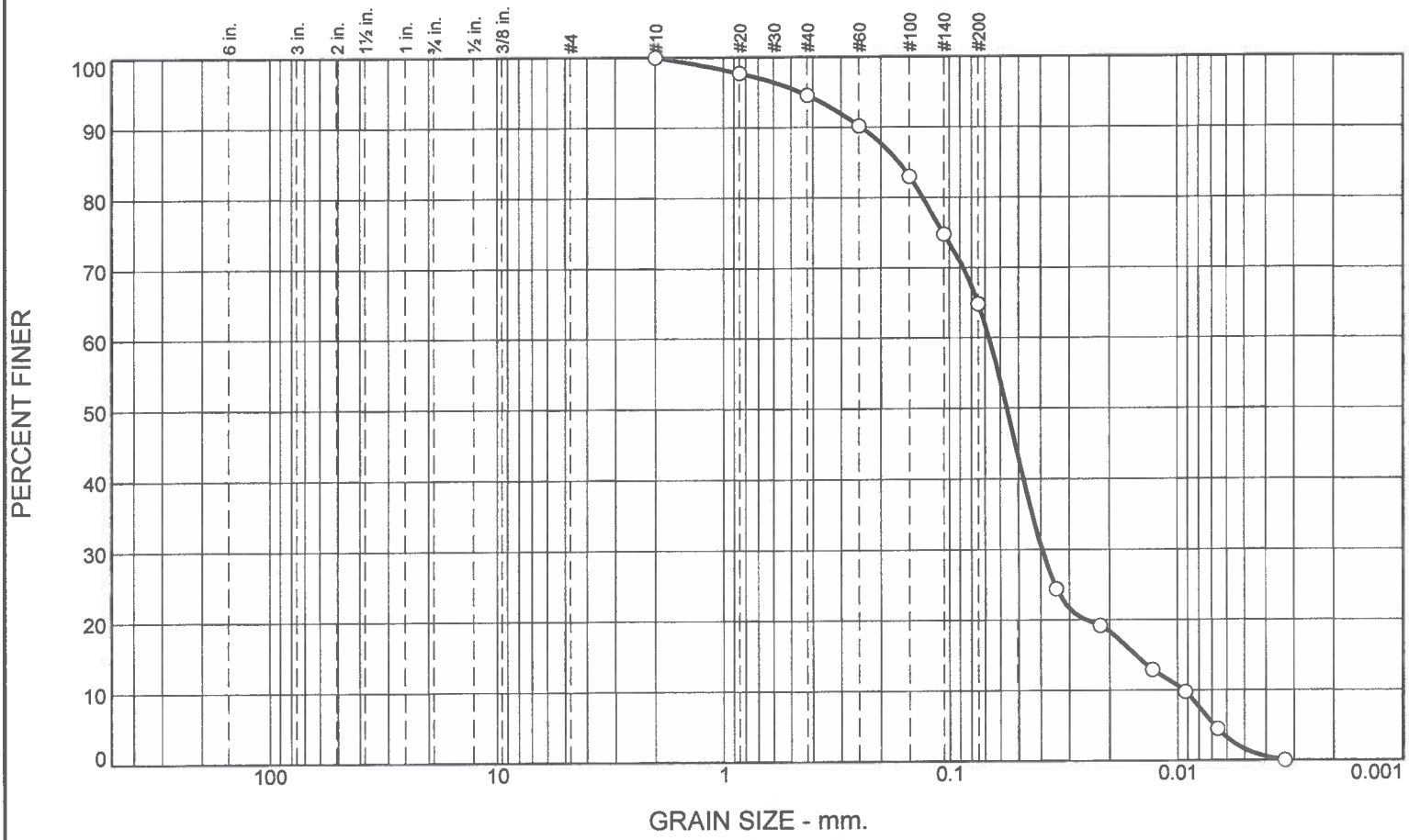
REVISION DATES		SHEET	OF
XX/XX/XX			

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME

8/20/2014 2510.x 001 Buckman Rd Bridge at NF Duck Crk LOTB.dwg

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.0	35.1	63.2	1.7	ML			

SIEVE inches size	PERCENT FINER ○		
	GRAIN SIZE		
D_{60}	0.0675		
D_{30}	0.0396		
D_{10}	0.0094		
	COEFFICIENTS		
C_c	2.47		
C_u	7.18		

SIEVE number size	PERCENT FINER ○
#10	100.0
#20	97.7
#40	94.6
#60	90.2
#100	83.0
#140	74.8
#200	64.9

Material Description
○ SANDY SILT, dark yellowish brown

REMARKS:
○

○ Source of Sample: R-14-002 Depth: 10.5-11.0' Sample Number: 3b

Blackburn Consulting

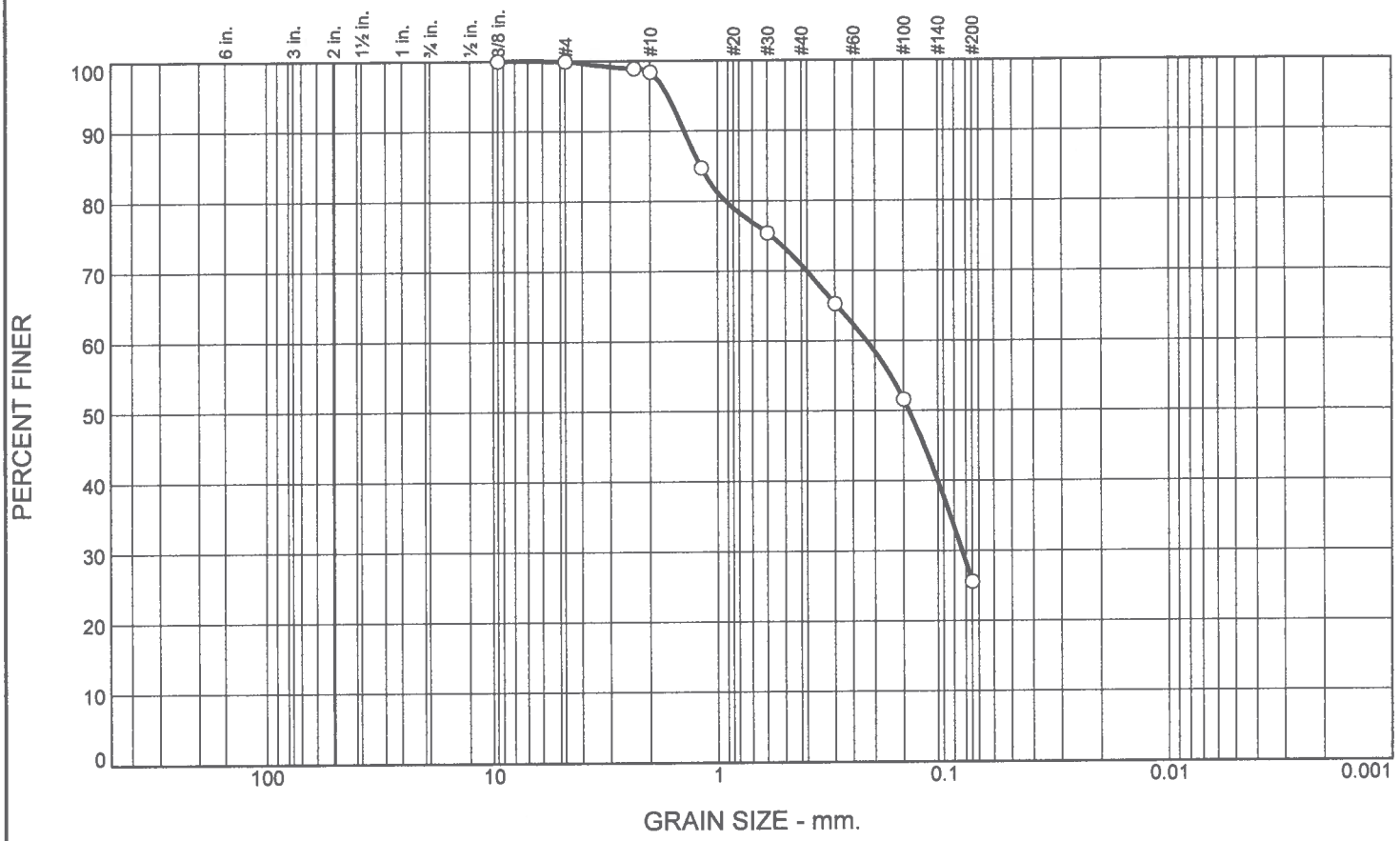
W. Sacramento, CA

Client: San Joaquin County

Project: Buckman Road Bridge Replacement - North Fork of Duck Creek

Project No.: 2510.X-001 Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PL	PI
○	0.0	0.1	74.3	25.6		SM			

SIEVE inches size	PERCENT FINER ○		
3/8"	100.0		
	GRAIN SIZE		
D_{60}	0.2179		
D_{30}	0.0832		
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○
#4	99.9
#8	98.9
#10	98.4
#16	84.7
#30	75.5
#50	65.3
#100	51.6
#200	25.6

Material Description
○ SILTY SAND, dark yellowish brown

REMARKS:
○

○ Source of Sample: R-14-002 Depth: 20.00'-20.5' Sample Number: 5b

Blackburn Consulting

W. Sacramento, CA

Client: San Joaquin County
Project: Buckman Road Bridge Replacement - North Fork of Duck Creek
Project No.: 2510.X-001 Figure

Appendix J Scour Analysis

Buckman Road Bridge Replacement Project
San Joaquin County, California
Ultimate (Contraction) Scour

100-year Flow
Calculation guideline from HEC-18 5th Edition
Input from HEC-RAS for Proposed Alternative x

Input

Equation 6.7:

$$\tau = \gamma \left(\frac{V_2 n}{K_u} \right)^2 y_o^{-1/3}$$

Variable	English Units		Metric Units		Description
τ	1.2525769	lb/ft^2	59.97371	N/m^2=Pa	initial shear stress for a specific flow
g	62.4	lb/ft^3	9800	N/m^3	unit weight of water (62.4 lb/ft^3 and 9800 N/m^3)
V_2	8.19	ft/s	2.496312	m/s	average velocity in contracted section
n	0.035		0.035		Manning's roughness coefficient
K_u	1.486		1		1.486 for U.S. Customary, and 1.0 for S.I.
y_o	6.37	ft	1.941576	m	Upstream flow depth
τ_c	0.0020885	lb/ft^2	0.1	N/m^2=Pa	Critical shear stress (from Figure 6.11)
CHECK	Contraction scour will occur				If initial shear stress exceeds critical value, then contraction scour will occur during that flow period, and the ultimate scour is computed from Equation 6.6.

Equation 6.6:

$$y_{s-ult} = 0.94 y_1 \left(\frac{1.83 V_2}{\sqrt{g y_1}} - \frac{K_u \sqrt{\frac{\tau_c}{\rho}}}{g n y_1^{1/3}} \right)$$

Variable	English Units		Metric Units		Description
y_1	6.4	ft	1.9	m	Upstream average flow depth
V_2	8.2	ft/s	2.5	m/s	Average velocity in contracted section
τ_c	0.0020885		0.1	N/m^2=Pa	Critical shear stress of channel bed material
n	0.035		0.035		Manning's roughness coefficient
K_u	1.486		1		1.486 for U.S. Customary, and 1.0 for S.I.
ρ	2.8	slugs/ft^3	1450	kg/m^3	Density of channel bed material (from 1250 to 1800)
g	32.2	ft/s^2	9.81	m/s^2	acceleration due to gravity
D_{50}			0.15	mm	grain size for which 50% of bed material is finer
y_{s_ult}	6.2	ft	1.9	m	Ultimate contraction scour

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
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Fax: 925.941.0018
www.wreco.com

Buckman Road Bridge Replacement Project
San Joaquin County, California
Local Scour at Abutments - Froehlich or HIRE

100-year Flow
Calculation guideline from HEC-18 5th Edition
Input from HEC-RAS for Proposed Alternative x

Units = (SI or English)	English	
g = acceleration due to gravity =	32.2	ft/s^2

Left Overbank = South Abutment (BB 12+76.0)

y1 = depth of flow at abutment on the overbank or in the main channel =	4.9	ft
L = length of embankment projected normal to flow =	11.3	ft
Ratio of projected embankment length to flow depth = L/y1 =	2.308E+00	
Abutment scour equation to be used =	Froehlich	

Froehlich's Live Bed Abutment Scour Equation

L' = length of active flow obstructed by the embankment =	8.0	ft
ya = average depth of flow on the flood plain =	2.45	ft
Ae = flow area of the approach cross section obstructed by the embankment =	19.6	ft^2
Ve = flow velocity =	2.6	ft/s
Qe = flow obstructed by the abutment and approach embankment = Ae * Ve =	51	ft^3/s
Fr = Froude Number of approach flow upstream of the abutment =	0.30	
Θ = abutment skew =	120	degrees
K1 = coefficient for abutment shape =	1	
K2 = coefficient for angle of embankment shape = (Θ/90)^0.13 =	1.04	
Ys = abutment scour = ya*(2.27*k1*k2*((L'/ya)^0.43)*(Fr^0.61)+1) =	**7.0**	**ft**

HIRE Live Bed Abutment Scour Equation

V = velocity of flow at upstream face of abutment =	2.6	ft/s
Fr = Froude Number = V/((g*y1)^.5) =	n/a	
Θ = abutment skew =	120	degrees
K1 = coefficient for abutment shape =	1	
K2 = coefficient for angle of embankment shape = (Θ/90)^0.13 =	n/a	
Ys = abutment scour = y1*(4*(Fr^0.33)*(K1/0.55)*K2) =	**n/a**	**ft**

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Buckman Road Bridge Replacement Project
San Joaquin County, California
Local Scour at Abutments - Froehlich or HIRE

100-year Flow
Calculation guideline from HEC-18 5th Edition
Input from HEC-RAS for Proposed Alternative x

Units = (SI or English)	English	
g = acceleration due to gravity =	32.2	ft/s^2

Right Overbank = North Abutment (EB 13+19.5)

y1 = depth of flow at abutment on the overbank or in the main channel =	2.2	ft
L = length of embankment projected normal to flow =	7.8	ft
Ratio of projected embankment length to flow depth =	3.619E+00	
Abutment scour equation to be used =	Froehlich	

Froehlich's Live Bed Abutment Scour Equation

L' = length of active flow obstructed by the embankment =	3.5	ft
ya = average depth of flow on the flood plain =	1.08	ft
Ae = flow area of the approach cross section obstructed by the embankment =	3.8	ft^2
Ve = flow velocity =	2.3	ft/s
Qe = flow obstructed by the abutment and approach embankment = Ae * Ve =	9	ft^3/s
Fr = Froude Number of approach flow upstream of the abutment =	0.39	
Θ = abutment skew =	60	degrees
K1 = coefficient for abutment shape =	1	
K2 = coefficient for angle of embankment shape = (Θ/90)^0.13 =	0.95	
Ys = abutment scour = ya*(2.27*k1*k2*((L'/ya)^0.43)*(Fr^0.61)+1) =	**3.3**	**ft**

HIRE Live Bed Abutment Scour Equation

V = velocity of flow at upstream face of abutment =	2.3	ft/s
Fr = Froude Number = V/((g*y1)^.5) =	n/a	
Θ = abutment skew =	60	degrees
K1 = coefficient for abutment shape =	1	
K2 = coefficient for angle of embankment shape = (Θ/90)^0.13 =	n/a	
Ys = abutment scour = y1*(4*(Fr^0.33)*(K1/0.55)*K2) =	**n/a**	**ft**

Appendix K Rock Slope Protection Analysis

Buckman Road Bridge Replacement Project

San Joaquin County, California

Streambank Rock Slope Protection

Calculation guideline from Caltrans Highway Design Manual

Input from HEC-RAS for Proposed Condition

100-year Flow

Input

Location along stream:	Upstream	Upstream Face	Downstream Face	Downstream		
V_{avg}	8.4	8.4	8.6	8.6	ft/s	Average channel velocity
g	32.2	32.2	32.2	32.2	ft/s^2	Acceleration due to gravity
Depth based on	Average	Average	Average	Average		Average Local
y	7.1	7.1	6.9	6.9	ft	Local depth of flow (toe of slope is typically used for bank revetment applications; average channel depth can be used)
S_f	1.1	1.1	1.1	1.1		Safety factor (typically = 1.1)
C_s	0.3	0.3	0.3	0.3		Stability coefficient (for blanket thickness $1.5d_{50}$ or d_{100}, whichever is greater) = 0.30 for angular rock
Cross section location:	Straight channel	Straight channel	Straight channel	Straight channel		Straight cha Inside of be Outside of b Downstrean End of dike
C_v	1.00	1.00	1.00	1.00		Velocity distribution coefficient (1.0 for straight channels or the inside of bends;
For outside of bends, need R_c and W:						
R_c	100.0	100.0	100.0	100.0	ft	Centerline radius of curvature of channel bend
W	1.0	1.0	1.0	1.0	ft	Width of water surface at upstream end of channel bend
C_t	1.0	1.0	1.0	1.0		Blanket thickness coefficient = 1.0
S_g	2.65	2.65	2.65	2.65		Specific gravity of stone (2.5 minimum)
Type of channel:	Trapezoidal	Trapezoidal	Trapezoidal	Trapezoidal		Natural Trapezoidal
V_{des}	8.4	8.4	8.6	8.6	ft/s	Characteristic velocity for design; depth-averaged velocity at a point 20% upslope from the toe of revetment
K_1	0.72	0.72	0.72	0.72		Side slope correction factor
q	33.7	33.7	33.7	33.7	degrees	Bank angle
SS	1.5	1.5	1.5	1.5		Side slope (horizontal to 1 vertical); 1.5 or flatter.
D_{30}	0.4	0.4	0.5	0.5	ft	Particle size for which 30% is finer by weight
D_{50}	0.5	0.5	0.6	0.6	ft	Particle size for which 50% is finer by weight
	Class I	**Class I**	**Class II**	**Class II**	**RSP Class**	**[Select the next larger size class.]**

Buckman Road Bridge Replacement Project

San Joaquin County, California

Rock Slope Protection Calculations for Abutments

Calculation guideline from HEC-23 3rd Edition

Input from HEC-RAS for Proposed Condition

100-year Flow

Location	Upstream	Upstream Face	Downstream Face	Downstream	
V	8.4	8.4	8.6	8.6	ft/s
g	32.2	32.2	32.2	32.2	ft/s^2
y	7.1	7.1	6.9	6.9	ft
Fr	0.55	0.55	0.58	0.58	
Equation	**Isbash**	**Isbash**	**Isbash**	**Isbash**	

For Froude Numbers $(V/(gy)^{1/2})<=0.80$, Isbash relationship (Equation 14.1)

$$D_{50} = \frac{yK}{(S_s - 1)}\left[\frac{V^2}{gy}\right]$$

y	7.1	7.1	6.9	6.9	depth of flow in the contracted bridge opening, ft
K	1.02	1.02	1.02	1.02	1.02 for vertical wall abutment, 0.89 or for spill-through abutment
S_s	2.65	2.65	2.65	2.65	specific gravity of rock
V	8.4	8.4	8.6	8.6	average velocity in contracted section, ft/s
g	32.2	32.2	32.2	32.2	gravitational acceleration, ft/s^2
D_{50}	1.3	1.3	1.4	1.4	median stone diameter, ft
D_{50}	16.1	16.1	17.0	17.1	median stone diameter, inches
	Class V	Class V	Class V	Class V	rock class

For Froude Numbers $(V/(gy)^{1/2})>0.80$, Equation 14.2

$$D_{50} = \frac{yK}{(S_s - 1)}\left[\frac{V^2}{gy}\right]^{0.14}$$

y	7.1	7.1	6.9	6.9	depth of flow in the contracted bridge opening, ft
K	0.69	0.69	0.69	0.69	0.61 for spill-through abutment, 0.69 or for vertical wall abutment
S_s	2.65	2.65	2.65	2.65	specific gravity of rock
V	8.4	8.4	8.6	8.6	average velocity in contracted section, ft/s
g	32.2	32.2	32.2	32.2	gravitational acceleration, ft/s^2
D_{50}	N/A	N/A	N/A	N/A	median stone diameter, ft
D_{50}	N/A	N/A	N/A	N/A	median stone diameter, inches
					rock class

APPENDIX H:

AIR QUALITY

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> Buckman Road Bridge

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.88	9.61	9.10	0.60	0.40	0.21	0.38	0.34	0.04	0.03	2,542.57	0.58	0.11	2,590.83
Grading/Excavation	7.36	63.86	74.49	3.28	3.08	0.21	2.79	2.74	0.04	0.17	16,165.27	4.68	0.30	16,370.53
Drainage/Utilities/Sub-Grade	5.17	45.83	51.14	2.28	2.08	0.21	1.94	1.90	0.04	0.11	10,441.23	2.71	0.12	10,545.12
Paving	0.89	12.86	8.81	0.44	0.44	0.00	0.38	0.38	0.00	0.02	2,348.69	0.56	0.08	2,386.50
Maximum (pounds/day)	7.36	63.86	74.49	3.28	3.08	0.21	2.79	2.74	0.04	0.17	16,165.27	4.68	0.30	16,370.53
Total (tons/construction project)	0.16	1.47	1.65	0.07	0.07	0.01	0.06	0.06	0.00	0.00	353.99	0.10	0.01	358.25

Notes:

Project Start Year ->	2024
Project Length (months) ->	3
Total Project Area (acres) ->	1
Maximum Area Disturbed/Day (acres) ->	0
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	67	0	120	0	200	40
Grading/Excavation	111	5	180	30	1,120	40
Drainage/Utilities/Sub-Grade	0	0	0	0	720	40
Paving	0	33	0	60	320	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Buckman Road Bridge

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39	0.00	0.00	7.76
Grading/Excavation	0.10	0.84	0.98	0.04	0.04	0.00	0.04	0.04	0.00	0.00	213.38	0.06	0.00	196.04
Drainage/Utilities/Sub-Grade	0.06	0.53	0.59	0.03	0.02	0.00	0.02	0.02	0.00	0.00	120.60	0.03	0.00	110.49
Paving	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.63	0.00	0.00	10.72
Maximum (tons/phase)	0.10	0.84	0.98	0.04	0.04	0.00	0.04	0.04	0.00	0.00	213.38	0.06	0.00	196.04
Total (tons/construction project)	0.16	1.47	1.65	0.07	0.07	0.01	0.06	0.06	0.00	0.00	353.99	0.10	0.01	325.00

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.