

**DRAFT SUPPLEMENTAL
ENVIRONMENTAL ASSESSMENT**

**AMERICAN RIVER WATERSHED COMMON FEATURES
NATOMAS BASIN PROJECT
REACH D
SUTTER COUNTY, CALIFORNIA**

AUGUST 2017



**US Army Corps
of Engineers**

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Prepared by the Lead Federal Agency:

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

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Acronyms and Abbreviations

2010 EIS/EIR	Environmental Impact Statement/Environmental Impact Report on the American River Watershed Common Features Project/Natomas Post-authorization Change Report /Natomas Levee Improvement Program, Phase 4b Landside Improvements Project
ADT	average daily traffic
AADT	average daily traffic
APE	area of potential effects
BMPs	Best Management Practices
CAAQS	California Ambient Air Quality Standards
CAR	Fish and Wildlife Coordination Act Report
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDDB	California Natural Diversity Database
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
Common Features Project	American River Common Features Project
Corps	U.S. Army Corps of Engineers
cy	cubic yards
CVFPB	Central Valley Flood Protection Board
dBA	A-weighted decibels
DPS	distinct population segment
DWR	Department of Water Resources
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Engineering Manual
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FRAQMD	Feather River Air Quality Management District
GGS	giant garter snake
GHG	greenhouse gas
I-5	Interstate 5
I-80	Interstate 80
JFP	Joint Federal Project
lbs	pounds

Ldn	day-night sound level
LOS	level of service
MIAD	Mormon Island Auxiliary Dam
MRL	Marysville Ring Levee
NAAQS	National ambient air quality standards
NCC	Natomas Cross Canal
NEMDC	Natomas East Main Drain Canal
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLIP	Natomas Levee Improvement Program
NMFS	National Marine Fisheries Service
NO _x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
O&M	operation and maintenance
PA	Programmatic Agreement
PG&E	Pacific Gas & Electric Company
PGCC	Pleasant Grove Creek Canal
PL	Public Law
PM ₁₀	particulate matter 10 micrometers or less
PM _{2.5}	particulate matter 2.5 micrometers or less
ppm	parts per million
RD 1000	Reclamation District No. 1000
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SAFCA	Sacramento Area Flood Control Agency
SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Officer
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO _x	sulfur oxides
SPCP	Spill Prevention and Countermeasure Plan
SR	State Route
SRBPP	Sacramento River Bank Protection Project
SRBPP	Sacramento River Bank Protection Project
SWPPP	Storm Water Pollution Prevention Plan
TNBC	The Natomas Basin Conservancy
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VELB	valley elderberry longhorn beetle
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act

1.0 PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The U.S. Army Corps of Engineers (Corps) proposes to construct levee improvements and modifications along portions of Reach D of the American River Common Features Project, Natomas Basin, which is located on the Natomas Cross Canal (NCC) south levee (Plate 1). Portions of Reach D that remain to be constructed include windows located at the former Bennett and Northern Main Pumping Plants, Pumping Plant 4, and the Vestal Drain relocation. The purpose of this proposed action is to continue the implementation of levee improvements constructed in 2007-2010 as a part of SAFCA's Natomas Levee Improvement Program (NLIP) necessary to bring the levee into conformance with current Corps requirements and construct the Federally authorized project.

The project design would reduce flood risk in this section of levee by meeting the requirements as defined by: (1) current design criteria used to certify levees as providing 100-year flood protection under regulations adopted by the Federal Emergency Management Agency (FEMA); (2) design criteria under the Corps Engineering Manual (EM) 1110-2-1913; and (3) current authorization from Congress in Section 7002 of Water Resources Reform and Development Act (WRRDA) of 2014 (Public Law 113-121).

1.2 Location of the Project Area

The proposed work is located in Sutter County and is the northernmost reach of the Natomas Basin. The Natomas Basin is bordered on the north by the Natomas Cross Canal (NCC), which is a 5.3-mile channel carrying water from several tributary watersheds in Placer and Sutter counties to the Sacramento River. Reach D is located along the NCC, beginning at the intersection of Sankey Road and Garden Highway near the confluence of the NCC and the Sacramento River and continuing northeast to the intersection of Howsley Road and the Pleasant Grove Creek Canal (PGCC) east of State Route 99 (SR 99) (Plate 2).

1.3 Background and Need for Action

The American River Common Features Project (Common Features Project) is a cooperative effort among local, State, and Federal agencies to increase the level of flood protection for the city of Sacramento and surrounding areas located along both banks of the American River, as well as sections along the Sacramento River east levee. The Natomas Basin includes portions of Sacramento and Sutter Counties as well as a portion of the City of Sacramento, California. The Natomas Basin is protected by 42 miles of levee, which almost completely encircles it. These levees are along the Sacramento and American Rivers, the NCC, the PGCC, and the Natomas East Main Drainage Canal (NEMDC). The Natomas Basin levees are divided into nine reaches (Plate 1), and identified as Reaches A – C on the Sacramento River, Reach D on the NCC, Reach E on the PGCC, Reaches F – H on the NEMDC, and Reach I on the American River. The Reach D levee is part of a system owned by Reclamation District No. 1000 (RD 1000) and the Central Valley Flood Protection Board (CVFPB), operated and maintained by RD 1000, and locally represented by SAFCA.

The original construction of the south levee along the NCC began in 1909. Between 1912 and 1914, clamshell dredges were used to construct the drainage canal known as the NCC. Excavated dredge spoils consisting of several soil types, including clays, silts and sands, were shaped into levee configuration with a crest width of 20 feet. In the past 30 years, four flood events in the winter months of 1986, 1995, 1997, and 2006 resulted in high-water conditions in the Reach D project area. A slide occurred on the landside of the NCC south levee in 1983 and another in 1986, not far south of SR 99. The Corps, Sacramento District, repaired the slides along a 300-linear-foot section of the levee under emergency repair authority (Public Law [PL] 84-99) in 1987. Additionally, in 1996, SAFCA constructed three stability berms along the landside of the NCC. Pencil boils were reported in 1997 and 2006, but no other seepage problems have been documented. Following the 2006 high-water event, a portion of the waterside slope of the levee slumped. This area was repaired by RD 1000 in 2006. These major storms raised concerns over the adequacy of the existing flood control system, which led to a series of investigations of the need to provide additional protection for the Natomas Basin.

In 1996, the Corps and CVFPB completed the Supplemental Environmental Impact Statement/Environmental Impact Report for the American River Watershed Investigation Feasibility Study (USACE, 1996) and the Chief of Engineers deferred a decision on a comprehensive flood control plan. However, the Chief recommended the features common to the proposed plans be authorized as a comprehensive flood control plan for the greater Sacramento area. Congress authorized these “common features” in the Water Resources Development Act (WRDA) of 1996. Under Section 366 of WRDA 1999, numerous modifications to the Common Features Project along the Lower American River and in the Natomas Basin were authorized.

SAFCA implemented the NLIP between 2007 and 2010 to improve levees surrounding the Natomas Basin. The NLIP included multiple phases of construction along the NCC and Sacramento River and the western edge of the Natomas Basin. Work consisted of the raising of non-compliant levees, installing cutoff walls and seepage berms, and flattening landside slopes. Phase 1 (2007) and Phase 1B (2008) included the construction of 5,300 linear feet of cutoff walls in a portion of the levee at Reach D, except for a portion of the levee located at the Bennett Pumping Plant, resulting in a “window” in the cutoff wall at this location. NCC South Levee Phases 2 and 2B, constructed in 2009 and 2010, extended the cutoff wall throughout the reach, excluding Northern Main Pumping Plant, which resulted in an additional window at this location.

On October 22, 2010, the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on the American River Watershed Common Features Project/Natomas Post-authorization Change Report /Natomas Levee Improvement Program, Phase 4b Landside Improvements Project (2010 EIS/EIR) was finalized, and is incorporated by reference in this document. This EIS/EIR was used to support Congressional approval of the Corps' Common Features/Natomas Post-authorization Change Report. The 2010 EIS/EIR evaluated potential impacts from the construction of the project under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The 2010 document evaluated

impacts associated with the construction of Reaches A, B, D, E, F, G, H, and I, the windows remaining in Reaches B, C, and D, and the relocation of the Vestal Drain as part of Reach D.

The Natomas Basin Project was authorized in 2014, allowing the Corps to complete the construction of the Natomas Basin levee improvements that SAFCA initiated. Construction of the Reach D Project is anticipated to begin in the spring of 2018. Vestal Drain excavation and other ground-breaking work must begin after May 1, 2018, to accommodate the giant garter snake (GGS) work window (Special Status Species, Section 3.2.2). The levee must be floodworthy by November 2018; however, landside work on Pumping Plant 4 would continue into 2019.

1.4 Authority

The proposed levee work is part of the ongoing Common Features Project. The Common Features Projects encompass several actions under two authorizations: the WRDA of 1996 (PL No. 104-303, § 101[a][1], 110 Stat. 3658, 3662-3663), and the WRDA of 1999 (PL No. 106-53, § 366, 113 Stat. 269, 319-320). Authorization for the expanded Natomas Basin Project was provided by Section 7002 of WRRDA 2014 (PL 113-121).

1.5 Purpose of the SEA

After the EIS/EIR was completed in 2010 and the project was authorized in 2014, the overall design was refined and several updates have been made during the preconstruction engineering and design phase of the project. Modifications to the design of Reach D warranted an additional NEPA analysis to fully evaluate this project. Overall changes to the design increased impacts in the project area to a level that would require additional mitigation to reduce impacts to less than significant. This SEA (1) describes the existing environmental resources in the project area; (2) evaluates the environmental effects of the alternatives on these resources; and (3) identifies measures to avoid or reduce any effects to a less-than-significant level where practicable. This SEA has been prepared in accordance with NEPA.

1.6 Decisions Needed

The District Engineer, commander of the Corps, Sacramento District, must decide whether the proposed project qualifies for a Finding of No Significant Impact (FONSI) under NEPA or whether a supplemental EIS must be prepared due to potentially significant environmental impacts. SAFCA is preparing a Mitigated Negative Declaration under CEQA. This document will be included in the Final SEA.

2.0 ALTERNATIVES

2.1 Alternatives Considered But Eliminated from Further Consideration

Numerous alternatives have been considered by the Corps and SAFCA to reduce flood risk in the Natomas Basin. These alternatives were evaluated and eliminated from further consideration during the completion of previous NLIP environmental documents. The

alternatives either were not economically feasible or were not capable of meeting the current Corps standards or the 200-year State-mandated flood protection levels for urban or urbanizing areas.

The following alternatives were reviewed and eliminated from further consideration:

- **Yolo Bypass Improvements.** This measure would involve lengthening the Fremont Weir and widening the Yolo Bypass to decrease the amount of flood water conveyed through the Sacramento River channel downstream of the weir. This alternative may be considered in future projects, but was eliminated from this evaluation.
- **Reduced Natomas Urban Levee Perimeter.** A cross levee running east to west across the Natomas Basin along the alignment north of Elkhorn Boulevard would be constructed to protect existing developed areas in the City and County of Sacramento. This alternative may be considered in future projects, but was eliminated from this evaluation.
- **No SAFCA Levee Improvements – Private Levees in Natomas.** Private developers would be forced to separately fund and implement individual flood damage reduction in form of private compartment levees protecting new developments.
- **Natomas 100-Year Protection.** A new assessment district would be created to provide only 100-year (0.01 Annual Exceedance Probability [AEP]) flood protection, using funding raised through a Capital Assessment District Number 3 to provide the local share of the cost.
- **No-Action Alternative – Airport Compartment Levee.** The Sacramento International Airport would be compelled to operate within its existing footprint, abandoning current plans for expansion or forced to construct a limited flood damage reduction structure, such as a ring levee.
- **Cultural Resources Impact Reduction Alternative.** Construction of a 500-foot-wide seepage berm rather than deep cutoff walls would avoid the deep ground-disturbing work that may adversely affect buried cultural resources, while achieving flood damage reduction.
- **Upstream Transitory Storage.** The acquisition of storage basins and construction of intake/discharge structures and perimeter levees would be required to increase downstream benefits without levee raising and strengthening of the Natomas Basin.

A more detailed evaluation of alternatives for the NLIP can be found in the 2010 EIS/EIR.

2.2 Alternative 1 - No Action

NEPA requires that the Federal lead agency (Corps) analyze a “no action” alternative that establishes the benchmark to compare the effects of the action alternatives.

No Action Alternative

Under the No Action Alternative, the Reach D Project would not be constructed. Under this scenario, key segments of this system would continue to provide less than 100-year (0.01 AEP) flood risk reduction and the entire Natomas Basin would be permanently designated as a FEMA special flood hazard area. With this designation, the Natomas area would be subject to development restrictions and mandatory flood insurance requirements pursuant to the regulations of the National Flood Insurance Program.

Woody Vegetation Removal. Even without construction of the Reach D Project, a substantial number of trees and shrubs may need to be removed from the waterside of the existing levees to meet Corps requirements, as described in *Guidelines for Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams* (USACE 2000). As part of its ongoing operation and maintenance (O&M) activities, RD 1000 would be initially responsible for removal of any encroachments that would threaten levee integrity. Along the NCC south levee, woody vegetation on the lower half of the waterside levee slope would be eligible for a variance from the Corps' levee vegetation guidance. However, without a variance, woody vegetation would need to be removed from the waterside in a worst-case scenario.

Potential Levee Failure. All phases of the NLIP must be implemented to reduce the risk of levee failure. Wind and wave run-up or seepage conditions could cause portions of this system to fail, triggering widespread flooding and extensive damage to the Basin's existing residential, commercial, agricultural and industrial structures. Extensive damage to utilities, roadways and other infrastructure systems would also likely occur. According to levee failure modeling conducted by the Sacramento County Department of Water Resources (DWR), a levee failure in just about any portion of the Natomas Basin could result in nearly complete inundation of the Basin with water level depths that could average 10 to 20 feet, and potentially reach over 30 feet in some areas (DWR 2008). The location of the levee breach, severity of the storm, and river flows at time of a potential levee failure would affect the magnitude of the flood damage. Bennett and Northern Windows are now low points in the NCC south levee and at a time of high flow could be direct overflow point into the Natomas Basin.

In the reasonably foreseeable future, it is possible that CVFPB or SAFCA would pursue levee repairs without Federal funding. This future foreseeable alternative would be evaluated separately for environmental effects if and when this future project is proposed. For the purpose of evaluating effects, it is assumed that a future project similar to the proposed project described in this document would not be implemented due to uncertainties in funding, authorization, and other approvals. Therefore, the no action alternative is evaluated as though no levee repair or strengthening would be built.

Assuming that no levee repair or strengthening would occur under the no-action alternative, the levees described in this document would not meet the current standards in EM 1110-2-1913 for Corps levees. The levees would continue to be operated and maintained by local levee maintenance districts. During flood events, the project sites would remain a potential hazard for levee underseepage. Excessive underseepage could undermine the integrity of the levees, and could lead to emergency flood-fighting activities to help prevent flooding in the

possible event of levee failure. Federal and State floodplain regulations would effectively prevent most new development throughout the Natomas Basin. Existing residential, commercial, and industrial development would continue to be concentrated in the southeastern portion of the Basin, south of Elkhorn Boulevard, occupying approximately one-third of the 53,000 acres encompassed by the perimeter levee system. The Basin's existing structures and developments, with a replacement value of approximately \$8.2 billion, would remain subject to a relatively high risk of flooding.

2.3 Alternative 2 – Reach D Project Construction

This section describes the features, construction details, staging and stockpile areas, borrow and disposal sites, construction workers and schedule, and O&M requirements for the Reach D Project.

2.3.1 Features of the Proposed Project

The levees in the Natomas Basin Reach D project area currently do not meet Corps criteria for seepage and slope stability. To reduce the risk of underseepage, abandoned pipes currently located through the levee at the former Northern Main and Bennett Pumping Plants would be removed. Abandoned power poles previously associated with the Bennett Pumping Plant would be removed and two existing power poles would be relocated by Pacific Gas and Electric (PG&E) Company. The existing Vestal Drain would be relocated 250 feet landward from its current location at the levee toe to reduce seepage of water from the NCC to the Vestal Drain, which could compromise the integrity of the levee. Upgrades to Pumping Plant 4 would include raising discharge and intake pipes, installing larger horsepower motors and higher head pumps, and constructing a new pump plant to house the new pumps and more effectively transfer flood waters into the NCC.

2.3.2 Construction Details

Bennett and Northern Main Pumping Plant Windows

The former Bennett and Northern Main Pumping Plants were abandoned after the completion of the SAFCA cutoff wall in 2007. It has since been determined that the gaps in the cutoff wall in these areas are small enough to not have significant seepage issues; however, the structures associated with the former pump plants must be removed in these levee sections (Plates 3 and 4). Structures to be removed include pipes through the levee, concrete sump and valve box structures, and three power poles formerly associated with the pumping plants. Additionally, in order to facilitate the construction, two additional power poles would be relocated by PG&E. These poles would be removed and relocated prior to project construction at the former Bennett Pumping Plant (Plate 5).

Abandoned pipes associated with the former Northern Main and Bennett Pumping Plants would be removed by temporarily degrading the levee, removing the pipes, and reconstructing the levee with appropriate compacted fill. To reduce the amount of in-channel work, the valve box structures at the waterside toe of the levee would be left in place due to their function as

retaining walls. It has been proposed that these valve box structures would be filled with a rock rip-rap material and the concrete sidewalls adjusted to grade (Plate 6). Additional rock would be placed in the NCC channel at the waterside toe to prevent further erosion on the steep banks. Waterside ramps would be removed to match the new waterside slope after the removal of the intake structures. The demolition and removal of remaining plant pipes and facilities at both Bennett and Northern Main Windows would be followed by the re-grading and raising of the levee crown alignment to match the adjacent levee sections constructed by SAFCA. Cutoff walls would not be installed at the Bennett and Northern Main Windows as removing the pipes, raising the levee and relocating the Vestal Drain would reduce the seepage path in these windows.

Pumping Plant 4

Outlet pipes at Pumping Plant 4 need to be raised to meet current Corps standards. To raise the outlet pipes to the appropriate elevation, the levee would be partially degraded to expose and remove the three existing 48-inch diameter pipes. Once the existing pipes have been removed, the levee would be partially rebuilt, new pipes installed on the partially rebuilt levee, and approximately three feet of material would be placed on top of the new pipes to complete the levee construction. In addition to the new pipes, a new outfall structure would be constructed on the waterside of the levee. The outfall structure would be constructed out of concrete and riprap in order to withstand water velocities exiting the pumping plant discharge pipes.

In addition to the raised pipes and outfall structure, the building that houses the pumps would be removed and replaced. The existing Pumping Plant 4 building is currently located in a low area that floods during heavy rain, and the new pump platform would be raised approximately three feet. Additional modifications to the existing Pumping Plant 4 include new trash rakes, a two-way trash rack access ramp, a storm drainage system, a new electrical building and transformer, and an enclosed yard to protect the pumps and the electrical building from vandalism (Plate 7).

Vestal Drain

The Vestal Drain is a feature that is designed to take storm water runoff from the surrounding agricultural fields and transport this water to Pumping Plant 4, which would then pump the water into the NCC. The existing Vestal Drain is located along the seepage path of the levee along the NCC, from approximately 1,500 feet east of Garden Highway to its connection with Pumping Plant 4, a length of approximately 1.5 miles (Plate 8). In order to reduce seepage along Reach D, the existing Vestal Drain would be relocated from its current position adjacent to the landside toe of the levee to a new alignment south of the Sankey Canal, approximately 250 feet southward from its current alignment. The new Vestal Drain would be between 8- to 20-foot-wide at the bottom and have 3H:1V side slopes, and would cross under the existing Bennett Irrigation Canal to connect into the existing North Drainage Canal near Pumping Plant 4 using box culverts. Material excavated from the new Vestal Drain alignment would be temporarily stockpiled until the new drain is completed. After construction of the new Vestal Drain, the water from the existing Vestal Drain would be diverted into the new drain. Once all water has

been diverted and the existing drain is dry (approximately two weeks), the old Vestal Drain would be filled in using the stockpiled excavated material.

Access and Staging

A combination of existing ramps and temporary ramps would be used during the construction of the project. The two existing landside ramps from the levee crown to the landside levee toe patrol road would be lengthened at the Bennett site to maintain maximum slopes of 10% due to the increased elevation of the levee. The remaining ramps at the Bennett and Northern Main sites would be regraded to match the new waterside slope after removal of the intake structures. The existing maintenance road on the landside levee toe would be widened to a minimum width of 12 feet, and would be raised approximately two feet above the adjacent grade in order to comply with Corps criteria.

There are several proposed staging areas for the construction of the project. These staging areas are described below and are shown on Plate 9.

- The main project staging area would be located on the landside of the levee near where Garden Highway crosses Sankey Road. This staging area is approximately 4 acres in area, and would likely contain construction trailers and equipment.
- The area between the existing Vestal Drain and the levee is proposed as a stockpile area for the material excavated from the new Vestal Drain alignment. This staging area is approximately 3.5 acres in area.
- The areas immediately adjacent to the Northern Main, Bennett, and Pumping Plant 4 sites would be used as staging areas for material and construction vehicles and equipment. These three staging areas would encompass approximately 9 acres in total.

During construction, haul trucks would be limited to the maintenance roads located on the landside toe of the levee and to the project right-of-way along the new Vestal Drain. It is assumed that the haul routes used to transport soil and materials to and from the project site would use SR 99, Interstate 5 (I-5), Howsley Road, and potentially Interstate 80 (I-80).

Site Preparation

Before the start of construction, construction areas would be fenced off to limit access, as appropriate. Construction fencing would be installed on the landside of the project site and along the boundary of the access/haul road at the waterside toe for site safety and security.

Prior to general site grading, approximately 3 to 6 inches of surface material would be stripped over the length of the new Vestal Drain alignment to remove existing vegetation, organic topsoil, and any debris. The vegetation and debris material would be disposed of in an approved commercial disposal site outside the construction limits. The organic topsoil would be stockpiled onsite for use in finish grading of the project site. Deeper stripping or grubbing may be required where concentrations of organic soils or tree roots are encountered during site grading. Where appropriate, trees would be protected in place. Pipe removal at Bennett,

Northern Main, and Pumping Plant 4 sites would require the removal of a total of approximately 40,000 cubic yards (cy) of material, including approximately 5,700 cy of topsoil. Material that is determined to be unsuitable for reuse on-site would be disposed of by the contractor at a State-approved, licensed, and permitted facility.

Restoration and Cleanup

Once the levee work is completed, all equipment and excess materials would be transported offsite via local roads and regional highways. The staging areas and barren earthen and levee slopes would be reseeded with native grasses to promote re-vegetation and minimize soil erosion. The borrow site would be finish graded to allow rice cultivation, similar to the process followed during implementation of the NLIP. The levee crown, access ramps, and maintenance roads would be topped with aggregate base rock. Any damage to roads or other access routes from construction activities would be repaired. Finally, the work sites and staging areas would be cleaned of all rubbish, and all parts of the work area would be left in a safe and neat condition.

2.3.3 Borrow and Disposals Sites

The Brookfield site, analyzed in the 2010 EIS/EIR, would be used as a source for borrow material. The Brookfield site is located in the northeast corner of the Natomas Basin and has an area of approximately 5 acres (Plate 10). Existing soil stockpiles on the site, as well as field excavation of depths between 5 and 6 feet, would yield approximately 50,000 cy of material. This material would be transported from the Brookfield site to construction areas along Reach D, requiring a haul route of no more than 6 miles to get to the southern portion of Reach D. Aggregate material would come from commercial sources up to 30 miles away.

Excavation of the new Vestal Drain would generate approximately 130,000 cy of material, which is the estimated quantity required for the filling of the existing Vestal Drain, including channel backfill, overbank grading, and material shrinkage. The excavated material would be temporarily stockpiled on-site until the new Vestal Drain is complete and the flows are diverted into the new channel.

The contractor is responsible for determining the location of a commercial disposal site outside the construction limits. It must be permitted and meet environmental standards as specified in the contract, as well as approved by the Corps. There are three landfills within 15 to 30 miles from the project area, including the North Area Recovery Station in Sacramento County, the Western Regional Sanitary Landfill in Sutter County, and the Yolo County Central Woodland. All listed disposal areas accept commercial and hazardous wastes.

2.3.4 Construction Workers and Schedule

An estimated 10 to 20 workers would be onsite each day during construction. These workers would access the area via regional and local roadways, and park their vehicles in one of the proposed staging areas. Construction would be performed during daytime hours only no earlier than 7:00 a.m. and no later than 10:00 p.m. Equipment warm-up is inclusive of these

hours. Haul roads that pass near residences would be restricted to daytime hours between 7:00 a.m. to 6:00 p.m. Monday through Friday, and 8:00 am to 5:00 p.m. on Saturdays. No hauling past residences would be permitted on Sundays and holidays unless permission has been applied for and granted by Sutter County. Construction would begin in May 2018 and continue through fall 2019.

2.3.5 Operation and Maintenance

After construction is completed, the non-Federal sponsors, CVFPB and SAFCA, would be responsible for O&M, including repair, rehabilitation, and replacement of all project features. CVFPB and SAFCA would transfer these responsibilities to RD 1000 to operate and maintain the levee, as well as the facilities associated with Pumping Plant 4 and the Vestal Drain, similar to the existing O&M responsibilities. Regular maintenance activities include mowing and herbicide treatments for aggressive invasive species on the levee slopes, controlling rodents, clearing the maintenance road, and inspecting the levee. An amendment to the existing Sacramento River Flood Control Project O&M Manual would include the new facilities associated with Pumping Plant 4 and the realigned Vestal Drain. All O&M activities would remain consistent with Corps guidance and the existing O&M manuals.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environmental resources in the project area, as well as potential environmental impacts of the alternatives on those resources.

3.1 Environmental Resources Not Evaluated in Detail

Initial evaluation of the effects of the project indicated that there would likely be little to no effect on several resources. These resources are discussed below to add to the overall understanding of the project area.

3.1.1 Aesthetics and Visual Resources

Aesthetic resources must be considered along with other natural resources. Aesthetic resources are those natural resources, landforms, vegetation, and manmade structures in the environment that generate one or more sensory reactions and evaluations by the observer, particularly in regard to pleasurable response. These sensory reactions are traditionally categorized as pertaining to sight, sound, and smell. Aesthetic quality is the significance given to aesthetic resources based on the intrinsic physical attributes of those specific features and recognized by public, technical, and institutional sources. The identification of scenic resources in the landscape requires a process that identifies the relevant visual features and that is derived from established Federal procedures. Visual quality is influenced by many landscape features including geologic, hydrologic, botanical, wildlife, recreational, and urban characteristics.

The areas along the NCC south levee are rural and agricultural. The surrounding lands are almost entirely flat, and there are few trees in the landscape, except those along the waterside

portion of channel, in widely spaced woodland areas a distance from the land side of the levee, and near residences. Views of these areas lack vividness, but the visual components of the agricultural landscape are largely uninterrupted by built features. Views of the NCC south levee areas are, therefore, intact and unified. There are no major roadways along these facilities and there are only a few residences have views of the project sites; these are not areas of recreational use or tourism. Views of these project areas are, therefore, of low-sensitivity.

The Brookfield borrow site, consists of lands under agricultural cultivation or fallowed fields, and is adjacent to cultivated or fallowed agricultural fields or areas with similar land cover types that are managed for their habitat values. Residences are sparse in the vicinity of the site, viewers are few, and there are no sensitive viewer groups near them.

The main viewer groups of the project area are local residents and travelers on Garden Highway, SR 99, and Howsley Road. Much of the viewscape is typical of local rural area, consisting of scattered agricultural outbuildings, rural roads, disturbed areas of ruderal vegetation, utility poles and overhead utility lines and the existing levees. The existing levee blocks view of the Sacramento River from the east as well as blocks views of the work areas from boaters on the river. The levee and adjacent berms are an integral part of the visual setting to regular viewers, including farmers, recreationists, and other travelers on local county roads. Garden Highway is used by local residents, by recreationists traveling to marinas, Verona Village Resort, and Teal Bend Golf Club, as well as agricultural traffic. Recreationists are considered a sensitive viewer group; however, overall numbers of recreationists in this area are low. Overall views of the Basin lack vividness and are neither striking nor distinctive. Airport facilities and arriving and departing aircraft are prominent features in the middle of the Basin and in broader views of the overall landscape, and these Airport-related features contrast with the otherwise rural character of the northern and middle portion of the Basin.

Levee improvement, pump plant construction, and the Vestal Drain realignment would temporarily affect the aesthetics in the project area, including the staging areas and the borrow site. Short-term activities would include the presence and activities of construction equipment, including preparing the sites, degrading the top of the levee at the Northern Main and Bennett Windows, relocating the Vestal Drain, and repairing and replacing Pumping Plant 4. Exposed soils on the levees and staging areas would be reseeded with native grasses to promote revegetation and minimize soil erosion. The reconstructed levee would remain visually consistent with the preconstruction conditions. Long term changes to the aesthetics include the placement of riprap on the waterside of the levee toe at the pumping plants. No recreationists or residents would be affected by this change to the canal as there is no public access allowed; therefore, impacts to aesthetics would be less than significant. In addition, the riprap area above the summer waterline would be filled with soil and vegetated with willow cutting and grasses. This would reduce the visual impact of the rock.

3.1.2 Recreation

The NCC is not considered a significant recreation resource. The width and depth of the channel does not accommodate most water-based recreation. Limited boating/fishing opportunities are available when the NCC experiences high water stages due to elevated

Sacramento River water levels. The levee road itself is blocked by locked gates preventing motor vehicles from exiting and entering onto the levee, and the levees are only used by the public for passive recreational activities, such as walking and jogging. Reach D is the most remote of all the Natomas Basin Project sites and is not a popular recreational site due to the low population density in the area. Construction at Reach D would temporarily close the top of levee to walking and jogging activities from the Bennett Pumping plant site (located approximately one mile from Garden Highway) to the Northern Main pumping plant site but would not close or restrict access to any of the water-based recreational opportunities on the NCC; therefore, impacts to recreation would be less than significant.

The Sacramento River is a popular location for both water-related and land-based recreation. Recreational boating is one of the primary uses of the Sacramento River near the project area. Marinas and boat launches are accessible by land only from Garden Highway. Land-based activities, such as camping, picnicking, and shoreline fishing, also occur in limited areas along the Sacramento River. The Verona Marina and Verona Village Resort is located at the western end of Reach D. Construction at Reach D would not close or restrict access to any of the recreational opportunities on the Sacramento River; therefore, impacts to recreation would be less than significant.

3.1.3 Socioeconomics

The project site and vicinity are generally rural in character. Farms and rural residences are located on both sides of the NCC, with rice the primary crop under cultivation. Three homes are located 700-1,000 feet north of the Bennett Pumping Plant, and a few residences are located between 50 and 200 feet south of the levee in the area east of SR 99. A residence and several ranch buildings are within 25 feet of the haul route along Howsley Road from the project work sites to the Brookfield borrow site. Several roadways are located in the vicinity of the NCC, including State Route 99, Sankey Road, Powerline Road, Howsley Road, and Garden Highway, which is located on the crown of the Sacramento River east levee. Other land uses include the Verona Village Resort, which is a small trailer campground, marina, restaurant, and store on the west side of Garden Highway, located approximately 660 feet southwest of the western terminus of the NCC south levee.

As directed in Executive Order 12898, all Federal agencies must identify and address adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The minority population makes up approximately 30% of Sutter County's overall population, and 17% percent of the population are low-income (U.S. Census Bureau 2016). Project implementation would not require the removal of any residences. Since the Northern Main and Bennett Pumping Plants have already been abandoned, project implementation would not adversely affect local businesses. Project-related construction would benefit the local economy by providing additional short-term construction-related jobs. Any impacts caused by construction activities would not disproportionately affect minority or low-income populations as the levee improvements would reduce flood risk for the entire Natomas Basin; therefore, impacts to socioeconomics would be less than significant.

3.1.4 Hazardous and Toxic Waste

The Public Health and Safety Element of the *Sutter County General Plan* (Sutter County 2011) Hazardous Materials goal is intended to “protect health, safety, property, and the environment from the use, transport, disposal, and release/discharge of hazardous materials and waste.” Policy 3.1 states the County “shall ensure that the use and disposal of hazardous materials complies with appropriate federal, state and local requirements.” Policy 3.3 states that “the review of all proposed development projects that manufacture, use or transport hazardous materials shall be coordinated between the County and appropriate State and Federal agencies.”

Kleinfelder conducted Phase I Environmental Site Assessments on several parcels within the NLIP area in 2008 and 2009. Phase I assessments are intended to determine the presence of recognized environmental conditions, which are defined as a past, present, or likely future release of hazardous substances or petroleum products into the soil, groundwater, or surface water of a site. The 2010 EIS/EIR contains a summary of findings evaluated by Kleinfelder for the NLIP. No findings are listed specifically for the NCC.

Due to the age of the infrastructure in the area, there is a potential for previously unknown asbestos-containing building materials or lead-based paint at the pumping plants, as well as a potential for previously unknown asbestos-coated pipes located in the Vestal Drain area. Pipes would be tested for asbestos-containing material prior to removal. If any asbestos-containing material is identified, the material would be safely removed.

The Natomas Basin has historically and is currently used for agricultural purposes. This type of land use involves the application of pesticides, residues of which can remain in the soil for years. Soil testing performed in 2009 by Kleinfelder indicated the presence of pesticide residues, including arsenic, dieldrin, and toxaphene. Elevated concentrations of arsenic in soil can be a result of historic arsenic-containing pesticide applications; however, arsenic can also occur naturally in certain soils within the project footprint and throughout California. The concentrations of pesticide residues found on these sites do not constitute a reportable condition. The pesticides were not detected at levels exceeding Corps and California hazardous waste threshold limits and are not considered an imminent threat to public health, welfare or the environment.

3.2 Environmental Resources Evaluated in Detail

Initial evaluation of the effects of the project indicated that there could be the potential for impacts to several resources. Sections 3.2.1 through 3.2.11 describe the baseline conditions, effects, and the proposed measures to avoid, reduce, minimize, mitigate, or compensate for any potential significant effects. Baseline conditions are defined under the CEQA guidelines as ‘environmental conditions as they exist at the time of analysis.’ In determining effects, the consequences of the proposed action are compared to the consequence of taking no action. Impacts are identified as direct, indirect, or cumulative. Cumulative impacts are addressed separately in Section 5, Cumulative Impacts. Effects are assessed for significance based on significance criteria. The significance criteria used in this document are based on factual or scientific information and data; and regulatory standards of Federal and State agencies.

3.2.1 Geology, Soils and Agricultural Resources

The Natomas Basin is relatively flat and open, with levees providing the only significant topographic relief in the Basin.

Baseline Conditions

Geology. The Natomas Basin lies in the Sacramento Valley portion of the Great Valley Geomorphic Province. The Great Valley is a large valley trending northwest-southeast and is drained by the Sacramento and San Joaquin Rivers, which join and flow out of the province through San Francisco Bay. This geomorphic province is an asymmetric trough approximately 400 miles long and 50 miles wide characterized by a relatively flat alluvial plain composed of a deep sequence of sediment deposits from Jurassic to recent age.

The Sacramento Valley has been a depositional basin throughout most of the late Mesozoic and Cenozoic time. A vast accumulation of sediments was deposited during cyclic transgressions and regressions of a shallow sea that once inundated the valley. Overlying the thick sequence of sedimentary rock that form the deeply buried bedrock in the mid-basin areas of the valley are Late Pleistocene and Holocene alluvial deposits. The youngest geomorphic features in the project area are low and wide floodplains found primarily along the Sacramento and American Rivers. These major drainage ways were originally confined within broad natural levees sloping away from the river or streams, which were formed through the deposition of alluvium during floods. As flood waters lost energy, the coarser materials settled out nearest the rivers and streams, forming the natural levees and sand bars in the vicinity of the river channel. The finer material was carried in suspension farther from the rivers and streams and settled out in quiet waters such as swales, abandoned meander channels and lakes.

Flanking the recent alluvial deposits in the Natomas Basin are late Pleistocene alluvial fan and terrace deposits of the Modesto and Riverbank Formations. Stream terrace deposits, mapped as the Modesto Formation, are higher in elevation and older than floodplain sediments. Before the construction of the existing levees, these stream terraces were occasionally flooded. The lower fan terraces of the Riverbank Formation are higher in elevation and older than stream terraces, and were only rarely flooded.

Soils. The Sutter soil surveys identify a variety of soil map units in the Natomas Basin Project area. Most of the soils in the NLIP area are shallow to moderately deep, sloping, well-drained soils with very slowly permeable subsoils underlain with hardpan. These soils have good natural drainage, slow subsoil permeability, and slow runoff (NRCS 2016).

The Natomas Basin generally consists of deep soils derived from alluvial sources, which range from low to high permeability rates and low to high shrink-swell potential. Soils range from low to high hazard ratings for construction of roads, buildings, and other structures related to soil bearing strength, shrink-swell potential, and potential for cave-ins during excavation. Soils adjacent to the Sacramento River are dominated by deep, nearly level, well-drained loamy and sandy soils. The natural drainage is good and the soils have slow to moderate subsoil permeability. The river terraces consist of very deep, well-drained alluvial soils. The porous

nature of the soils underneath the existing levee system is an important consideration for the design of levee improvements.

Agricultural Resources. Approximately 60% of the Natomas Basin is in some form of agricultural or open space use in the unincorporated areas of Sacramento and Sutter counties. Rice is the most common crop, and is generally grown over large areas of contiguous land north of Elkhorn Boulevard. Agricultural lands in the southern and western portions of the Natomas Basin support other crops, such as field crops and orchards (Plate 11). The 2010 EIS/EIR describes agricultural resources in full detail. The Agricultural Resources chapter of the *Sutter County General Plan* (Sutter County, 2011) designates the proposed general distribution, location, and extent of all uses of land. Policy AG 1 is to preserve and protect high-quality agricultural lands for long-term agricultural production, and Policy AG 4.5 promotes the growth and expansion of existing agricultural industries as well as the development of new and diverse agricultural production, process, and distribution industries.

Environmental Analysis

Basis of Significance. Direct and indirect effects on Geology, Soils, and Agricultural Resources would be considered significant if the alternatives result in any of the following:

1. Convert Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use;
2. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to nonagricultural use or conversion of forest land to non-forest use;
3. Conflict with existing zoning for agricultural use or a Williamson Act contract.

Alternative 1 - No Action. Under the No Action alternative, the project area would continue to be maintained by local levee maintenance districts. Maintenance activities typically include mowing and herbicide treatment to the levee slopes to regulate vegetation growth. Under this alternative the proposed project would not be built. There would be no change to the geology, soils, or agricultural resources in the project area; however, emergency actions taken to prevent flooding in the possible event of levee failure could result in flooding of farm fields, erosion, and sediments left in flooded areas.

Alternative 2 - Proposed Levee Improvements. Improvements along the NCC south levee would result in a widened landside footprint of flood control facilities, including the conversion of approximately 15 acres of agricultural land to non-agricultural purposes for the new Vestal Drain alignment. Approximately 5 acres in the Brookfield borrow site would be temporarily disturbed and then regraded for rice production. A detailed discussion of agricultural resources and land use is presented in the 2010 EIS/EIR. The conversion of agricultural land to non-agricultural uses associated with the relocation of the Vestal Drain and the Brookfield borrow site was considered an unavoidable impact in the original document, and

there are no additional impacts associated with land use on this project that were not identified in the 2010 EIS/EIR. Therefore, the evaluation of impacts to agriculture is complete.

The Vestal Drain would be relocated approximately 250 feet to the south of its current position. This relocation requires the excavation of approximately 130,000 cy of material and the conversion of approximately 15 acres of agricultural land to non-agricultural use. The land associated with the new Vestal Drain alignment has already been purchased by SAFCA, and is currently not actively cultivated. Material excavated from the new alignment would be used to fill in the existing Vestal Drain, and very little soil would be transported on or off the site. This area of the Natomas basin contains geologically similar soils, and relocation of soils would not result in significant impacts to local geology.

The use of the Brookfield borrow site for soil would result in the excavation of approximately 5 acres of land. The Brookfield borrow site has already been purchased by SAFCA, and is currently not actively cultivated. Once the excavation of the borrow soils is complete, the disturbed area would be regraded to support rice cultivation, similar to the process conducted at the site during SAFCA's NLIP activities.

Avoidance, Minimization, and Mitigation Measures

A complete list of avoidance, minimization, and mitigation measures are described in the 2010 EIS/EIR. In order to reduce impacts to soil and agricultural resources, lands required for construction would be reduced to the greatest extent practicable, and staging areas would be located on sites that are not currently in use for agricultural practices. Soil excavated during construction would be reused to the greatest extent practicable, which would reduce wasted material and reduce the amount of borrow material required.

In order to avoid impacts to adjacent farmlands, the new Vestal Drain would be completed and water diverted into the new canal prior to the filling in of the existing Vestal Drain. This scheduling would enable adjacent farmlands to continue using the drainage facilities regardless of the stage of construction.

The new Vestal Drain is located along the edge of existing agricultural fields, and the adjacent fields would remain in agricultural production during and after project construction. Edge conversions are not expected to conflict with the land use goals or policies of Sutter County, and agricultural land loss would be minimized. Additionally, the proposed improvements to flood control facilities would be consistent with the community flood protection goals of the jurisdictions in which they would take place. Land uses adjacent to the levee are anticipated to remain the same, and the staging areas would be returned to pre-project uses after construction. Therefore, impacts to soils and agricultural resources would be less than significant.

3.2.2 Vegetation and Wildlife

Regulatory Setting

The following Federal, State and local laws and regulations apply to the resources covered in this section. Descriptions of laws and regulations can be found in Chapter 5.0.

Federal

- Executive Order 13112, Invasive Species
- Fish and Wildlife Coordination Act (FWCA) (16 USA §§661 – 667e)

Local

The Natomas Basin Habitat Conservation Plan (NBHCP) was developed to promote biological conservation in conjunction with economic and urban development in the Natomas Basin. The NBHCP establishes a multispecies conservation program to minimize and mitigate the expected loss of habitat values and incidental take of “covered species” that could result from urban development and O&M of irrigation and drainage systems within the area of coverage. The NBHCP is implemented by The Natomas Basin Conservancy (TNBC) which acquires, establishes, enhances, monitors, and manages mitigation lands in perpetuity.

The *Sutter County General Plan* Biological Resources and Open Space policy is intended to “support a comprehensive approach for the conservation, enhancement, and regulation of Sutter County’s significant habitat and natural open space resources.” The Plan contains policies that generally address preservation of natural vegetation, including wetlands. It requires that new development mitigate the loss of federally protected wetlands to achieve “no net loss,” minimize surface runoff, and encourage the creation and use of wetland mitigation banks. The general plan also encourages the preservation of native oak trees when possible, and encourages the use of native and drought tolerant plant species (Sutter County, 2011).

Baseline Conditions

There are four major plant communities and cover types within and around the project area: ruderal herbaceous, fallow and active agricultural fields, riparian forest and scrub, and open water (canal). A plant community is a natural or human-influenced assemblage of plants that have common characteristics and can be easily identified by key species. Sensitive native communities are considered native-diverse communities that are regionally uncommon or of special concern to Federal, State, and local resource agencies. The riparian forest and scrub, and open water habitats are considered sensitive native communities. These communities and associated wildlife are described below.

Ruderal Herbaceous. The ruderal herbaceous community is a plant community that occurs in the project area. Ruderal species are the first to colonize disturbed lands. The disturbance in the project area originated with the construction of the levee and the presence of agriculture. Ruderal species are fast growing species requiring little nutrition and have massive

seed production. This community is located on the waterside levee slopes predominantly. Areas of ruderal herbaceous community also occur in the waterside area between the levee and the NCC, as well as the landside, between the levee toe and the adjacent agricultural fields.

This community is dominated by annual grasses, such as ripgut brome (*Bromus diadrus*), wild oat (*Avena fatua*), and forbs, including red stemmed filaree (*Erodium cicutarium*) and common groundsel (*Senecio vulgaris*). This community is primarily composed of non-native and invasive plants; however, the ruderal herbaceous community provides cover and foraging habitat for resident and migratory songbirds, small mammals, and reptiles. The native grasses on the upper portion of the waterside and landside levee slopes occur as a result of reseeded restoration from the previous NLIP Project and they are mowed as part of the maintenance program by RD 1000 to reduce wildfire danger and allow observation of the ground surface for levee inspection.

Fallow and Active Agricultural Fields. The northern portions of the Basin are dominated by agricultural lands. The primary crops in the Natomas Basin are rice, corn, other grain crops, and tomatoes. The most common crop is rice, which is grown over large areas of contiguous land north of Elkhorn Boulevard. The amount of land in active rice production has greatly diminished in recent years and former rice fields are now fallow or support other grain crops.

Agricultural fields within the project site exist on the landside along the entire length of the levee. Active rice fields and TNBC fallow fields provide habitat for resident and migratory birds, including waterfowl. Agricultural fields, especially heavily irrigated fields, provide habitat for reptiles including GGS.

Riparian Forest and Scrub. Riparian forest and scrub is a native community that occurs near the project area. This community consists of forested areas and underbrush habitat along the NCC. This community includes native and nonnative trees, shrubs, vines, and brush in narrow bands along the river and canal.

The majority of the species at the project site include Fremont cottonwoods (*Populus fremontii*), willow species (*Salix* sp.), and Valley oak (*Quercus lobata*). Less common species include Boxelder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*) and poison oak (*Toxicodendron diversilobum*).

Open Water. The Sacramento River, the Sankey Canal, the Vestal Drain, the North Drainage Canal, the North Main Canal, and the NCC are considered open water habitat. The Sankey Canal obtains water from the Sacramento River via the Sankey Diversion pumping station and then distributes the water to the agricultural fields located in this area. The center of the Sankey Canal is approximately 250 feet south of the center of the north Natomas levee, and the canal follows the alignment of the levee from the Sankey Pump Station to its terminus near Pumping Plant 4. Along the length of the Sankey Canal, various irrigation canals deliver water to nearby agricultural fields. Excess water from the fields are drained into the Vestal Drain, which drains into the North Drainage Canal and is pumped into the NCC through Pumping Plant 4. The NCC drains directly into the Sacramento River at its southern end near the intersection of Sankey Road and Garden Highway. The NCC is located approximately 100 feet from the center

of the levee on its northern (western) side. East of Pumping Plant 4, the canal is known as the North Main Canal and continues to a point near State Highway 99. The former Northern Pumping Plant is located along this canal. The former Bennet Pumping Plant is located on the Vestal Drain near the Sankey Canal, and Pumping Plant 4 is located near the Sankey Canal at the eastern terminus of the Vestal Drain and the North Drainage Canal. The main project staging area is located adjacent to the westernmost portion of the Sankey Canal.

Managed Wetland. Existing Natomas Basin Conservancy Mitigation Lands for GGS were created between 2003 and 2005 on the landside of the NCC south levee at Frazer North and Lucich North. This TNBC owned mitigation site covers over 300 acres of agricultural land that was converted into a managed wetland specifically designed to be favorable for GGS.

Environmental Effects

Basis of Significance

Direct and indirect effects on vegetation and wildlife would be considered significant if the alternatives result in any of the following:

1. Substantial loss, degradation, or fragmentation of any natural communities or wildlife habitat.
2. Substantial reduction in the quality or quantity of important habitat with the result that native wildlife could not live or successfully reproduce in the project area.
3. Interfere substantially with the movement of any native wildlife species (habitat connectivity) or with established native resident or migratory wildlife corridors.
4. Conflict with any local, state or Federal policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
5. Substantial effects on a sensitive natural community, including Federally-protected wetlands and other jurisdictional Waters of the U.S. as defined by Section 404 of the Clean Water Act.

Alternative 1 - No Action. Under the No Action alternative, the affected levee reach would continue to be maintained by local levee maintenance districts. Maintenance activities typically include mowing and herbicide treatment to the levee slopes to regulate vegetation growth. Under this alternative the proposed project would not be built. There would be no change to the vegetation or wildlife in the project area; however, emergency actions taken to prevent flooding in the possible event of levee failure could result in loss of vegetation.

Alternative 2 - Proposed Levee Improvements. The majority of vegetation removal during the construction of Reach D would be ruderal grassland during the clearing and grubbing phase of the project; however, some trees may require removal and/or trimming. The pipe

removal at the Bennett and Northern Main sites and the pipe raise at Pumping Plant 4 would involve a partial degradation of the levee, and vegetation located in the areas of degradation would be removed. Some trimming and removal of native oak and other large trees in and adjacent to the project area may be required in order to place material safely and effectively. The excavation of the new Vestal Drain and the filling in of the existing Vestal Drain would require the removal of aquatic habitat and vegetation removal in the areas impacted by construction, including the removal of at least one small tree currently located in the existing Vestal Drain alignment. Temporary displacement of local wildlife populations due to noise and increased human presence is likely to occur during construction activities in the project area, the haul route, and the borrow site. The effects to vegetation and wildlife would be temporary and would be less than significant once the avoidance, minimization, and mitigation measures described below are implemented.

Avoidance, Minimization, and Mitigation Measures

The riprap placement on the waterside toe of the levee at Bennett, Northern Main, and Pumping Plant 4 would preserve as much vegetation as practicable by placing rock around existing native trees and large woody shrubs. Impacts associated with riprapping around trees left in place are currently unknown. Where tree trimming or removal is required, it would be conducted under the observation or direction of a qualified arborist. Trees located outside the project footprint would be protected in place. Additional vegetation would be installed by placing soil and willow pole cuttings in the riprapped areas (Plate 6).

Grasses removed due to construction activities would be restored through reseeding. Areas of soil compaction would be loosened and seeded with native grasses. The seed mixture would include species such as California barley (*Hordeum californicum*), six week fescue (*Vulpina microstachys*), purple needlegrass (*Nassella pulchra*) and creeping wildrye (*Leymus triticoides*). Reseeded areas would be periodically monitored until 80 percent vegetation cover is achieved within the period established by the Corp's contracting officer.

Effects associated with the trimming and removal of trees, the temporary removal of grasses, and the relocation of the aquatic habitat associated with the Vestal Drain would be less than significant. If any further vegetation removal is necessary for construction of the project, mitigation measures would be coordinated with the U.S. Fish and Wildlife Service (USFWS) under the Fish and Wildlife Coordination Act. USFWS recommends that where feasible native trees or shrubs with a diameter of 2 inches or greater should be replaced on-site, in-kind with container plantings. Coordination with USFWS is ongoing. The mitigation measures would be conducted in or near the areas that the vegetation was removed. There are no additional impacts associated with vegetation and temporary habitat removal on this project that were not identified in the 2010 EIS/EIR, and the proposed avoidance, minimization, and mitigation measures would reduce impacts to less than significant.

3.2.3 Fisheries

Regulatory Setting

The following Federal and State laws and regulations apply to the resources covered in this section. Descriptions of the laws and regulations can be found in Chapter 5.0.

Federal

- Endangered Species Act (16 U.S.C. 1531 et seq.)
Magnuson-Stevens Fishery Conservation and Management Act of 1997

State

- California Endangered Species Act (Fish and Game Code 2050 et seq.)

Existing Conditions

The Sacramento River supports at least 57 fish species, including the Federally-listed as threatened green sturgeon (*Acipenser medirostris*) and the Federally and State-listed as endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), the Federally and State-listed as threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), the Federally-listed as threatened Central Valley steelhead (*O. mykiss*), the Federally and State-listed as endangered Sacramento pikeminnow (*Ptychocheilus grandis*), and the Federally and State-listed as threatened delta smelt (*Hypomesus transpacificus*). Other species of note include the American shad (*Alosa sapidissima*), rainbow trout (*Oncorhynchus mykiss*), striped bass (*Morone saxatilis*), and Sacramento splittail (*Pogonichthys macrolepidotus*). Additional detailed information on fisheries in the Sacramento River is included in the 2010 EIS/EIR.

The project areas are in the proximity of Essential Fish Habitat (EFH) for the Federally-listed as threatened green sturgeon and the Federally-listed as threatened Central Valley steelhead. EFH is defined in the Magnuson-Stevens Act as "...those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." As required by the Act, the National Marine Fisheries Service (NMFS) implemented regulations to provide guidance regarding EFH designation. The regulations further clarify EFH by defining "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrates" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding or growth to maturity" to cover a species' full life cycle.

The Magnuson-Stevens Act requires that Federal agencies consult with NMFS when any activity proposed to be permitted, funded, or undertaken by a Federal agency may have adverse impacts on designated EFH. According to NMFS, the Sacramento River is considered EFH for

the green sturgeon, the Central Valley spring-run Chinook salmon, and the Central Valley steelhead. The NCC is considered EFH for Central Valley steelhead.

The Central Valley steelhead and its habitat is present on the Sacramento River and the NCC, and the project area connects to the Sacramento River on the downstream end of the project. Natomas Reach D is in the proximity of EFH for the Central Valley spring-run Chinook salmon, Central Valley Steelhead, and the Southern distinct population segment (DPS) of the green sturgeon.

Central Valley Spring-Run Chinook Salmon. Spring-run Chinook salmon historically occurred from the upper tributaries of the Sacramento River to the upper tributaries of the San Joaquin River. However, they have been extirpated from the San Joaquin River system. The only streams in the Central Valley with remaining wild Central Valley spring-run Chinook salmon populations are the Sacramento River and its tributaries, including the Yuba River, Mill Creek, Deer Creek, and Butte Creek.

Central Valley Steelhead. Central Valley steelhead have already been extirpated from the majority of their historic range in this region and this evolutionary significant unit is considered to be at high risk of extinction. However, because suitable habitat exists within the study area, Central Valley steelhead have the potential to be present from early August through late February (NMFS 1996). Juveniles could occur within the project area from early December through March.

Southern DPS Green Sturgeon. Green sturgeon are the most widely distributed sturgeon species, known to range from nearshore waters of Mexico to the Bering Sea. Despite this large geographic range, the only known spawning locations in California for green sturgeon are in the Klamath, Sacramento, Feather, and Rogue Rivers. In the southern DPS, adults and juveniles occur in the upper Sacramento River, where the majority of spawning occurs, and the Feather River. The southern DPS boundary currently includes all populations of green sturgeon south of the Eel River, with the only known population being in the Sacramento River (Adams et al. 2002). Designated critical habitat in California lies within the Sacramento River and San Joaquin River.

Environmental Effects

Basis of Significance. An alternative would be considered to have a significant effect on fisheries resources if it would in any of the following:

1. substantially interfere with the movement of any resident or migratory fish,
2. permanently remove or diminish Essential Fish Habitat, or
3. involve discharges of material into waterways that would pose a hazard to fish.

Alternative 1 - No-Action. Under the no action alternative, there would be no effects on existing special status species or critical habitat. There would be no substantial changes to the listed species that use channel areas and no substantial change to available habitats. Current

levee maintenance, recreation, and public activity would not change. The effects of these activities on special status species and their associated habitat would be the same; however, the possible event of levee failure may result in the loss or depletion of available habitats, and special status species could be adversely affected.

Alternative 2 - Proposed Levee Improvements. Construction of the proposed project could result in indirect effects to the Central Valley spring-run Chinook salmon, Central Valley steelhead, and the Southern DPS green sturgeon. These effects could be considered significant to these special status species unless mitigated.

The construction of Reach D would not directly impact Central Valley spring-run Chinook salmon or green sturgeon because no construction would occur in the Sacramento River. In-water work along the NCC could directly impact the Central Valley steelhead if cofferdams or other dewatering techniques trap juvenile fish in the area to be dewatered. Indirect impacts to all fish species could occur if siltation or other contamination enters the water during construction. These potential impacts would be avoided using the measures discussed below.

Avoidance, Minimization, and Mitigation Measures

Prior to ground disturbance, all on-site construction personnel would be given instruction regarding the presence of sensitive species and the importance of avoiding these species and their habitats.

Instream work would be limited to the areas immediately adjacent to the Bennett, Northern Main, and Pumping Plant 4 construction areas. Riprap would be placed around trees in order to preserve existing vegetation and shaded riverine aquatic habitat needed by listed salmonids or other native fish species. The Corps is coordinating with NMFS to determine the potential impacts of the placement of riprap to listed fish species.

Implementation of Best Management Practices (BMPs) during the construction of the project would prevent material from entering the canal located on the waterside of the project levee:

- The contractor would be required to develop and submit a Storm Water Pollution Prevention Plan (SWPPP) to minimize the potential for soil or contaminants to enter the canal.
- Erosion/sediment controls such as hay bales, straw wattles, silt fencing, or other types of barriers would be used at the waterside toe of the levee to prevent soil from entering the canal.
- Water trucks would be used for dust suppression along all areas of disturbed soil and along the haul routes on the top of the levee, and at the levee toes.
- Fuel would be brought to the project site on the day that work is to be performed. If fuels, lubricants, or other potential hazardous substances must be stored on site, the

contractor would follow all applicable Federal, State, and local laws related to the transportation, storage, and handling of the materials, and take appropriate measures against accidental spillage.

- If equipment is to be refueled on site, the contractor would take measures to avoid and contain any spills. The contractor would be required to develop and submit a Spill Prevention and Countermeasure Plan (SPCP) prior to initiating construction activities.

The SWPPP and SPCP must be approved by the Corps. A Corps representative would be identified as the point of contact for any contractor who might incidentally take a listed green sturgeon, steelhead, or Chinook salmon species, or find a dead, injured, or entrapped listed green sturgeon, steelhead, or Chinook salmon. This point of contact would be identified to all construction employees during an orientation regarding the potential effects on listed green sturgeon, steelhead, and Chinook salmon species. The orientation would be conducted by a qualified fisheries biologist and cover specific information on measures to prevent injury to listed fish and what to do if any are found in the project area.

3.2.4 Special Status Species

Regulatory Setting

The following Federal and State laws and regulations apply to the resources covered in this section. Descriptions of the laws and regulations can be found in Chapter 5.0.

Federal

- Endangered Species Act (16 United States Code [USC] 1531 et seq.)
- Migratory Bird Treaty Act (16 USC §703-712)
- Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d)

State

- California Endangered Species Act (Fish and Game Code 2050 et seq.)
- California Fish and Game Code (Sections 3511, 4700, 5050, and 5515), Fully Protected Species
- California Fish and Game Code (Section 3503), Protection of Bird Nests and Raptors

Special Status Species Evaluation

A list of Federally-listed, candidate species, and species of concern that may be affected by the proposed levee improvement project in Reach D was obtained on April 21, 2017, via the USFWS website Information for Planning and Consultation (IPaC, 2017). The species lists from the Sacramento and San Francisco Bay-delta offices can be found in Appendix A. In addition, a search of the California Natural Diversity Database (CNDDB) was conducted on April 21, 2017, and determined all of the listed species within the United States Geological Survey (USGS) quad

Verona (Appendix A). These species lists indicated that several State- and Federally-listed species have been reported within, or near the project boundaries; however, only the Federally-listed as threatened GGS (*Thamnopsis gigas*), the Federally-listed as threatened valley elderberry longhorn beetle (*Desmoceros californicus dimorphus*) (VELB), the Federally-listed as threatened Central Valley spring-run Chinook salmon, the Federally-listed as threatened Central Valley steelhead, the Federally-listed as threatened southern DPS green sturgeon and the State-listed as threatened Swainson's hawk (*Buteo swainsoni*) have been reported within one half mile of the project boundary. The State-listed as fully protected white-tailed kite (*Elanus leucurus*) has been reported within the Natomas Basin. The Federally-listed as threatened western yellow-billed cuckoo (*Coccyzus americanus*) was not identified within ½ mile of the project area; however, cuckoos could use the woody vegetation along the Sacramento River as stopover habitat during their spring migration. The Federally-listed as endangered least Bell's vireo (*Vireo bellii pusillus*) was not identified within ½ mile of the project area; however, as the vireo begins gradually expanding back into historic range, occurrences within the surrounding riparian areas may increase in frequency. Fisheries species are discussed in Section 3.2.3, Fisheries. Other special status species that were not identified as occurring or having habitat in the project area are not discussed further in this document. The complete USFWS and CNDDDB lists are included in Appendix A.

Giant Garter Snake. GGS are one of the largest garter snakes, reaching up to 64 inches and 1.5 pounds. These snakes feed on small fish, tadpoles, and frogs inhabiting agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds and adjacent uplands in the Central Valley. Most of the snake's natural habitat has been lost, which is why rice fields have become so critical for providing thousands of acres of habitat. GGS are dormant during the winter, inhabiting small mammal burrows above flood elevations and emerging in the warmer weather of spring around May.

The NLIP required that mitigation for the GGS be constructed by SAFCA and TNBC established hundreds of additional acres of GGS habitat throughout the entire Natomas Basin using mitigation fees collected through the implementation of the NBHCP. In the North Basin area, there are 14 plots of land designated as GGS habitat (Plate 12). As a result of this mitigation, there are GGS present and active in the area surrounding the NCC. According to CNDDDB, there are three reported sightings of GGS within a half mile of the canal. Surveys would be conducted prior to construction, and would continue during construction, as required.

Valley Elderberry Longhorn Beetle. VELB are endemic to the riparian habitats in the Sacramento and San Joaquin Valleys where it resides on elderberry (*Sambucus* spp.) plants. The beetle's distribution is patchy throughout the remaining riparian forests of the Central Valley from Redding to Bakersfield (USFWS, 1984). The beetle is a pith-boring species that depends on elderberry plants during its entire life cycle. The beetle tends to be located in population clusters that are not evenly distributed across the Central Valley (Barr, 1991).

Surveys along Reach D have not identified any elderberry shrubs. Additional surveys would be conducted prior to construction. If any elderberry shrubs are identified in or near the project area, the shrubs would be avoided. USFWS has recommended that a 100-foot buffer zone around elderberry shrubs be maintained to avoid indirect effects to VELB.

Western Yellow-billed Cuckoo. The Western yellow-billed cuckoo was Federally-listed as threatened in October 2014. Nesting Western yellow-billed cuckoos no longer occur on the Sacramento River south of Colusa as the river has been channelized from that point into the Sacramento-San Joaquin Delta. However, nesting Western yellow-billed cuckoo do occur south and north of the Sacramento area, so there is a small potential for migratory birds to use the riparian habitats along the Sacramento River as they move between nesting habitat areas.

Currently, no Western yellow-billed cuckoos have been documented in or near the project area; however, the riparian habitat along the NCC could be used as stopover habitat for migratory birds.

Least Bell's Vireo. The least Bell's vireo was Federally-listed as endangered in May 1986 but was not considered to be present at the NCC in 2010. Least Bell's vireos use dense and early successional riparian habitat for nesting and foraging. Dense riparian habitat is present in the Lower American River Parkway and Yolo Bypass.

Despite the least Bell's vireo sightings in 2010 and 2011 in the Yolo Bypass, there are no known recent occurrences of breeding least Bell's vireo in the Sacramento Valley. As the vireo begins expanding back into its historic range, it is possible that over the course of the project vireos may use the surrounding riparian habitat more frequently.

Swainson's Hawk. Swainson's hawks breed in open habitats and prairies in North America and over-winter in Mexico and South America. In California, Swainson's hawk migrate through and breed in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and the Mojave Desert. They usually arrive in the Central Valley between March 1 and April 1, and migrate south between September and October. Swainson's hawk nests usually occur in trees near the edges of riparian stands, in lone trees or groves of trees in agricultural fields, and in mature roadside trees.

During biological surveys conducted in 2016, nesting Swainson's hawks were identified less than ¼-mile from the Pumping Plant 4 project area. Reproductive success of the nest was not determined. Additionally, two other pairs of Swainson's hawks were observed in and around the Reach D project area. Follow-up surveys conducted in 2017 identified a nesting Swainson's hawk about 1.5 miles and another about 1.2 miles north of the former Northern Main Pumping Plant. During the 2017 surveys, another Swainson's hawk was seen about 0.5 mile south of the former Bennett Pumping Plant. This hawk was perched upon a power pole while exhibiting foraging behaviors. It is possible that other Swainson's hawks are using the riparian habitat along Reach D for nesting, and additional surveys in accordance with CDFW's Swainson's Hawk Survey Protocols (CDFW, 2000) would be conducted to ensure that the locations of nesting raptors are recorded. Raptor surveys would be conducted in the spring of 2018 prior to the beginning of project construction.

White-tailed Kite. The white-tailed kite is a common to uncommon yearlong resident in coastal and valley lowlands and is rarely found away from agricultural areas. The white-tailed kite forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands. Nests

are made of loosely piled sticks and twigs; lined with grass, straw, or rootlets; and placed near the top of a dense oak, willow, or other tree stand usually 20 to 100 feet above ground. Nests are located near open foraging areas in lowland grasslands, agricultural areas, wetlands, oak-woodland and savannah habitats, and riparian areas associated with open areas.

White-tailed kite are recorded as occurring in several locations in the Natomas Basin and the riparian habitat in the vicinity of the project area provides suitable nesting habitat for this species. The nearest reported record of a nesting white-tailed kite in CNDDDB was recorded in 2002 and is over 11 miles from the Reach D project site within the USGS quad Rio Linda.

Biological surveys conducted in 2016 and 2017 did not identify any white-tailed kites. Additional biological surveys would be conducted prior to the construction of the project in 2018, as well as additional surveys throughout the breeding season according to the CDFW Swainson's Hawk Survey Protocols.

Environmental Effects

Basis of Significance. For this analysis, a direct or indirect effect was considered significant if it met one or more of the following significance criteria:

- Have a substantial adverse effect, either directly or indirectly, on species growth, survival, or reproductive success through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW or the USFWS;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Contribute to a substantial reduction or elimination of species diversity or abundance; or
- Have an adverse effect on a species' designated critical habitat, if applicable.

Alternative 1 - No-Action. Under the no action alternative, there would be no effects on existing special status species or critical habitat. There would be no substantial changes to the listed species in and around the project area and no substantial change to available habitats. Current levee maintenance, recreation, and public activity would not change. The effects of these activities on special status species and their associated habitat would be the same; however, the possible event of levee failure may result in the loss of habitat availability, and special status species could be adversely affected.

Alternative 2 - Proposed Levee Improvements. The project could result in direct and indirect effects to GGS, white-tailed kites, and Swainson's hawks. These effects could be considered significant to these special status species unless mitigated. Although no elderberry shrubs or Western yellow-billed cuckoos have been identified on the site, there is a small chance

for indirect effects on these species if previously unknown populations are present in the project area.

Effects to the Giant Garter Snake. Construction of the levee improvements would potentially result in direct and indirect effects to GGS and its habitat. Direct effects could include direct mortality caused by road strikes, excavation, and destruction of dens. Indirect effects include noise, vibration, presence of workers and equipment that may lead to the disruption of foraging or sunning that may cause a decrease in the reproductive success of the species.

Effects to the Valley Elderberry Longhorn Beetle. Since no elderberry shrubs have been identified in the project site, there would be no direct impacts to VELB during the construction of Reach D. If unknown shrubs exist near the project area, VELB could be indirectly impacted due to physical vibration of these elderberry shrubs and an increase in dust.

Effects to Western Yellow-billed Cuckoos. Construction of the levee improvements would not directly affect the Western yellow-billed cuckoo as the project area is unlikely to support Western yellow-billed cuckoo nesting habitat; however, indirect impacts may occur to migrant individuals in transit to breeding sites along the Sacramento River north of Colusa. Although cuckoos are unlikely to occur in the action area, potential dispersal and foraging habitat is present in the American River Parkway and along the Sacramento River.

Effects to Least Bell's Vireo. Due to the lack of least Bell's vireo nesting habitat in the project area, construction of levee improvements at Reach D would not directly affect the vireo. Indirect impacts may include the disruption of movement north from known critical habitat in Southern California into the Central Valley. The removal of riparian vegetation on the levee and at the levee toe is unlikely to impact least Bell's vireo habitat.

Effects to White-tailed Kite and Swainson's Hawk. Construction of the levee improvements would not directly affect white-tailed kites or Swainson's hawks. Indirect effects could occur due to the presence of construction vehicles and workers. Construction activities in the vicinity of an active nest have the potential to result in forced fledging or nest abandonment by adult hawks, potentially causing significant effects due to the direct mortality and/or reduction in the success of a listed species.

Avoidance, minimization, and mitigation measures to avoid these potential impacts are discussed below.

Avoidance, Minimization, and Mitigation Measures

Prior to ground disturbance, all on-site construction personnel would be given instruction regarding the presence of sensitive species and the importance of avoiding these species and their habitats. Additional avoidance, minimization, and mitigation measures would include the following:

- Avoid impacts to nesting migratory birds by conducting pre-construction surveys for active nests in and around the work areas. Work activity around active nests would be avoided until the young have fledged.
- Minimize project impacts by reseeded disturbed areas at the completion of construction.

Species-specific avoidance, minimization, and mitigation measures are described below.

Valley Elderberry Longhorn Beetle. Surveys along Reach D have not identified any elderberry shrubs. Additional surveys would be conducted prior to construction. If any living elderberry shrubs having at least one stem equal to or greater than 1 inch in diameter are identified within the proposed project's limits of construction (impact footprint), or within approximately 100 feet of these limits, the following measures would be implemented by the project:

- In areas where the 100 foot minimum buffer zone is not possible, the next maximum distance allowable would be established. This area would be fenced, flagged and maintained during construction. A biological monitor would be present during the initial setup of fencing around the shrub.
- Environmental awareness training would be conducted for all workers before they begin work. The training would include the Federal status of the beetle, the need to avoid adversely affecting the elderberry shrubs, avoidance areas and measures to be taken by the workers during construction to protect elderberry shrubs.
- No insecticides, herbicides, fertilizers, or other chemicals that have the potential to harm the elderberry shrub or the beetle would be used within 20 feet of any elderberry shrub. Dust suppression measures would be implemented as necessary, and speed limits would be established on all unpaved roads.
- The contractor would use established ramps and access routes.

The proposed mitigation measures would reduce the effects on VELB to less than significant.

Giant Garter Snake. Biological surveys for the presence of GGS would be conducted by Corps biologists 24 hours in advance of construction. The active period of the snake is May 1 through October 1, and construction is currently scheduled to begin May 1 in order to reduce potential impacts to hibernating snakes. The construction work period is currently projected to continue past October 1. Additional measures as directed by USFWS and CDFW would be taken as extra precaution during the dormant period, in which snakes hibernate and cannot actively move out of the way of potential danger. Coordination with USFWS is ongoing. Additional measures would include the presence of a biological monitor capable of recognizing the snake and with the authority to stop construction until corrective measures are completed or the snake is determined to be unharmed.

To avoid potential take the following measures, as called for in the October 2008 USFWS Biological Opinion on the Section 7 Programmatic Formal Consultation on the Natomas Levee Improvement Program (USFWS, 2008), would be employed:

- Exclusion fencing would be placed around upland areas that GGS could use to overwinter. The fencing would be monitored to observe damage or openings for repair.
- BMPs to prevent sediment from entering snake habitat would be implemented. BMPs may include silt fencing and straw wattles.
- Project-related vehicles would observe a 20 mph speed limit within construction areas.

The proposed mitigation measures would reduce the effects on GGS to less than significant.

Western Yellow-billed Cuckoo and Least Bell's Vireo. Prior to construction, surveys would be conducted to determine the presence of potential habitat for the least Bell's vireo and the Western yellow-billed cuckoo. The project is currently scheduled to begin May 1, 2018, which is during the nesting season. An on-site biologist experienced with passerine behavior would monitor any active nests while construction related activities are taking place. The biological monitor would have the authority to stop work and would consult with CDFW and USFWS to determine the best course of action necessary to avoid nest abandonment or take of individuals. Tree removals would occur between November and February to reduce potential impacts to nesting birds. Tree removal would be highly selective, requiring only trees that may affect levee safety to be removed. Coordination with the USFWS is ongoing and re-initiation of consultation would occur if least Bell's vireos or Western yellow-billed cuckoos are sighted near or on the project site.

White-tailed Kite and Swainson's Hawk. Biological surveys according to the Swainson's Hawk Nesting Survey Protocol would be conducted between March and April, 2018. These survey protocols are useful for detecting the presence of nesting raptors (white-tailed kites and Swainson's hawks) and would continue to be conducted prior to construction. If active nests for white-tailed kites or Swainson's hawks are observed in or adjacent to the project area prior to the start of construction, CDFW would be notified in order to determine the potential impacts of the construction to the nests. To avoid potential effects to nesting raptors, CDFW typically requires the avoidance of nesting sites during construction activities and/or avoiding construction during the nesting season. The project is currently scheduled to begin May 1, 2018, which is during the nesting season. If necessary, an on-site biologist experienced with raptor behavior would monitor active nests while construction related activities are taking place. If the nesting raptors exhibit agitated behavior in response to construction related activities, the biological monitor would have the authority to stop work and would consult with CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals. The proposed mitigation measures would reduce the effects on white-tailed kites and Swainson's hawks to less than significant.

3.2.5 Air Quality

Baseline Conditions

Regulatory Background. The Federal Clean Air Act establishes National Ambient Air Quality Standards (NAAQS) and delegates enforcement to the states, with direct oversight by the U.S. Environmental Protection Agency (EPA). In California, the Air Resources Board (CARB) is the responsible agency for air quality regulation.

The California Clean Air Act established California Ambient Air Quality Standards (CAAQS). These standards are more stringent than Federal standards and include pollutants not listed in Federal standards. All Federal projects in California must comply with the stricter State air quality standards. The Federal standards and local thresholds for Sutter County are shown in Table 1.

On November 3, 1993, the EPA issued the General Conformity Rule, stating Federal actions must not cause or contribute to any violation of a NAAQS or delay timely attainment of air quality standards for those areas designated as in nonattainment of Federal standards. A conformity determination is required for each pollutant where the total of direct and indirect emissions caused by a Federal action in a nonattainment area exceeds *de minimus* threshold levels listed in the Code of Federal Regulations (CFR) (40 CFR 93.153).

Table 1. Air Emission Thresholds for Federal and Local Criteria Pollutants

Criteria Pollutant	Federal Standard (tons/year)	FRAQMD Threshold (lbs/day)
NO _x	25**	25 (4.5 tons/year)
CO	100	*
SO _x	100	*
PM ₁₀	100	80
ROG	25**	25 (4.5 tons/year)

NO_x = nitrogen oxides PM₁₀ = particulate matter SO_x = sulfur oxides
 CO = carbon monoxide ROG = reactive organic gases
 * = default to State standard (see California Ambient Air Quality Standards, Appendix B)
 ** = rates for “severe” Federal nonattainment areas [Federal Register (40 CFR), 1993]
 FRAQMD = Feather River Air Quality Management District
 lbs = pounds
 Source: FRAQMD, 2010

Local Air Quality Management. The Sacramento Valley Air Basin encompasses several counties in northern California, including Sacramento and Sutter counties. The Sacramento Valley Air Basin is included in the Sacramento Federal Ozone Nonattainment Area and is also subject to regulations, attainment goals, and standards of the U.S. and California EPAs. The EPA’s General Conformity Regulation requires that “serious” designated nonattainment areas further reduce nitrogen oxides (NO_x) and reactive organic gases (ROG) thresholds to 50 tons/year rather than 100 tons/year. The Feather River Air Quality Management District (FRAQMD) covers Sutter County, and Natomas Reach D is in south Sutter County, which is part of the Sacramento Metropolitan area. South Sutter County was designated as a “severe”

nonattainment area for the 2008 NAAQS, effective July 20, 2012. This designation was finalized on October 26, 2015 (EPA, 2015).

Particulate matter is a term used for solid or liquid particles emitted into the air. Particulate matter less than 10 micrometers in diameter (PM₁₀) is small enough to be inhaled and can cause health problems in the respiratory system. As of October 2013, south Sutter County is in attainment for PM₁₀ under the Federal 24-Hour Ambient Air Quality Standards, but is considered in non-attainment status for the State standard (FRAQMD, 2017). On October 16, 2006, the EPA promulgated a new 24-hour standard for particulate matter less than 2.5 micrometers in diameter (PM_{2.5}). This change lowered the daily standard from 65µg/m³ to 35µg/m³ to protect the general public from short term exposure to fine particulate matter. The Sacramento Valley Air Basin does not meet the Federal standards for 24-hour attainment measures, but is in attainment for the Federal annual arithmetic mean for 12 µg/m³ and the State standards (SMAQMD, 2015).

The California Clean Air Act of 1988 requires nonattainment areas to achieve and maintain the CAAQS by the earliest practicable date and local air districts to develop plans for attaining State ozone standards.

On October 1, 2015, the EPA revised the Federal 8-hour average ozone standard, lowering it from 0.075 parts per million (ppm) to 0.070 ppm (EPA, 2015). All states are required to submit designation recommendations to meet this standard (CARB, 2016). Under the new designation, south Sutter County is in non-attainment for the 0.070 ppm 8-hour ozone standard.

Sources of Pollutants. There are many sources of air pollutants within the region. To estimate the sources and quantities of pollution, CARB, in cooperation with local air districts and industry, maintains an inventory of California emission sources. Table 2 shows the 2008 Estimated Annual Average Emissions as estimated for the Sacramento Metropolitan area (CARB, 2008).

Table 2. 2008 Estimated Annual Average Emissions for Sacramento Metropolitan Area (Tons per Year)

Stationary Sources	ROG	CO	NO_x	SO_x	PM	PM₁₀	PM_{2.5}
Fuel Combustion	0.3	3.7	3.6	0.1	0.4	0.4	0.4
Waste Disposal	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Cleaning and Surface Coatings	4.0	-	-	-	-	-	-
Petroleum Production and Marketing	2.5	0.0	0.0	-	-	-	-
Industrial Processes	0.9	0.3	0.2	0.1	2.3	1.1	0.5
TOTAL Stationary Sources	8.1	4.1	3.9	0.1	2.7	1.5	0.9
Area wide Sources							
Solvent Evaporation	13.2	-	-	-	0.0	0.0	0.0
Miscellaneous Processes	4.0	40.3	3.1	0.1	74.4	34.9	10.1
TOTAL Area wide Sources	17.3	40.3	3.1	0.1	74.4	34.9	10.1
Mobile Sources							
On-road Motor Vehicles	22.7	209.3	44.1	0.2	2.1	2.0	1.4

Other Mobile Vehicles	12.9	86.0	24.9	0.2	1.5	1.5	1.3
TOTAL Mobile Sources	35.6	295.3	69.0	0.4	3.6	3.5	2.8
GRAND TOTAL	61.0	339.6	76.0	0.6	80.7	44.4	13.8

NO_x = nitrogen oxides

CO = carbon monoxide

SO_x = sulfur oxides

PM = particulate matter

Note: Estimates are rounded.

PM₁₀ = particulate matter 10 micrometers or less

PM_{2.5} = particulate matter 2.5 micrometers or less

ROG = reactive organic gases

Environmental Effects

Basis of Significance. Direct and indirect effects on air quality would be considered significant if the alternatives result in any of the following:

1. Exceed any ambient air quality thresholds;
2. Contribute on a long-term basis to any existing or projected air quality violation;
3. Expose sensitive receptors (such as schools, residents, or hospitals) to substantial pollutant concentrations;
4. Not conform to applicable Federal, State, or local thresholds on a long-term basis, or;
5. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard.

Alternative 1 - No Action. Under the no action alternative, the project would not be constructed, and there would be no construction-related effects on air quality in the project area. Air quality would continue to be influenced by climatic and geographic conditions, local and regional emissions from vehicles and households, and local commercial and industrial land uses. Air quality is expected to improve in the future based on the stricter standards implemented by CARB and FRAQMD. However, air emissions would temporarily increase in the event of an emergency flood-fighting situation or cleanup after a levee failure.

Alternative 2 - Proposed Levee Improvements. Construction activities would extend from May 1, 2018, through the fall of 2019. Combustion emissions would result from the use of construction equipment, power generators, truck haul trips to and from the Brookfield borrow site and potential disposal sites, and worker vehicle trips to and from the work areas. Exhaust from these sources would contain ROG, carbon monoxide (CO), NO_x, PM₁₀, PM_{2.5} and carbon dioxide (CO₂). Exhaust emissions would vary depending on the type of equipment, the duration of use, and the number of construction workers and haul trips to and from the construction site. Fugitive dust would also be generated during disturbance of the ground surfaces during construction. Although material excavated during construction would be stored in the staging areas for reuse, materials would be moved multiple times from excavation to stockpile to fill placement. The proposed haul route encircles the project area for an approximately six miles round trip, and it is estimated that approximately 65 construction vehicles hauling materials would access the site per day.

The updated Road Construction Emissions Model, Version 8.1.0 (SMAQMD, 2016) was used to estimate project emission rates for ROG, CO, NO_x, PM₁₀, PM_{2.5}, and CO₂. The estimated equipment to be used, volume of material to be moved, and disturbance acreages were compiled to determine the data to input into the emissions model. The emission calculations are based on standard vehicle emission rates built into the model. Details and results of the calculations for each reach are provided in Appendix B. The estimated emissions for the Natomas Reach D Project are shown in Table 3.

Table 3. Estimated Air Emissions for Natomas Reach D

	ROG	CO	NO_x	PM₁₀	PM_{2.5}	CO₂
Total emissions (lbs/day)	6.16	51.02	64.80	53.45	13.57	8,087.44
FRAQMD thresholds (lbs/day)	25	N/A	25	80	N/A	N/A
Total (tons/construction project)	0.84	6.83	8.56	7.59	1.9	1,140.79
Federal standards (tons/year)	25	100	25	100	N/A	N/A

NO_x = nitrogen oxides
 CO = carbon monoxide
 SO_x = sulfur oxides
 CO₂ = carbon dioxide
 FRAQMD = Feather River Air Quality Management District
 lbs = pounds
 Note: Estimates are rounded.

PM₁₀ = particulate matter 10 micrometers or less
 PM_{2.5} = particulate matter 2.5 micrometers or less
 ROG = reactive organic gases

Table 3 summarizes the estimated emissions (in pounds per day and total tons for the project) and compares them to the Federal standards and local thresholds. Based on the air quality analysis performed, the estimated emissions totals of PM₁₀ and ROG for the construction of Reach D would be below the Federal conformity *de minimis* thresholds established by the EPA. The project would exceed the FRAQMD daily threshold for NO_x; however, mitigation measures would be implemented to reduce the anticipated NO_x emissions to the greatest extent practicable.

The project would not contribute on a long-term basis to existing or projected air quality violations, or expose sensitive receptors to substantial pollutant concentrations. The project would implement all the FRAQMD Basic Construction Emission Control Practices (included in Appendix B) and would disturb less than 15 acres of area per day. These factors, along with mitigation, below, would ensure that air quality impacts related to implementation of the project would be less than significant.

Avoidance, Minimization, and Mitigation Measures

Emissions would result from the use of construction equipment, truck haul trips to and from the borrow sites, and worker vehicle trips to and from the construction sites. Prior to construction, the contractor would submit a construction equipment list to be used in the project for approval by the Corps and FRAQMD. FRAQMD would confirm the fleet emissions and endorse the list only if the total fleet emissions would meet a 20% reduction in NO_x and a 45% reduction in PM₁₀ in comparison to the state fleet emissions average. The contractor would be required to follow the requirements of FRAQMD's standard mitigation program:

- Construction equipment exhaust emissions would not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions limitations (40 percent opacity or Ringelmann 2.0);
- The contractor would be responsible to ensure that all construction equipment is properly tuned and maintained prior to and for the duration of onsite operations;
- Idling time would be limited to 5 minutes, per the State Idling Rule (13 CCR Chapter 10, Section 2485 and 13 CCR Chapter 9 Article 4.8 Section 2449); and
- Existing power sources or clean fuel generators would be used to the extent practicable.

Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require CARB Portable Equipment Registration with the State or a local district permit. The contractor would be responsible for arranging appropriate consultations with CARB or FRAQMD to determine registration and permitting requirements prior to equipment operation at the site.

Additionally, a Fugitive Dust Control Plan would be submitted to FRAQMD prior to the start of construction (FRAQMD 2016). Implementation of the BMPs listed below would reduce air quality degradation caused by dust and other contaminants:

- During construction, implement all appropriate dust control measures, such as tarps or covers on dirt piles, in a timely and effective manner.
- Periodically water all construction areas having vehicle traffic, including unpaved areas, to reduce generation of dust. Application of water would not be excessive or result in runoff into storm drains.
- Suspend all grading, earth moving, or excavation activities when winds exceed 20 miles per hour.
- Water or cover all material transported offsite to prevent generation of dust.
- Sweep paved streets adjacent to construction sites, as necessary, at the end of each day to remove excessive accumulations of soil or dust.
- Cover all trucks hauling dirt, sand, soil, or other loose material would comply with the requirements of California Vehicle Code Section 23114. This provision would be enforced by local law enforcement agencies.
- Revegetate or pave areas cleared by construction in a timely manner to control fugitive dust.

Any additional mitigation required would be offset by mitigation fees, which would be paid by the contractor to FRAQMD. As a result, the proposed action does not require an in-depth conformity analysis to evaluate ambient air quality concentrations and instead is presumed to conform to the region's ozone and PM₁₀ State implementation plan. Impacts to air quality would be temporary, short-term, and localized. Sensitive receptors, such as schools, residences,

or hospitals would not be exposed to substantial pollutant concentrations. These proposed avoidance, minimization, and mitigation measures would reduce impacts to less than significant.

3.2.6 Climate Change

Environmental Setting

Warming of the climate system is now considered to be unequivocal (IPCC, 2007). Global average surface temperature has increased approximately 1.33 degrees Fahrenheit (°F) over the last one hundred years, with the most severe warming occurring in the most recent decades. In the twelve years between 1995 and 2006, eleven years ranked among the warmest years in the instrumental record of global average surface temperature (going back to 1850). Continued warming is projected to increase global average temperature between 2 and 11 °F over the next 100 years (IPCC, 2007).

The causes of this warming have been identified as both natural processes and as the result of human actions. Increases in greenhouse gas (GHG) concentrations in the Earth's atmosphere are thought to be the main cause of human-induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. The six principal GHGs of concern are CO₂, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

On August 1, 2016, the Council on Environmental Quality (CEQ) released final guidance regarding the consideration of GHGs in NEPA documents for Federal actions. The guidance “does not establish any particular quantity of GHG emissions as ‘significantly’ affecting the quality of the human environment or give greater consideration to the effects of GHG emissions and climate change over other effects on the human environment;” however, it recommends that agencies “should consider (1) The potential effects of a proposed action on climate change as indicated by assessing GHG emissions, and (2) The effects of climate change on a proposed action and its environmental impacts (CEQ, 2016).

Environmental Effects

Basis of Significance.

The proposed project could result in a significant impact if it would generate GHG emissions:

1. That may cause a significant net increase in emissions;
2. That does not comply with any applicable threshold of significance; or
3. That would conflict with any applicable plan, policy, or rules regulating the emissions of GHGs.

Alternative 1 - No Action. Under the no action alternative, the project would not be constructed, and there would be no construction-related effects on climate change in the project

area. Locally generated emissions, including levee O&M, would continue. The climate would continue to be influenced by local and regional emissions from vehicles, and local commercial and industrial land uses. Additionally, with the California ARB and FRAQMD implementing stricter ozone precursor standards, it is anticipated that GHG emissions would be reduced from current levels in the future. However, large amounts of GHG emissions could result from flood-fighting activities in the event of a potential or actual levee failure.

Alternative 2 - Proposed Levee Improvements. Natomas Reach D is a relatively small, short-term project and emissions from construction vehicles would occur during a short time period. Using the emissions model and calculations previously discussed in Air Quality (Section 3.2.5), CO₂ emissions are estimated to be less than 2,000 tons per year.

The proposed construction would use large, diesel-fueled construction vehicles during all phases of the project. The partial degrade of the levee crown at Northern Main, Bennett, and Pumping Plant 4 would result in emissions from bulldozers, scrapers and graders, as well as emissions from the haul trucks used to dispose of material. Diesel-powered graders, compactors, pavers, and haul trucks for borrow materials would be used for the re-construction of the levee crown. The excavation of the new Vestal Drain would result in emissions from excavators, bulldozers, and scrapers as well as emissions from haul trucks. The filling in of the existing Vestal Drain would result in emissions from haul trucks, graders, and compactors.

In addition to the construction vehicles, mixers, and haul trucks involved in the actual construction of the project, there would also be GHG emissions from the workforce vehicles. Workers would commute from their homes to the construction site and park in the staging areas. Workers are assumed to commute approximately 30 miles from the construction site due to the remote setting of the project. During construction, there may be times during which large construction vehicles on the roads slow regular traffic patterns, increasing emissions from vehicles that use the roads on a regular basis.

The long-term O&M of the project sites would remain the same with or without project conditions. Current O&M involves the periodic mowing and spraying of the levee slopes for fire danger control and observation of the levee slope. While the project does not improve O&M efficiency, the project would also not increase emissions due to O&M.

The most recent version of the Sacramento Metropolitan Air Quality Management District (SMAQMD) Road Construction Emissions Model (version 8.1.0) now generates an output for CO₂ and CO_{2e}. The SMAQMD Road Construction Emissions Model was developed based on knowledgeable individuals from SMAQMD, the California Department of Transportation, the California ARB, and the EPA. As discussed in Table 3 (Section 3.2.5), estimated CO₂ emissions for the Natomas Reach D Project would total approximately 7,992 lbs/day and approximately 1,133 total tons for the construction of the entire project. The estimated CO_{2e} emissions would total approximately 8,061 lbs/day and approximately 1,142 total tons for the construction of the entire project. Details and results of the calculations are provided in Appendix B.

There would be no significant increase of long-term emissions (permanent sources) of GHGs from this project. Maintenance emissions would be the same, and the rehabilitated Pumping Plant 4 would not use significantly more electricity. Based on the review discussed above, this project does not conflict with any applicable plan, policy, or rules regulating the emissions of GHGs.

Avoidance, Minimization, and Mitigation Measures

BMPs and implementation of the standard construction mitigation measures as recommended by FRAQMD would reduce GHG emissions, including but not limited to:

- Minimize the idling time of construction equipment to no more than five minutes or shutting equipment off when not in use;
- Maintain all construction equipment in proper working condition;
- Encourage carpools, shuttle vans, and/or alternative modes of transportation for construction worker commutes; and
- Use locally sourced or recycled materials for construction materials as much as practicable.

These measures and other BMPs as listed in Section 3.2.5, Air Quality, would reduce impacts to less than significant.

3.2.7 Water Resources and Quality

Baseline Conditions

The Natomas Basin is bounded on all sides by waterways, including the Sacramento River to the west, the American River to the south, the NEMDC and PGCC to the east, and the NCC to the north. Levees along these rivers and canals reduce flood risk and convey water from the Sierra Nevada to the Sacramento-San Joaquin Delta. Winter rains and spring snow melt can cause high flows in the valley's rivers. High water flows stress levees and berms, weakening them, causing them to erode, and possibly fail. To maintain the levee system, areas with existing or potential erosion and seepage damage are periodically identified and repaired.

The Sacramento River is the major waterway in the project area. The river flow is influenced by upstream dams, local weather, spring snow melt, flood bypasses, and upstream tributaries such as the Feather River to the north and the NCC to the east.

The local rivers, lakes, and rainfall recharge the ground water table in the project area. The ground water table is approximately 75 feet below the surface (DWR, 2011). Average ground water depth can be affected by seasonal changes in water volume in the valley, rivers, and lakes, local rainfall, and urban demand on the ground water (DWR, 2012).

Environmental Effects

Basis of Significance. A project would significantly affect water resources if it would:

1. Violate any water quality standards or waste discharge requirements;
2. Substantially deplete surface water or groundwater supplies, or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level ;
3. Substantially alter the existing drainage pattern of a site or area, including the alteration of a course of a stream or river; or
4. Interfere with existing beneficial uses or water rights.

Alternative 1 - No Action. Under this alternative, there would be no construction activity to affect water resources or quality in the project area. The surface and groundwater conditions would continue to be affected by agricultural and urban contaminants through runoff. Extreme flooding events could wash siltation and contaminants into the water system, and if emergency levee work became necessary to prevent levee failure, measures required for the protection of water quality might not be able to be used.

Alternative 2 - Proposed Levee Improvements. Levee construction would occur within the levee alignment, the landside levee slope, and portions of the waterside slope. In-water placement of riprap would be placed along the waterside toe of Bennett, Northern Main, and Pumping Plant 4 sites. Soil-filled rock would be placed above the mean summer elevation of water surface at the Northern Main and Bennett sites. An outfall structure would be constructed on the waterside slope of Pumping Plant 4.

In order to prepare the sites to receive riprap, small vegetation and loose materials would be removed, and trees greater than two inches in diameter would be protected in place to the greatest extent practicable. After clearing, if the bank exhibits signs instability from an engineering and site safety standpoint, the additional unstable material would be removed. Riprap would be placed directly in the water up to the mean summer water elevation. Coir fabric would be placed on top of the lower riprap layer as a barrier between this riprap and the soil-filled rock, and soil-filled rock would be placed as a planting zone to allow for revegetation of the site. Willow pole cuttings would be placed in the soil-filled rock to a depth below the mean summer water elevation.

The placement of riprap along the river banks would temporarily generate increased turbidity in the immediate vicinity of the construction area. Additionally, placement of riprap in the water could result in a sediment plume becoming suspended in the water and could generate turbidity levels. BMPs would be implemented to reduce impacts to less than significant.

Approximately 50 acres of bare soil would be exposed during the entirety of construction; however, it is anticipated that no more than 5 acres of soil would be disturbed per day. Upon completion of construction, the levee slope, canal banks and staging areas would be

reseeded with native noninvasive species. Dust control measures would be implemented on the levee crown, side slopes, maintenance roads and stockpiles to avoid dust and soil from entering the river, canal, or other drainages as a result of construction activities. BMPs would be followed to avoid erosion and movement of soils into the drainage system.

In addition, inadvertent spills of oil or fuels from construction equipment could be a source of contamination at work or staging areas. Precautions would be followed to avoid contamination. The contractor would be required to properly store and dispose of any hazardous waste generated at the site. These BMPs and the avoidance, minimization, and mitigation measures listed below would prevent any contaminants from entering the river.

Additionally, there are many irrigation and drainage canals and pipes along the alignment of the Vestal Drain. While it is not anticipated that there would be any impacts to water quality during construction, the drainage into the existing Vestal Drain could be interrupted during the construction of the new Vestal Drain alignment.

Avoidance, Minimization, and Mitigation Measures

Since the project would disturb more than 1 acre of land, the contractor would be required to obtain a National Pollution Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board (RWQCB), Central Valley Region. As part of the permit, the contractor would be required to prepare a SWPPP, identifying BMPs to be used to avoid or minimize any adverse effects to surface waters during construction.

The incorporation of the following BMPs would reduce effects to water quality to less than significant:

- The contractor would prepare a spill control plan and a SWPPP prior to initiation of ground disturbing construction activities. The SWPPP would be developed in accordance with guidance from the RWQCB, Central Valley Region. These plans would be reviewed and approved by the Corps before construction begins.
- During placement of riprap into the water, materials such as coir mats or hay bales, rock groins, sand bags, and drain screens would be utilized to prevent sediment from traveling outside the construction area footprint.
- Implement appropriate measures to prevent debris, soil, rock, or other material from entering the water when not actively placing riprap. Use a water truck or other appropriate measures to control dust on haul roads, construction areas, and stockpiles.
- Properly dispose of oil or other liquids.
- Fuel and maintain vehicles in a specified area that is designed to capture spills. This area cannot be near any ditch, stream, or other body of water or feature that may convey water to a nearby body of water.
- Inspect and maintain vehicles and equipment to prevent dripping of oil or other liquids.

- Schedule construction to avoid the rainy season as much as possible. Ground disturbance activities are scheduled to begin May 1, 2018. If rains are forecasted during construction, erosion control measures would be implemented as described in the RWQCB Erosion and Sediment Control Field Manual.
- Maintain sediment and erosion control measures during construction. Inspect the control measures before, during, and after a rain event.
- Train construction workers in stormwater pollution prevention practices.
- Revegetate disturbed areas in a timely manner to control erosion.

BMPs would be implemented to maintain the integrity of soil stockpiles; no material would enter the NCC or the Sacramento River. The construction of the new Vestal Drain would be completed inland with no connection to water sources until the existing Vestal Drain is decommissioned and flows are diverted into the new alignment; therefore, no impacts to water quality are anticipated during the realignment of the Vestal Drain. The completed levee improvements would not significantly alter the alignment of the current levee nor would they provide for any additional flow capacity beyond the current design requirements. The improvements would not alter the river hydraulics nor would they alter the downstream capacity of the levee system. Since no significant adverse effects to groundwater or surface water resources are anticipated, no additional mitigation is required.

3.2.8 Traffic and Circulation

Baseline Conditions

Streets in the project area consist of a mix of regional highways, county maintained roads, and levee roads. There are no sidewalks in the area and the public does not access the project area on a regular basis. With the exception of some residences located along the haul routes to and from the Brookfield borrow site, the nearest residences are located more than 1,500 feet from the project. Roadways that border Reach D include: SR 99, Garden Highway, Howsley Road, Sankey Road, Natomas Road and West Riego Road. The highways run north-south, crossing the canal. Traffic along these roads include private automobiles and light and heavy (semi-trucks) commercial vehicles. With the exception of Levee Road, these roadways are on the landside of the levee. The majority of other roads near the project site are unpaved maintenance and agricultural roads, including those around the TNBC managed wetland sites. There is little to no pedestrian or bicycle traffic in the project area.

The Public Works Department of Sutter County is responsible for planning, designing, constructing, operating, and maintaining all the roadways in the Natomas Basin within the county. SR 99, I-5, and I-80 are the exception and are owned by the State. The *Sutter County General Plan Background Report* (Sutter County, 2010) contains the most recent traffic count and level of service (LOS) data for roadways. LOS is a qualitative description of operation of a roadway segment based on delay and maneuverability. LOS can range from “A,” representing free-flow conditions, to “F,” representing gridlock. In the general plan background report, Garden Highway between Catlett and Riego Road was rated LOS A, with an average daily traffic (ADT) volume of 150. SR 99 was rated LOS C with an ADT volume of 33,500 between Sankey

Road and Howsley Road and from Howsley Road to SR 70. Riego Road, from Garden Highway to SR 99 was rated at LOS A with an ADT volume of 650, and Sankey Road traffic from Garden Highway to SR 99 was negligible.

The nearest major roads to the project area are SR 99 and Garden Highway. SR 99 is a primary regional transportation corridor within Sutter County and supports north/south regional travel along the Central Valley. SR 99 extends from I-5 in the project area north through Sacramento and Sutter Counties to the Butte County line. The roadway has two to four lanes over its length and provides regional access to the Sacramento metropolitan area in the south and the cities of Gridley and Chico in the north. The freeway sections connect and serve the agriculture and industry of the California Central Valley, connecting agricultural production with processing and packing businesses. Back annual average daily traffic (AADT) represents traffic south of the count location and is the total volume for the year divided by 365 days. The back AADT on SR 99 at the intersection of Riego Road in 2015 was 37,500 vehicles. The back AADT on SR 99 at the junction at SR 70 in 2014 was 31,500 vehicles (CalTrans, 2015). SR 99 crosses the NCC in between these two count locations. Traffic volume on these roads peaks during the morning and evening rush hours, and reduces in volume during the middle of the day.

Garden Highway is a north/south two-lane roadway that extends north from the Sacramento city limits along the Sacramento River to Yuba City. Garden Highway serves as an alternative north/south route to SR 99. Howsley Road is an east/west two-lane roadway that intersects SR 99 at the NCC and crosses the PGCC and connects with Pleasant Grove Road just west of the Sutter/Placer County line.

Environmental Effects

Basis of Significance. The project would significantly affect traffic if it would:

1. Cause an increase in traffic volume that is substantial in relation to the existing load and capacity of a roadway;
2. Cause an increase in safety hazards on an area roadway; or
3. Cause substantial deterioration of the physical condition of the nearby roadways.

Alternative 1 - No Action. The no action alternative would have no effect on the traffic and circulation in the project area. The existing roadways, bike paths, types of traffic, traffic volume, and circulation patterns would not change. However, traffic could increase in the event of an emergency flood-fighting situation or cleanup after a levee failure. During a flood event, monitoring efforts would increase, and emergency vehicles would require access to the site. In the event of a levee failure or breach, roads could be closed or washed out.

Alternative 2 - Proposed Levee Improvements. The project would temporarily affect local roads and major urban connector roads that are used as haul routes during construction. Haul trucks would cause an increase in traffic volume and reduce traffic speeds on local roads.

During construction, haul trucks would travel between the licensed disposal facility, the Brookfield borrow site, and the construction site. Haul trucks would be limited to the landside toe maintenance roads to the south of the levee and the existing and new Vestal Drain alignments. External haul routes would require the use of SR 99, Garden Highway, Howsley Road and Natomas Road. During the height of construction, it is estimated that trucks conducting approximately 50 haul trips would be accessing the site per day. The type and volume of construction traffic should not cause a substantial deterioration of the physical condition of the nearby roadways; however, pre-construction and post-construction conditions would be documented by the contractor. Any deteriorated roadways determined to be caused by the project would be repaired by the contractor.

Avoidance, Minimization, and Mitigation Measures

The contractor would be required to develop a Traffic Control Plan, which would be reviewed and approved by Sutter County prior to construction. This plan would include the following measures:

- Do not permit construction vehicles to block any roadways or private driveways.
- Provide access for emergency vehicles at all times.
- Select haul routes to avoid schools, parks, and high pedestrian use areas, when possible.
- Obey all speed limits, traffic laws, and transportation regulations during construction.
- Use signs and flaggers, as needed, to alert motorists, bicyclists, and pedestrians to avoid conflict with construction vehicles or equipment.
- Flaggers would be used at each roadway that crosses the levee to safely circulate traffic through the construction site.
- Use separate entrances and exits to the construction site.
- Prior to construction, notify local residents, business, schools, and Sutter County if road closures would occur during construction.
- The contractor would repair roads damaged by construction.

To reduce traffic safety hazards, a flagger at Howsley Road would control construction traffic as the haul trucks leave the construction site and enter the borrow site. These proposed mitigation measures would reduce the effects on traffic and circulation to less than significant.

3.2.9 Noise and Vibration

Baseline Conditions

Noise is defined as unwanted sound that evokes a subjective reaction to the physical characteristics of a physical phenomenon. Ambient noise in the project area is minimal but is mostly generated by traffic on Garden Highway and SR 99. Other noise may be generated primarily in the summer by motorized recreation on the Sacramento River. Based on experience

with similar settings, it is assumed existing noise levels in the project area are in the range of 60 to 70 decibels day-night sound level (L_{dn}). Noise-sensitive receptors in or near the project area include residents, agricultural workers, and wildlife.

The project area is located in a secluded area with no public vehicle access. The NCC does flow into the Sacramento River, which directly parallels Garden Highway. The high quantity of open space and vegetation provides natural buffers from the few residences near the NCC. Currently, the main sources of noise include motor vehicles, agricultural activity, and natural sounds.

Since Reach D lies within Sutter County, the County's noise policies and regulations apply to the project. The County has established policies and regulations concerning the generation and control of noise that could adversely affect their citizens and noise-sensitive land uses. The *Sutter County General Plan* (Sutter County, 2011) is a document required by state law that serves as the County's "blueprint" for land use and development. The General Plan provides an overall framework for development in the county and protection of its natural and cultural resources. The Noise Element of the General Plan contains planning guidelines relating to noise. The *Sutter County General Plan* Noise Element has established noise standards for noise-sensitive land uses. Near agricultural areas, the County has established an exterior noise level of 75 A-weighted decibels (dBA) L_{dn} and an interior noise level of 45 dBA L_{dn}. The County's Noise Ordinance also states any exterior noise limits must not exceed 65 dBA between 10:00 p.m. and 7:00 a.m. (nighttime) and 70 dBA between 7:00 a.m. and 10:00 p.m. (daytime and evening) for industrial, manufacturing, utilities, and agricultural areas (Sutter County, 2011).

Although construction equipment may cause noticeable increase in ambient noise levels near individual levee construction and staging areas, any noise increases would be short term and intermittent. Construction noise would fluctuate depending on construction phase, equipment type and duration of use, distance between noise source and receptor, and presence or absence of barriers between noise source and receptor. Noise from construction activity generally attenuates at six dBA per doubling of distance. Assuming an attenuation rate of six dBA per doubling of distance, construction equipment noise in the range of 80 to 90 dBA at 50 feet would generate noise levels of 74 to 84 dBA at 100 feet from the source. The nearest residences are located more than 1,500 feet away from the construction activities. Using the same attenuation rate of 6 dBA per doubling of distance, the noise levels would be reduced to 50 to 60 dBA based on the distance from the source.

Environmental Effects

Basis of Significance. Adverse effects related to noise are considered significant if an alternative would result in any of the following:

1. Exposure of persons or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. Substantial short-term or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project;
3. Substantial long-term increase in ambient noise levels in the project vicinity above levels existing without the project;
4. Vibration exceeding 0.2 inch per second within 75 feet of existing buildings.

Alternative 1 - No Action. Under the no action alternative, there would be no project-related effects to noise. Sources of noise and noise levels would continue to be determined by local activities, development, and natural sounds. However, noise levels would temporarily increase in the event of an emergency flood-fighting situation.

Alternative 2 - Proposed Levee Improvements. Construction activity noise levels at and near the construction areas would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, and construction activities within the staging area would increase noise levels near the NCC waterway. Table 4 shows typical noise levels during different construction stages. Table 5 shows typical noise levels produced by various types of construction equipment.

Table 4. Typical Construction Noise Levels

Construction Phase	Noise Level (dBA, Leq) ^a
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

^a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.
Source: U.S. Environmental Protection Agency, 1971.

Table 5. Typical Noise Levels From Construction Equipment

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Backhoe	85

Source: Cunniff, Environmental Noise Pollution, 1977.

Noise from construction activities generally attenuates at a rate of 6 dBA per doubling of the distance from the reference noise source. Residences are located approximately 1,500 feet from the construction activities; however, there are a few residences located along the haul route. During the height of construction, the haul route is expected to have up to 50 round trips per day. A receptor at 50 feet from a dump truck would experience noise levels up to approximately 88 dBA during a pass by.

Construction activities associated with the project would be temporary in nature and related noise impacts would be short-term. The County's Noise Ordinance states that any exterior noise limits must not exceed 65 dBA between 10:00 p.m. and 7:00 a.m. (nighttime) and 70 dBA between 7:00 a.m. and 10:00 p.m. (daytime and evening) for industrial, manufacturing, utilities, and agricultural areas (Sutter County, 2011). Construction would be performed during daytime hours only no earlier than 7 AM and no later than 10 PM. Equipment warm-up is inclusive of these hours. Sensitive receptors that could be affected by this increase include residents, wildlife, and recreationists. The Sutter County General Plan requires construction projects to limit noise-generating construction activities taking place within 1,000 feet of sensitive receptors to the hours. Haul roads that pass near residences would be restricted to daytime hours between 7:00 am and 6:00 pm Monday through Friday, 8:00 am and 5:00 pm on Saturdays. No hauling past residences would be permitted on Sundays and holidays unless permission has been applied for and granted by the County. Construction would begin in May 2018 and continue through fall 2019.

Construction activities associated with the project may result in some minor amount of ground vibration. Vibration from construction activity is typically below the threshold perception when the activity is more than about 50 feet from the receptor. The closest residences to the construction activities would be approximately 1,500 feet away. The haul traffic would add a small volume of trucks to the roads in this area. Truck traffic related to agricultural and nearby industries use the roads in the area; therefore, this increase would be less than significant due to the small change from no action conditions. Additionally, the transitional nature of the construction activities would have intermittent exposure to any one location. Vibration from these activities would be short term and would end when construction is completed.

Avoidance, Minimization, and Mitigation Measures

The following measures would be implemented to further reduce the potential adverse effects related to noise and vibration:

- Construction would be performed during daytime hours only Monday through Friday no earlier than 6 AM and no later than 8 PM. Saturday construction hours are also limited to daytime hours only, and can start no earlier than 8 AM and end no later than 8 PM. Equipment warm-up is inclusive of these hours. Sunday hours are 8 AM to 8PM, daytime hours only, but are limited to equipment maintenance only.
- Construction equipment noise shall be minimized during project construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications) and by shrouding or shielding impact tools.

- Turn off all equipment, haul trucks, and worker vehicles when not in use for more than 5 minutes.
- Notify residences, schools, and businesses about the type and schedule of construction.

The closest residences to the construction activities would be approximately 1,500 feet away, and implementation of the measures described above would minimize the exposure of residents, schools, businesses, wildlife, and recreationists to excessive noise. Therefore, the impact after mitigation is less than significant.

3.2.10 Public Utilities and Services

Baseline Conditions

Overhead electric utilities exist in the project area. The primary electric supply comes from the existing PG&E overhead 12 kilovolt (kV) pole line, which parallels the NCC south levee. PG&E has determined that the overhead powerline crossing the NCC at the Bennett site needs to be replaced and relocated approximately 60 feet southwest of its existing location, with or without the project. Additional poles associated with the former Bennett Pumping Plant are planned to be removed, as they are no longer being utilized. Additional utilities and services in the project area include irrigation canals and pumping stations.

Environmental Effects

Basis of Significance. A project would significantly affect public utilities and services if it would:

1. Disrupt or significantly diminish the quality of the public utilities and services for an extended period of time; or
2. Damage public utility and service facilities, pipelines, conduits, or power lines.

Alternative 1 - No Action. Under the no action alternative, there would be no impacts to public utilities or services in the area. The new PG&E poles would still be placed, and abandoned poles would be removed by PG&E at a later date.

Alternative 2 - Proposed Levee Improvements. The proposed power pole relocation project would relocate the PG&E power pole approximately 60 feet to the southwest. The installation of the new power pole would require a guy anchor at the southern end of line. In order to reconnect the relocated power pole, two power poles would be replaced, one on the waterside and one on the landside of the NCC. Additionally, three abandoned power poles within the levee footprint would be removed.

The project includes replacement of the existing Pumping Plant 4 pumps with new upgraded pumps. Due to the substantial increase in pumping head, the new pumps have larger horsepower electric motors than the existing pumps. The existing two 450 horsepower pumps

would be replaced with two 600 horsepower pumps, and the existing 300 horsepower pump would be replaced with a 450 horsepower pump. These upgrades require a medium voltage transformer (2400kV) to be installed, which is planned to be housed in a new electrical building. Additionally, the existing trash rack would be replaced and widened for equipment access. The construction of the new Pumping Plant 4 requires a larger electrical service due to the pump horsepower upgrades. This new electrical service would require the construction of a new pad-mounted transformer. The overhead wires above the existing Pumping Plant 4 sump would be re-route to the south around the plant site to allow clear overhead space above the pump plant, which is needed to allow cranes to pick up the pumps.

Abandoned utility lines, wells, and/or foundations that currently exist within the project boundaries would be removed and disposed of off-site. The holes resulting from the removed poles would be backfilled, and the area would be stabilized. The electrical service required for the new pumps at Pump Plant 4 would increase the power load in the area; however, the increase would be marginal and would only be needed when the pumps are in use. As the pumping stations are more likely to be used during winter storms when electrical demand is lower, the long term impacts would be less than significant.

The Sankey Canal has several utilities that need to be protected in place. There are control panels and level gauges located at both the Bennett Irrigation Canal and North Drainage Canal. There are also flow meters at the Bennett Irrigation Canal that need to be protected in place. While it is not anticipated that there would be any interruption in irrigation service, the drainage into the existing Vestal Drain could be interrupted during the construction of the new Vestal Drain alignment. Additionally, temporary interruptions of irrigation supply could occur if irrigation infrastructure is damaged or inoperable during construction.

Two large box culverts are necessary to complete the Vestal Drain relocation. A 6 x 6-foot culvert would be constructed completely beneath the current Bennett Canal bottom elevation. However, instead of rebuilding the canal above the proposed culvert, the two existing 54-inch diameter pipes (charged by the Sankey Canal) are planned to be extended over the culvert and backfilled. In this respect, the existing Bennett Canal would be shortened by approximately 70 linear feet. An 8 x 8-foot box culvert is planned to connect the relocated Vestal Drain to the North Drainage Canal under the drain's access road.

Avoidance, Minimization, and Mitigation Measures

Prior to initiating ground disturbing activities, the contractor would coordinate with Underground Services Alert to ensure that all underground utilities are identified and marked. Utilities not planned to be relocated or removed would be protected in place. If any utilities require disruption of service, residents and businesses within the potentially affected area would be given notice of the anticipated time and duration of the disruption of service before the start of construction.

During the relocation and removal of the power poles, PG&E would allow access for vehicles and equipment for emergency and maintenance operators. During the construction of

the Natomas Reach D Project, PG&E structures and lines would be avoided to allow access for maintenance and repair.

The project site is not immediately adjacent to residences. Implementation of the project is not expected to interrupt public services such as mail delivery, trash pickup, street sweeping, etc. No public utilities services would be interrupted during construction, but power would be temporarily cut to the RD 1000 Pumping Plant 4. The RD 1000 Pumping Plant 2 has the capacity to serve the upper Natomas Basin for drainage needs until Pumping Plant 4 is complete and operational. Prior to initiating ground disturbing activities, the contractor would coordinate with Underground Service Alert to ensure all underground utilities are identified and marked. Coordination with PG&E would reduce potential impacts to less than significant.

3.2.11 Cultural Resources

Baseline Conditions

Regulatory Setting. Section 106 of the National Historic Preservation Act of 1966 (NHPA) and the implementing regulations (36 CFR Part 800) requires Federal agencies to consider the effects of their actions on the properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP). To determine whether an undertaking could affect National Register-eligible properties, the Federal agency determines the area of potential effects (APE) which then must be inventoried for cultural resources (including archeological, historical, and traditional cultural properties). Any resources encountered are then evaluated for listing in the National Register, and impacts to any National Register eligible sites are considered prior to implementation of the undertaking.

CEQA also requires that for public or private projects financed or approved by public agencies, the effects of the projects on historical resources and unique archeological resources must be assessed. Historical resources are defined as buildings, sites, structures, objects, or districts that have been determined to be eligible for listing in the California Register of Historical Resources. Properties listed in the National Register are automatically eligible for listing in the California Register.

Cultural Setting. The term “cultural resources” is used to describe several different types of properties: prehistoric and historic archeological sites; architectural properties, such as buildings, bridges, and infrastructure; and resources of importance to Native Americans (traditional cultural properties). Artifacts include any objects manufactured or altered by humans.

Prehistoric archeological sites date to the time before recorded history. This area of the U.S. consists primarily of sites associated with Native American use before the arrival of Europeans. Archeological sites dating to the time when these initial Native American-European contacts were occurring are referred to as protohistoric. Historic archeological sites can be associated with Native Americans, Europeans, or any other ethnic group. In the study area, these sites include the remains of historic structures and buildings. Structures and buildings are

considered historic when they are more than 50 years old or when they are exceptionally significant.

A traditional cultural property is defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (National Park Service, 1998). Although normally associated with Native Americans, traditional cultural properties can include those that have significance derived from the role the property plays in any cultural groups' or communities' historically rooted beliefs, customs, and practices.

Pursuant to 36 CFR §800.16(l)(1), historical property is defined as "...any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria."

Records and Literature Search & Field Work:

A records and literature search of the APE was conducted for the overall Natomas Basin in 2008. Within the area of potential effects (APE) for the project a records and literature search indicates there are known cultural resources associated with Reclamation District (RD) 1000, including the Vestal Drain south of the Natomas Cross Canal (NCC), the NCC levee, and the pump stations (Northern, Bennett, and Pumping Plant 4). Northern and Bennett pump stations were removed in 2009 and the remaining components (abandoned conduits, box culverts, and pipes) are all that remain. Pumping Plant 4 was built in 1964 with additional pumps installed in 1985 and 1989, and is not a part of the historic drainage system of RD 1000.

An updated records and literature search was conducted in July 2017 as part of the Corps' inventory efforts. Corps Archaeologist Dr. Patrick O'Day, PhD, and Student Archaeologist Mrs. Hope Schear conducted an in house records search and historical research on the internet using the USGS Topoview database of historical maps, and the BLM General Land Office (GLO) database of historic survey plats, notes, and land patent records. The information gathered was used to determine the methods that would be employed during pedestrian survey of the area of potential effect (APE).

An intensive pedestrian survey of the project APE was conducted over a three day period in the beginning of July 2017. Dr. O'Day and Mrs. Schear used a combination of surface and subsurface inventory to identify cultural resources. The entire APE was walked in transects and several auger probes were placed in random places throughout the APE. No new resources were found during the pedestrian survey.

In late July 2017 an updated records search for the Reach D APE using a 0.25 mile buffer was conducted at the Northeast Information Center in Chico, CA. The records search revealed five previously recorded resources of which two are located within the APE. There have also been twelve previous investigations conducted within a 0.25 mile radius of the APE. Two

previously recorded resources located within the APE are the Northern Main Pump Station, and the Bennett Pump Station. The Northern Main Pump Station and the Bennett Pump Station were recommended ineligible for the National Register and they were removed in 2009. The remaining components were observed in the field and are still present but will be removed during this phase of the project. These components are not considered contributing elements of the historic drainage system of RD 1000. The vestal drain south of the NCC did not show up in the records search but was observed during the pedestrian survey.

The Corps has initiated consultation with the SHPO and potentially interested Native American Tribes and groups to determine if there are any significant cultural resources that may be adversely effected by this project.

Environmental Effects

Basis of Significance. An alternative would be considered to have a significant adverse effect on cultural resources if it diminishes the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Types of effects include physical destruction, damage, isolation, or alteration of the character of the setting; introduction of elements that are out of character; neglect; and transfer, lease, or sale.

Alternative 1 - No Action. The no-action alternative assumes that no levee improvements would be constructed by USACE. The cultural resources are expected to remain as described in the existing conditions. However, a major flooding event could alter existing conditions by burying, destroying, or revealing cultural resources.

Alternative 2 - Proposed Levee Improvements. The project, as planned, would impact the NCC levee, Vestal Drain, and pumping stations as parts of the National Register listed RD 1000, as well as Pumping Plant 4, which is not a historic component of RD 1000. A Programmatic Agreement (PA) for the American River Common Features Project was executed September 10, 2015. The Corps is in the process of inventory and evaluation of historic properties and determining potential effects to historic properties for Alternative 2, to include consultation with the SHPO, Native American tribes, and interested parties. Any adverse effects to historic properties would be resolved in accordance with the PA.

Avoidance, Minimization, and Mitigation Measures

USACE archaeologists make every effort to identify cultural resources that occur in the APE in order to determine ways to avoid adverse effects, minimize the extent of adverse effects, or mitigate adverse effects. However, the possibility exists that potentially significant inadvertent discoveries of cultural remains could be encountered during project construction. If buried or otherwise obscured cultural resources are encountered during construction, activities in the area of the find would be halted, and a qualified archeologist would be consulted immediately to evaluate the find.

Should any potentially significant cultural resources be discovered, compliance with Stipulation IX of the PA, "Discoveries of Unknown Historic Properties," and Section 9.3 of the American River Common Features Project General Reevaluation Report Historic Properties

Management Plan (HPMP), “Inadvertent Discoveries” would be implemented to mitigate adverse effects to significant properties. Mitigation, or resolution, of adverse effects to historic properties would be completed in compliance with the PA and HPMP and in consultation with SHPO, Native American tribes, and interested parties. Compliance with the PA would reduce this effect to a less-than-significant level.

4.0 GROWTH-INDUCING EFFECTS

Local population growth and development would be consistent with the *Sutter County General Plan*, adopted in 2011 (Sutter County, 2011). The proposed action alternative would not induce growth in or near the project area because the *Sutter County General Plan* is designed to maintain the agricultural and rural setting of this area. Population growth in Sutter County is anticipated to remain low, with the greatest growth experienced in Yuba City and Live Oak. Unincorporated portions of Sutter County are anticipated to maintain a low growth rate (Sutter County, 2011). Additionally, the NBHCP maintains existing upland and riparian habitat for the conservation of listed and unlisted species, and currently maintains over 300 acres of managed wetland habitat on the south side of the NCC, adjacent to the Northern Main Pumping Plant site. This habitat is intended to remain undeveloped in perpetuity, and additional tracts of land surrounding the managed wetland are also intended to maintain undeveloped or rural agricultural characteristics (NBHCP, 2003).

The goal of the proposed action alternative is to complete previously constructed levee improvements on Reach D of the Natomas Basin in order to meet Corps requirements for levee seepage criteria. Construction, operation, and maintenance of the improved levee would not result in a substantial increase in the number of permanent workers or employees.

5.0 CUMULATIVE EFFECTS

NEPA requires discussion of project effects that, when combined with the effects of other projects, result in significant cumulative effects. The NEPA regulations define a cumulative effect as:

“The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor or collectively significant actions taken over a period of time” (40 CFR § 1508.7).

The effects of the proposed construction of Natomas Reach D would likely have no adverse cumulative effects on topography and soils, land use, socioeconomics, noise, recreation and visual resources, traffic, utilities, air quality, and cultural resources. There would be short term cumulative effects on fisheries, vegetation and wildlife, and special-status species; however, mitigation measures would be implemented to reduce the effects.

The cumulative effects of the Natomas Basin Project were addressed in the 2010 American River Common Features Project/Natomas Post-authorization Change Report/Natomas Levee Improvement Program, Phase 4b Landside Improvements Project EIS/EIR (USACE, 2010). Other ongoing regional flood risk reduction projects would increase the level of flood protection provided to lands in the Sacramento Valley region, thereby reducing the risk of adverse effects related to floods. However, the projects could reduce the riparian ecosystems along the river where construction would take place. Mitigation would occur in order to result in no net loss of riparian values, but would cumulatively cause temporary losses and probable changes in the specific types, quantities, and locations of the habitat.

The Natomas Basin Project involves multiple reaches over multiple phases. The construction schedule is subject to change, but is currently projected to take place as follows:

- Reach I, Contract 1: Construction of blanket drain under I-5 crossing of American River and utility relocation, September through November 2017; construction of cutoff wall, April through November 2018.
- Reach H: Construction, March 2018 through November 2019.
- Reach D: Removal of pipes at Bennett and Northern Main sites and relocation of Vestal Drain, May through September 2018; construction of Pumping Plant 4 improvements, July 2018 through fall 2019.
- Reach I Contract 2: Tree removal, November 2019 through February 2020; construction of landside slope stability improvements, April through November 2020.
- Reach B: Adjacent levee with seepage cutoff wall and/or seepage berm: design to begin in 2017; construction proposed for 2019.
- Reach A: Adjacent levee with seepage cutoff wall and/or seepage berm: design to begin in 2018; construction proposed for 2020.
- Reach E: Cutoff wall and levee slope stability improvements: design to begin 2017; construction proposed from May 1 to October 2020.
- Reaches F and G: Cutoff wall and levee slope stability improvements: design to begin 2018; construction proposed from May 1 to October 2021.

Additional projects involving windows remaining from the original NLIP construction and the remaining projects associated with the comprehensive mitigation strategy for the project are planned to be designed and constructed after 2019.

5.1 Other Projects in Local Area

This section briefly describes other major Federal and local projects in the Sacramento area. All of these projects are required to evaluate the effects of the proposed project features on environmental resources in the area. In addition, mitigation or compensation measures must be

developed to avoid or reduce any adverse effects to a less than significant level based on Federal and local agency criteria. Those effects that cannot be avoided or reduced to less than significant are more likely to contribute to cumulative effects in the area.

5.1.1 Folsom Dam Flood Management Operations Study

The Flood Management Operations Study is being completed in conjunction with the Joint Federal Project (JFP) by the Corps, U.S. Bureau of Reclamation (USBR), CVFPB, and SAFCA. The Flood Management Operations Study for Folsom Dam will develop, evaluate, and recommend changes to the flood control operations at Folsom Dam that would further reduce flood risks to the Sacramento area. Operational changes may be necessary to fully realize the flood risk reduction benefits of the following:

- The additional operational capabilities created by the auxiliary spillway;
- The increased downstream conveyance capabilities anticipated to be provided by the Common Features Project;
- The increased flood storage capacity anticipated to be provided by completion of the Folsom Dam Raise Project; and
- The use of improved forecasts from the National Weather Service.

Further, the Flood Management Operations Study will evaluate options for the inclusion of creditable flood control transfer space in Folsom Reservoir in conjunction with Union Valley, Hell Hole, and French Meadows Reservoirs. The study will result in a Corps decision document and will be followed by issuance of a water control manual implementing the recommendations of the Flood Management Operations Study. It should be recognized that the initial water control manual will implement the recommendations of the Study, but will not include the capabilities to be provided by the Folsom Dam Raise Project and additional Common Features Project improvements until such time as these projects have been completed.

5.1.2 Folsom Dam Raise

The Folsom Dam Raise project will follow the JFP. This project includes: (1) raising the crest elevation of the eight dikes, the left wing dam, the right wing dam, and the Mormon Island Auxiliary Dam (MIAD) by approximately 3.5 feet and modifying Folsom Dam's spillway gates, and; (2) three ecosystem restoration projects (automation of the temperature control shutters at Folsom Dam and restoration of the Bushy and Woodlake sites downstream on the American River). It is currently estimated that construction for the actual dam raise elements of the project will begin in 2018 or 2019, and will be completed within approximately 4 years from the start of construction. There presently is no schedule for the three ecosystem restoration projects.

5.1.3 Folsom Dam Safety and Flood Damage Reduction Project Ongoing Construction Activities

The Folsom Dam Safety and Flood Damage Reduction Project addresses dam safety and flood risk management at the Folsom Facility (the main dam, dikes, left wing dam, the right

wing dam, and MIAD). Several activities associated with the project include the Folsom Dam Auxiliary Spillway Joint Federal Project, referred to as the Joint Federal Project (JFP; static upgrades to Dike 4; MIAD modifications; and seismic upgrades (piers and tendons) to the main dam.

JFP Auxiliary Spillway. Construction of the auxiliary spillway began in spring 2009 and should be completed by fall 2017. Over 58 acres of lands disturbed during the construction of this multi-phase project are currently being restored (restore pre-construction topography, planting of native grasses and forbs, etc.) and these efforts should also be completed by fall 2017. Several joint NEPA/CEQA documents have been prepared for the auxiliary spillway project. These include: the USBR 2007 Folsom Dam Safety and Flood Damage Reduction Project EIS/EIR (USBR, 2007); the Corps' 2010 Folsom Dam Safety and Flood Damage Reduction Supplemental Environmental Assessment/EIR for the Control Structure, Chute, and Stilling Basin (USACE, 2010b); the Corps' 2012 Folsom Dam Safety and Flood Damage Reduction Project Environmental Assessment/EIR for the Prison Staging Area and Stilling Basin Drain (USACE, 2012a); the Corps' 2012 Folsom Dam Modification Project Approach Channel Supplemental EIS/EIR (USACE, 2012b); and the Corps' 2016 Folsom Dam Modification Project: Phase V Site Restoration and Related Mitigation Activities Supplemental Environmental Assessment /EIR (USACE, 2016).

Right Bank Stabilization Project: Technical studies and hydraulic modeling indicated that the convergence of flows from the Folsom main dam and the auxiliary spillway could erode and possibly destabilize the existing slope along the right bank of the American River. Existing rock downstream of the stilling basin would be exposed to potential scour when water is released and discharged back to the American River. The proposed action would provide slope protection to the vulnerable upper slope and stabilize the lower portion of the slope with rock anchors. This project, the final component of the JFP, was addressed in the Corps' 2015 Folsom Dam Safety and Flood Damage Reduction Project Supplemental Environmental Assessment /EIR for the Right Bank Stabilization (USACE, 2010b). The Corps was to contract construction of the project originally, but this responsibility has since been transferred to USBR. The start of construction has not yet been scheduled, but could potentially begin in 2018.

5.1.4 Sacramento River Bank Protection Project

The Sacramento River Bank Protection Project (SRBPP) was authorized to protect the existing levees and flood control facilities of the Sacramento River Flood Control Project. The SRBPP is a long-range program of bank protection authorized by the Flood Control Act of 1960. The SRBPP directs the Corps to provide bank protection along the Sacramento River and its tributaries, including that portion of the lower American River bordered by Federal flood control project levees. Beginning in 1996, erosion control projects at five sites covering almost 2 miles of the south and north banks of the lower American River have been implemented. Additional sites at RM 149 and 56.7 on the Sacramento River totaling one-half mile have been constructed since 2001. During 2005 through 2007 construction of 29 critical sites under the Declaration of Flood Emergency by Governor Schwarzenegger totaling approximately 16,000 linear feet. This is an ongoing project, and additional sites requiring maintenance will continue to be identified

indefinitely until the remaining authority of approximately 24,000 linear feet is exhausted over the next 3 years. The WRDA of 2007 authorized an additional 80,000 linear feet of bank.

These projects would help to improve flood protection to residents in the Sacramento area by ensuring the integrity of the levees along the American and Sacramento Rivers. The Common Features Project and the SRBPP would also help meet FEMA's 100-year flood criteria for the Sacramento area levee system. These would be considered beneficial cumulative effects.

5.1.5 Marysville Ring Levee

The Marysville Ring Levee (MRL) Project was originally part of the 1999 Yuba River Basin Project, which included five miles of levee modifications along the MRL to address underseepage. The project is expected to decrease the flood risk to the city of Marysville to about a 0.36 percent chance of flooding in any given year, also stated as a 1 in 270 chance of a flood in any given year. The MRL Project would take place over three to four years, depending on Congressional authorization and funding.

5.1.6 Feather River West Levee Project

The primary purpose of the Feather River West Levee Project is to reduce flood risk in the Sutter Basin by addressing through seepage and under seepage along the Feather River West Levee from Thermalito Afterbay downstream to approximately 4 miles upstream of the Feather River's confluence with the Sutter Bypass. In order to construct the Feather River West Levee Project, the Sutter Butte Flood Control Agency is implementing a combination of measures to reduce flood risk according to Federal and State standards. These measures consist of flattening levee slopes, reconstructing levees, filling ditches and depressions, removing encroachments, and constructing slurry cutoff walls, stability berms, and relief wells. Project construction began in July 2013 and was completed in 2016. Additional work relating to the Sutter Basin is projected to begin design in 2017.

5.1.7 Lower Elkhorn Basin Levee Setback Project

DWR is proposing the Lower Elkhorn Basin Levee Setback Project to reduce flood risk on the Sacramento River to the greater Sacramento area. DWR is requesting permission from USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899, Section 408 (33 USC 408) (referred to hereafter as Section 408), for the alterations of Federal flood management facilities. DWR is also seeking a Department of the Army Permit under Section 404 of the CWA for discharge of dredged or fill material in jurisdictional waters of the United States.

The project is located in Yolo County and is bounded by the Sacramento River on the east, the Tule Canal and Yolo Bypass on the west, the Sacramento Bypass on the south, and I-5 on the north. The project would widen the Yolo Bypass by constructing a setback levee east of the Tule Canal in the Lower Elkhorn Basin, widen the Sacramento Bypass by constructing a setback levee north of the existing levee, and implement improvements in the Lower Elkhorn Basin and Sacramento Bypass to mitigate project impacts. Widening of the Sacramento Bypass is also a feature of the USACE American River Common Features USACE Chief's Report, dated

April 26, 2016, which was authorized by Congress in WRDA 2016, P.L. 114-322, December 16, 2016. WRDA 2016 is Title I of the Water Infrastructure Improvements for the Nation Act. The proposed Lower Elkhorn Basin Levee Setback Project would not duplicate this recommended feature, rather it would afford DWR a potential alternative means to construct the Sacramento Bypass levee setback as Advanced Construction of the authorized American River Common Features project.

5.2 Cumulative Effects

5.2.1 Geology, Soils, and Agricultural Resources

The *Sutter County General Plan* is designed to maintain the agricultural and rural setting in the unincorporated portions of the County. Population growth in Sutter County is anticipated to remain low, with the greatest growth experienced in Yuba City and Live Oak. Unincorporated portions of Sutter County are anticipated to maintain a low growth rate (Sutter County, 2011). Additionally, the NBHCP maintains existing upland and riparian habitat for the conservation of listed and unlisted species, and currently maintains over 300 acres of managed wetland habitat on the south side of the NCC, adjacent to the Northern Main Pumping Plant site. This habitat is intended to remain undeveloped in perpetuity, and additional tracts of land surrounding the managed wetland are also intended to maintain undeveloped or rural agricultural characteristics (NBHCP, 2003). As a result, the project, when added to other past, present, and reasonably foreseeable future actions, would not result in significant cumulative effects on land use.

5.2.2 Vegetation and Wildlife

The grassland habitat that would be occupied by the staging area, the levee slopes adjacent to the pumping plants, the Brookfield borrow site, and the new Vestal Drain alignment would be disturbed during project construction. These areas would be restored and re-vegetated upon completion of project construction. The project would result in short-term disturbances of wildlife habitat, but the project would not substantially reduce the connectivity or extent of natural vegetation and wildlife habitat along the NCC or the Sacramento River. Additional projects in the area would also have short-term effects on vegetation and wildlife associated with construction activities; however, mitigation measures for project related impacts would establish native vegetation in the Natomas Basin through the planting of native tree species. Such measures are expected to result in a net, long-term improvement in native vegetation and wildlife habitat values in the Natomas Basin, primarily by restoring degraded areas at a ratio higher than what was removed. Therefore, there would be no significant cumulative adverse effects to wildlife and vegetation.

5.2.3 Fisheries

The construction of Natomas Reach D would not result in significant effects on fisheries; however, the construction of other local projects constructed at once would increase disturbance and possibly reduce reproductive success. Potential cumulative effects on fish would include effects associated with other projects proposed to occur on the Sacramento and American Rivers. Cumulative effects were evaluated within the construction area and upstream and downstream of

the project within the affected river. The Corps' SRBPP result in direct loss of fish habitat from construction. Direct loss of habitats would still result because of the construction of bank protection measures; however both of these projects are expected to implement mitigation measures, including onsite plantings that would improve long term fish habitat on the Sacramento River. In addition, the completion of the Folsom JFP and the new Water Control Manual Update for Folsom Dam would likely benefit downstream fish species on the American River. The new spillway at Folsom Dam will enable better control of outflows from Folsom Dam, including the ability to release colder water from deeper in the lake, which would improve conditions on the American River for fish species. While short term cumulative effects would be significant from the direct effects associated with construction, the implementation of these projects would in time result in a net benefit to fish from the construction of setback levees and planting berms. Additionally, many projects being considered for the region could result in limited opportunities for mitigation of shaded riverine aquatic habitat for fish species.

5.2.4 Special Status Species

The construction of Natomas Reach D would not result in significant effects on special-status species; however, the construction of other local projects constructed at once would increase disturbance and possibly reduce reproductive success. However, once the construction is complete levels of disturbance would return to existing levels. No long-term impacts are anticipated to occur due to these projects. Establishment of new, additional native vegetation mitigation areas in the Natomas Basin would result in the long-term net improvement of habitat extent and connectivity. As a result, the project, when added to other past, present, and reasonably foreseeable future projects, would not result in cumulative adverse effects on special status species.

5.2.5 Air Quality

Construction of the Natomas Reach D project is not expected to have long-term effects on air quality since the operational activities (including inspection and maintenance) are expected to be similar to existing conditions. However, construction would result in direct, short-term effects on air quality, mainly related to combustion emissions and dust emissions. Construction of the Natomas Reach D project would likely coincide with the construction of the Corps' Natomas Reaches I and H, as well as SAFCA's North Sacramento Streams project. Table 6 shows the combined emissions for the Natomas Reach D, I, and H projects. No Federal conformity *de minimus* thresholds would be exceeded during the construction of these projects, and only the FRAQMD threshold for NO_x (combined total) would be exceeded.

In order to reduce cumulative effects on air quality, the contractor would be required to follow the requirements of FRAQMD's standard mitigation program (Appendix B) which is intended to reduce NO_x emissions by 20 percent. Any remaining emissions over the NO_x threshold should be reduced via a mitigation fee payment. Implementation of mitigation measures during construction would reduce emissions to the extent possible. This and other construction projects in the area would implement emissions reduction BMPs and mitigation measures that would reduce the impacts to air quality to less than significant. Therefore, the

Natomas Reach D project, in combination with other projects as described above, would not contribute significantly to cumulative effects on air quality.

Table 6. Combined Estimated Air Emissions for Concurrent Construction Projects (2017)

	ROG	CO	NO_x	PM₁₀	PM_{2.5}	CO₂
Total emissions (lbs/day)	47.3	299.9	370.7	110.1	36.8	48,094.4
FRAQMD thresholds (lbs/day)	25	N/A	25	80	N/A	N/A
Total (tons/construction project)	1.8	10.2	14.9	3.8	1.3	1,822.0
Federal standards (tons/year)	25	100	25	100	N/A	N/A

NO_x = nitrogen oxides

CO = carbon monoxide

SO_x = sulfur oxides

CO₂ = carbon dioxide

SMAQMD = Sacramento Metropolitan Air Quality Management District

lbs = pounds

Note: Estimates are rounded.

PM₁₀ = particulate matter 10 micrometers or less

PM_{2.5} = particulate matter 2.5 micrometers or less

ROG = reactive organic gases

5.2.6 Climate Change

Projects in the area would emit GHGs as part of the combustion engine process in light- and heavy-duty vehicles. GHGs by definition are cumulative in nature.

In addition to the overall cumulative effect of climate change, there would be a cumulative effect if Reach D is constructed at the same time as other regional projects. Cumulative GHG emissions would be generated by the operation of construction equipment at these sites. Approximately 18,539.3 pounds of GHGs per day, or a total of 405.9 tons overall, would be generated by the construction of all of these sites together.

Other projects in the local area and state wide would have varying levels of GHG emissions. Standard construction techniques and BMPs would reduce the GHGs emitted from these construction projects. Additionally, large ongoing construction projects such as the JFP are implementing “Green Construction” policies in order to reduce the potential overall emissions associated with the construction. With the statewide implementation of Green Construction techniques, new technology, and the use of BMPs, the cumulative emissions from these sites and other local construction projects would not contribute significantly to climate change.

5.2.7 Water Quality

The Natomas Reach D Project, along with other reaches in the Natomas Basin and other projects in the area, could result in accidental spills or leaks that could affect surface and ground water quality. With multiple projects under construction, the possibility exists that several accidental spills or leaks could enter the water. All projects have BMPs, as well as avoidance, minimization, and mitigation measures included in the construction plans that would be implemented to avoid or reduce these effects to less than significant. As a result, these projects would not contribute significantly to cumulative effects on water quality. In addition, the projects in the area could have an overall beneficial effect on water quality. By diminishing the

possibility for a catastrophic flood event, significant long-term impacts to water quality through contamination from flooded vehicles, household and industrial chemicals, raw sewage, and other wastes that may be present in the area would be reduced to less than significant.

5.2.8 Traffic and Circulation

The construction of all projects in the local area would involve trucks and worker vehicles entering and exiting residential areas, potentially disrupting traffic flow and possibly posing a safety hazard to other motorists, pedestrians, and bicyclists on and along these roadways and the haul route. Large trucks transporting equipment and materials to the work areas would not be consistent with the types of residential traffic using the rural roads; however, the increases in traffic would not significantly increase traffic levels above existing levels. The projects described above would be constructed in different areas and on different schedules, and implementation of measures in the Traffic Management Plans used by each different project would minimize traffic congestion and delays. Minimization measures and BMPs at all sites would reduce adverse effects; therefore, the cumulative effects to traffic would be less than significant.

5.2.9 Noise and Vibration

This project and other local projects in the Natomas Basin and Sutter County would have temporary, short-term impacts on ambient noise and vibration levels during construction. Movement and operation of equipment, haul trucks, and worker vehicles would generate noise in the work area, as well as on neighborhood roadways that provide access through the residential area. Noise levels could reach the high 80's dBA, depending on the type of equipment or truck. The construction of the project and the hauling of materials would increase vibration in the project area and along the haul routes; however, these impacts would be intermittent and less than significant. Other projects in the area are not proposed to occur simultaneously, and as a result, the cumulative effects related to noise and vibration would be less than significant.

5.2.10 Public Utilities and Services

The PG&E power pole relocation portion of the project would have no cumulative effects on the power supply of the region. Three of the power poles to be removed are no longer in service, and the power poles to be relocated would be aligned in such a way as to have no impact to surrounding power poles. Other local projects in the surrounding area are not anticipated to have significant impacts to public utilities and services. There would be no cumulative impact to these resources.

5.2.11 Cultural Resources

The determination of potential cumulative effects for historic properties would be completed through the execution of the stipulations of the PA. If necessary, adverse effects to historic properties may be resolved through mitigation measures which would be consulted on with the SHPO and with Native American tribes and interested parties in accordance with the PA.

6.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

6.1 Federal

Clean Air Act of 1972, as amended, 42 U.S.C. 7401, et seq. *Compliance.* The proposed action is not expected to violate any Federal air quality standards, exceed the EPA's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. Implementation of BMPs and adopted FRAQMD measures would reduce NO_x emissions. Thus, the Corps has determined that the proposed project would have no significant effects on the future air quality of the area.

Clean Water Act of 1972, as amended, 33 U.S.C. 1251, et seq. *Partial Compliance.* The Clean Water Act (CWA) is the primary Federal law governing water pollution. It established the basic structure for regulating discharges of pollutants into waters of the U.S. and gives the U.S. EPA the authority to implement pollution control programs, such as setting wastewater standards for industries (EPA, 2002). In some states, such as California, the EPA has delegated authority to regulate the CWA to state agencies.

Section 401 of the CWA regulates the water quality for any activity that may result in any in-water work or discharge into navigable waters. These actions must not violate Federal water quality standards. The Central Valley RWQCB administers Section 401 of the CWA in California, and either issues or denies water quality certifications. Water quality certifications typically include project-specific requirements established by the RWQCB to ensure attainment of water quality standards.

Section 404 of the CWA requires that a permit be obtained from the Corps when an action will result in the discharge of dredged or fill material into wetlands and waters of the U.S. Under Section 404, the Corps regulates such discharges and issues individual and/or general permits for these activities. Before the Corps can issue a permit under Section 404, it must determine that the project is in compliance with the CWA Section 404(b)(1) guidelines. The 404(b)(1) guidelines specify that "no discharge of dredged or fill material shall be permitted if there is a practical alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 C.F.R. § 230.10[a]).

When conducting its own civil works projects, the Corps does not issue permits to itself. Rather, the Corps complies with the guidelines and substantive requirements of the Clean Water Act, including Section 404 and Section 401. The Natomas Basin project would require discharge of fill material into Waters of the U.S.; therefore, a section 404(b)(1) analysis is being conducted for Reach D, and will be included with the final document. The discharge of fill material would comply with the 404(b)(1) guidelines with the inclusion of appropriate measures to minimize pollution or adverse effects on the aquatic ecosystem. Additionally, a Section 401 water quality certification has been requested from the Central Valley RWQCB. This document will also be included with the final document.

The contractor would be required to obtain a NPDES permit from the California RWQCB, Central Valley Region, since the project would disturb one or more acres of land and involve possible storm water discharges to surface waters. As part of the permit, the contractor would be required to prepare a SWPPP identifying BMPs to be used to avoid or minimize any adverse effects of construction on surface waters. With the completion of these requested permits and documents, the Corps would be in compliance with this Act.

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, et seq. *Partial Compliance.* In accordance with Section 7(c), the Corps obtained a list from USFWS of Federally listed and proposed species likely to occur in the project area on 21 April 2017 via the USFWS website Information for Planning and Consultation. The Federally threatened GGS, the Federally threatened VELB, and the Federally threatened Western yellow-billed cuckoo. This project may affect, but is not likely to adversely affect these species.

The Corps reinitiated consultation with USFWS on June 20, 2016, in order to update the Biological Opinion originally issued on October 8, 2008 (USFWS, 2008), an appended December 8, 2014, due to changes to the project description and in order to analyze effects to the Federally threatened Western yellow-billed cuckoo. The Corps has made the determination that the project may affect, but is not likely to adversely affect GGS, VELB, and the Western yellow-billed cuckoo. On August 11, 2016, USFWS concurred with this determination.

In addition, the Federally threatened Central Valley spring-run Chinook salmon, the Federally threatened Central Valley steelhead, the Federally threatened Southern DPS green sturgeon may occur in the project area. Consultation with NMFS is ongoing. With the completion of consultation with NMFS and the implementation of any mitigation measure, the Corps would be in compliance with this Act.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. *Compliance.* This order directs all Federal agencies to identify and address adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Any impacts caused by construction activities would not disproportionately affect minority or low-income populations.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. *Compliance.* This order directs all Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children. There are no schools or other facilities near the project area. The project would not have adverse or disproportionate impacts on children.

Farmland Protection Policy Act (7 U.S.C. 4201, et seq). *Compliance.* Approximately 15 acres of Prime Farmland and Farmland of Statewide Importance located in the new Vestal Drain alignment would be converted to non-agricultural uses. Full analysis is included in the 2010 EIS/EIR.

Fish and Wildlife Coordination Act of 1958, as amended, 16 U.S.C. 661, et seq.

Partial Compliance. The Fish and Wildlife Act (FWCA) ensures that fish and wildlife receive consideration equal to that of other project features from projects that are constructed, licensed, or permitted by Federal agencies. The FWCA requires federal agencies that construct water resource development projects to consult with USFWS, NMFS, and the applicable state fish and wildlife agency (CDFW) regarding the project's impacts on fish and wildlife and measures to mitigate those impacts. The USFWS and CDFW have participated in evaluating the proposed project, and USFWS is preparing a Coordination Act Report (CAR), to be included as Appendix C to this document. The Corps will consider all recommendations proposed in the draft CAR. With issuance of a final CAR from USFWS, the Corps would be in full compliance with this Act.

Migratory Bird Treaty Act (15 U.S.C 701-18h). *Ongoing.* An on-site biologist experienced with raptor behavior would monitor active nests while construction related activities are taking place. If the nesting raptors exhibit agitated behavior in response to construction related activities, the biological monitor would have the authority to stop work and would consult with CDFW and USFWS to determine the best course of action necessary to avoid nest abandonment or take of individuals.

National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq.

Ongoing. Comments received during the public review period will be incorporated into the final SEA, as appropriate, and a comments and responses appendix will be prepared. The final SEA will be accompanied by a final FONSI if determined appropriate by the District Engineer after consideration of public comments.

National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Ongoing. Section 106 of the NHPA requires a Federal agency to take into account the effects of Federal undertakings on historic properties, following the procedures outlined in 36 CFR Part 800. The PA for the American River Common Features Project was executed September 10, 2015 between the Corps and the State Historic Preservation Officer (SHPO). Completion of the stipulations required by the PA would assure compliance with Section 106 of the NHPA. The stipulations of the PA include identification and evaluation of potential historic properties within the area of potential effects (APE) for the undertaking, determination of effects to historic properties, and resolution of adverse effects to historic properties, as necessary, and consultation with the SHPO, Native Americans, and interested parties.

On June 1, 2017, letters were sent to the SHPO, Native American tribes, and interested parties providing a map of the APE, project description, and requesting comments on the project. In a letter dated June 30, 2017, the SHPO responded that they did not have any comments regarding the project. Consultation with Native American tribes is ongoing as the Corps continues efforts to identify historic properties within the APE. The United Auburn Indian Community of the Auburn Rancheria and Wilton Rancheria have both expressed interest in the project. Buena Vista Rancheria deferred to the Colusa Indian Community for the project. Compliance with these stipulations would ensure compliance with Section 106.

Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 et seq.). *Compliance.* This act was enacted to preserve selected rivers or sections of rivers in their free-flowing condition in order to protect the quality of river waters and to fulfill other national conservation purposes. The Sacramento River is not considered a Wild or Scenic River, and none of the internal water features of the project are tributaries to the lower American River. Therefore, the Natomas Reach D Project would have no effect on Wild and Scenic Rivers.

6.2 State

California Clean Air Act of 1988. *Compliance.* The FRAQMD determines whether project emission sources and emission levels significantly affect air quality based on Federal standards established by the EPA and State standards set by the CARB. The project is in compliance with all provisions of the Federal and State Clean Air Acts.

California Endangered Species Act of 1984. *Compliance.* The California Department of Fish and Wildlife administers this State law providing protection of fish and wildlife resources. This act requires the non-Federal lead agencies to prepare biological assessments if a project may adversely affect one or more State-listed endangered species. Mitigation measures as described in this document would reduce potential effects on State-listed species to less than significant.

California Environmental Quality Act, California Public Resources Code, Section 21000 et seq. *Ongoing.* SAFCA, the Non-Federal Sponsor serving as the Lead Agency for CEQA, will determine the appropriate CEQA environmental document needed for the Reach D work discussed in this SEA. SAFCA and CVFPB, as the Non-Federal Sponsors, will ensure full compliance with the requirements of this act.

7.0 COORDINATION AND REVIEW OF THE DRAFT SEA

The draft SEA will be circulated for 30 days to agencies, organizations, and individuals known to have a special interest in the project. Copies of the draft SEA will be made available for viewing at local public libraries, and provided by mail upon request. Coordination with all the appropriate Federal, State, and local government agencies including USFWS, NMFS, SHPO, CDFW, and CVFPB is ongoing.

8.0 FINDINGS

This draft SEA evaluated the environmental effects of the proposed project. Potential adverse effects to the following resources were evaluated in detail: recreation, special status species, vegetation and wildlife, air quality, water resources and quality, traffic and circulation, noise, and cultural resources.

Results of the draft SEA, field visits, and coordination with other agencies indicate that the proposed project would have no significant long-term effects on environmental resources.

Short-term effects during construction would either be less than significant or mitigated to less than significant using BMPs.

SAFCA, as the Non-Federal Sponsor serving as the Lead Agency for CEQA, is evaluating this project under the CEQA guidelines and will prepare the appropriate CEQA document.

9.0 LIST OF PREPARERS

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Report preparation and coordination

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Cultural resources analysis and coordination

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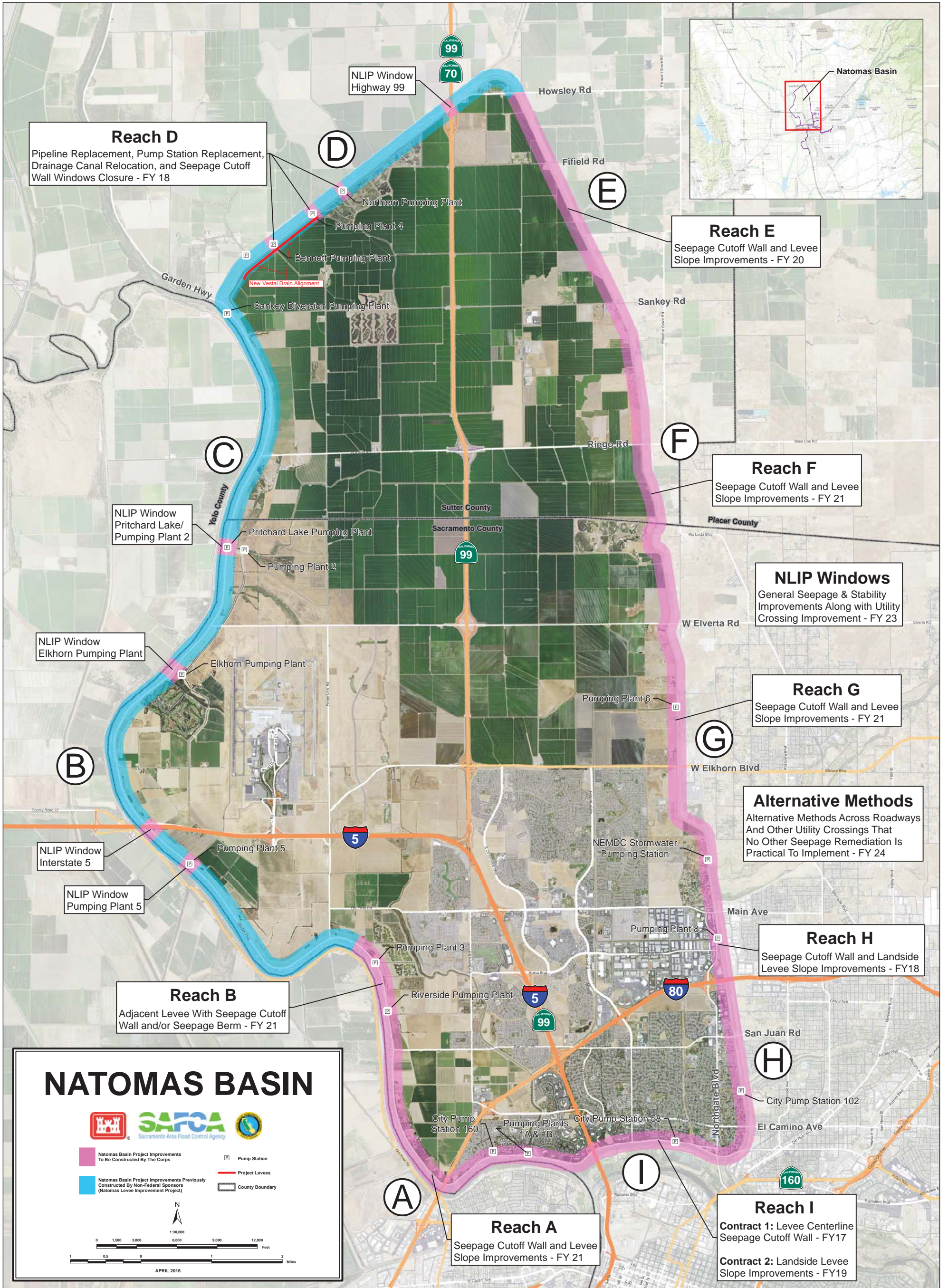
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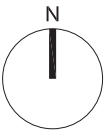
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Plates

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NOTES

1. HAUL ROUTES SHALL BE LANDWARD OF THE LEVEE. THE LEVEE CROWN SHALL NOT BE USED AS A HAUL ROUTE.
2. CONSTRUCTION TRAFFIC SHALL NOT EXCEED LEGAL LOADS FOR ROADS AND BRIDGES TO BE USED.

LEGEND

-  STAGING AREA
-  BORROW SITE
-  HAUL ROUTE



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MARK	DESCRIPTION	DATE

DESIGNED BY: E. JULIAN	ISSUE DATE: 04/21/2017
DRAWN BY: E. JULIAN	SOLICITATION NO.:
CHECKED BY: M. BOEDTKER	CONTRACT NO.:
SUBMITTED BY: P. VALENTINE	DESIGN FILE NO.:
SIZE: ANSI D	FILE NAME:
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IN-HOUSE DESIGN 1325 J STREET SACRAMENTO, CA 95814-2922	2067

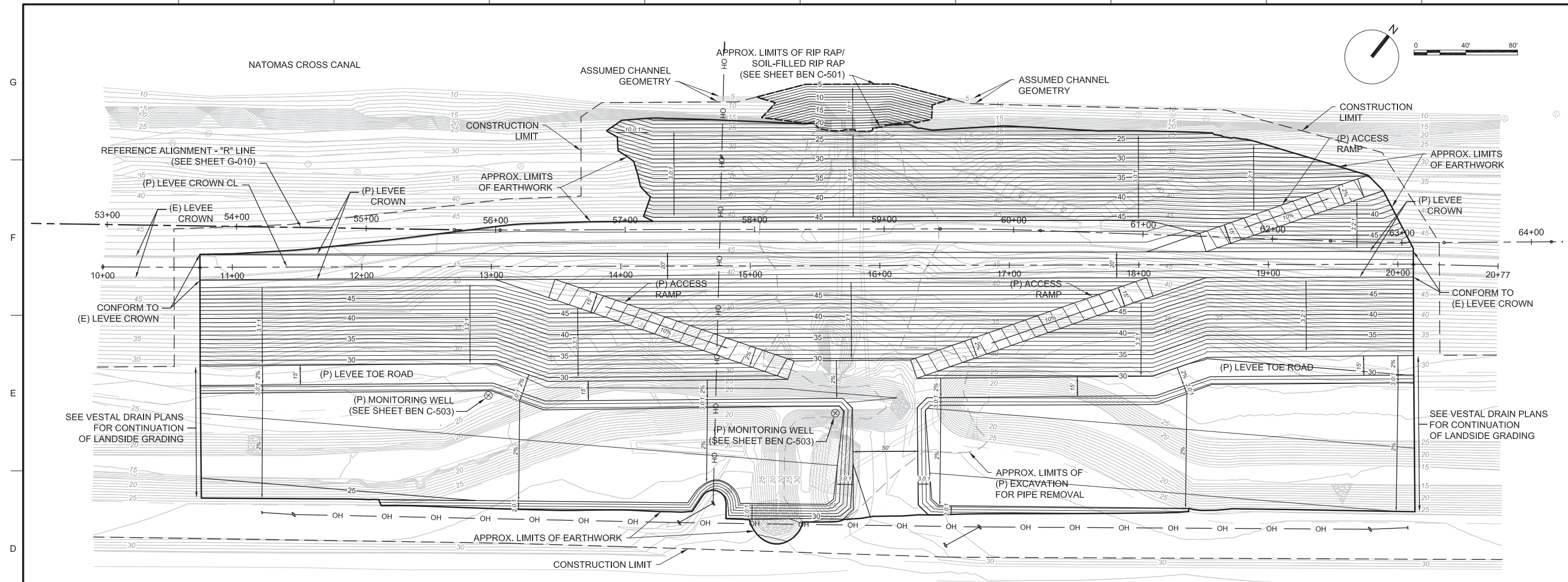
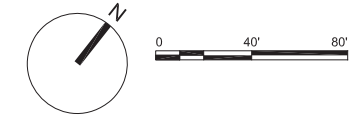
AMERICAN RIVER COMMON FEATURES
NATOMAS BASIN REACH D WINDOWS

HAUL ROUTE, BORROW SITE, & STAGING MAP

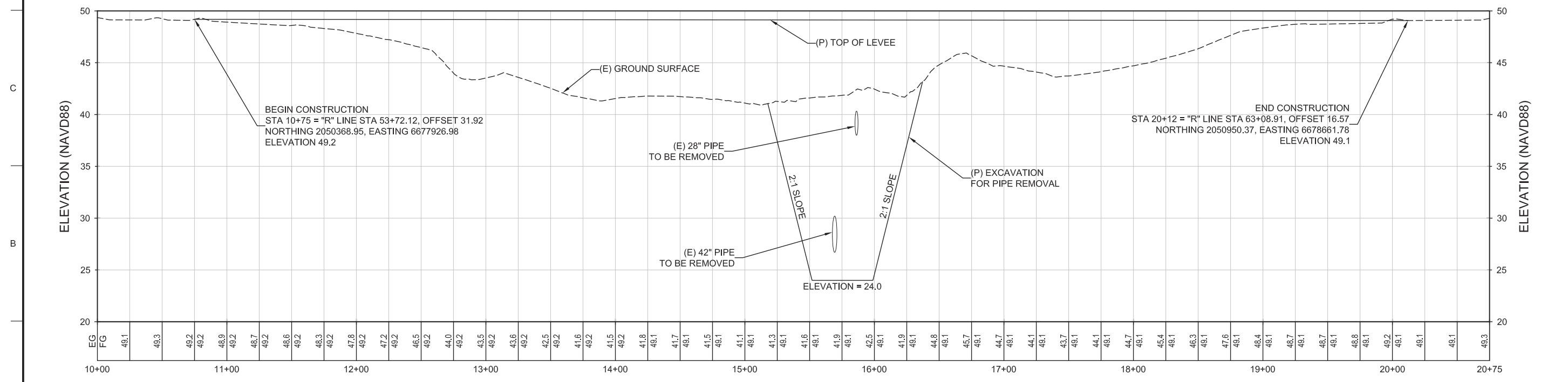
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US Army Corps of Engineers



PLAN
SCALE 1"=40'



PROFILE
SCALE 1"=40' HORIZONTAL
1"=5' VERTICAL

- NOTES: 1. (P) LEVEE CROWN CL ALIGNMENT IS A STRAIGHT LINE FROM STA 10+75 TO 20+12.
 2. BOTTOM OF NATOMAS CROSS CANAL ESTIMATED TO BE AT ELEV 5' BASED ON AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY.
 3. ELEVATIONS SHOWN FOR BELOW GRADE PIPES WERE ESTIMATED BASED ON AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY.
 4. ALL SLOPES TO RECEIVE FILL SHALL BE BENCH PER DETAIL ON SHEET BEN C-502.
 5. LEVEE EMBANKMENT FILL SHALL CONSIST OF LEVEE FILL. RANDOM FILL MAY BE USED FOR THE LEVEE TOE ROAD AND LANDSIDE AREA.

MARK	DESCRIPTION	DATE

DESIGNED BY: E. JULIAN	ISSUE DATE: 04/21/2017
DRAWN BY: E. JULIAN	SOLICITATION NO.:
CHECKED BY: M. BOEDTKER	CONTRACT NO.:
SUBMITTED BY: P. VALENTINE	DESIGN FILE NO.:
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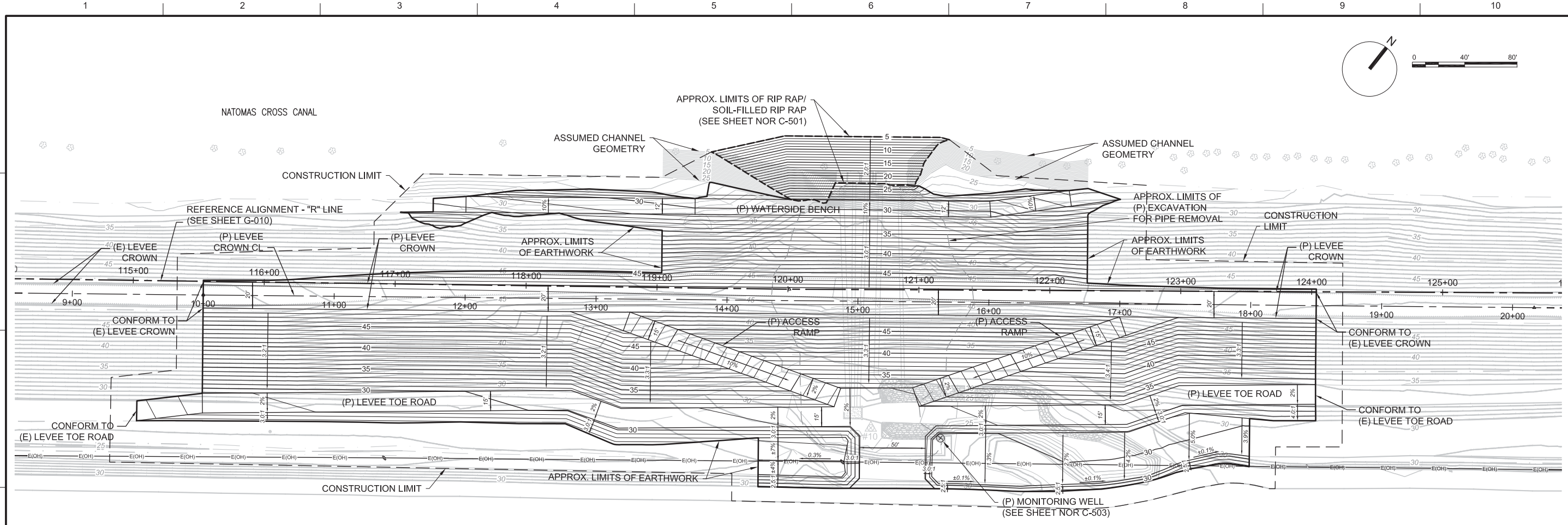
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AMERICAN RIVER COMMON FEATURES NATOMAS BASIN REACH D WINDOWS	BENNETT WINDOW (BEN) GRADING PLAN & PROFILE STATIONS 10+00 TO 20+75
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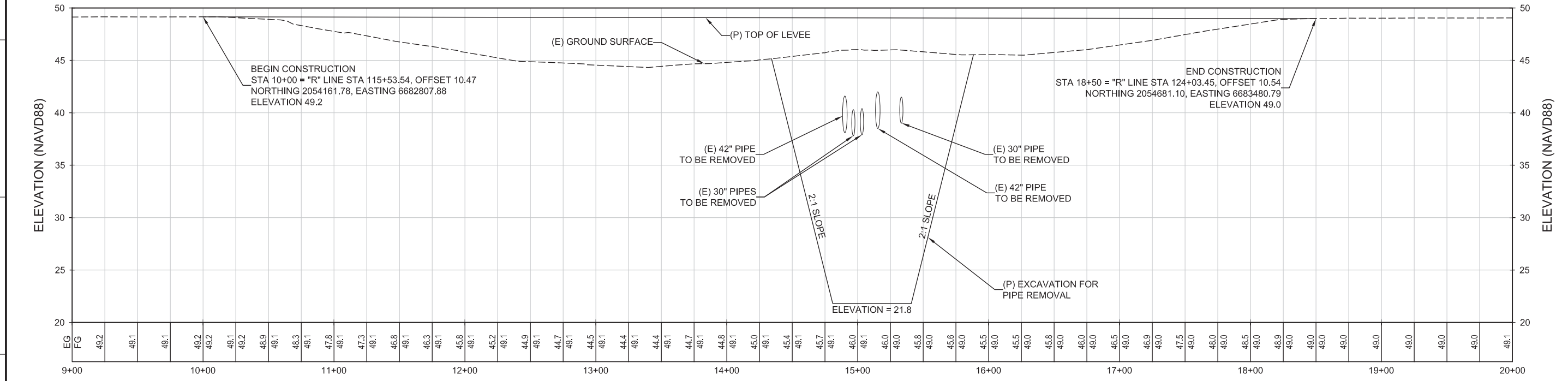
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PLAN
SCALE 1"=40'



PROFILE
SCALE 1"=40' HORIZONTAL
1"=5' VERTICAL

- NOTES: 1. (P) LEVEE CROWN CL ALIGNMENT IS A STRAIGHT LINE FROM STA 10+00 TO 18+50.
 2. BOTTOM OF NATOMAS CROSS CANAL ESTIMATED TO BE AT ELEV 5' BASED ON AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY.
 3. ELEVATIONS SHOWN FOR BELOW GRADE PIPES WERE ESTIMATED BASED ON AVAILABLE INFORMATION. CONTRACTOR TO FIELD VERIFY.
 4. ALL SLOPES TO RECEIVE FILL SHALL BE BENCHMARKED PER DETAIL ON SHEET BEN C-502.
 5. LEVEE EMBANKMENT FILL SHALL CONSIST OF LEVEE FILL. RANDOM FILL MAY BE USED FOR THE LEVEE TOE ROAD AND LANDSIDE AREA.

MARK	DESCRIPTION	DATE

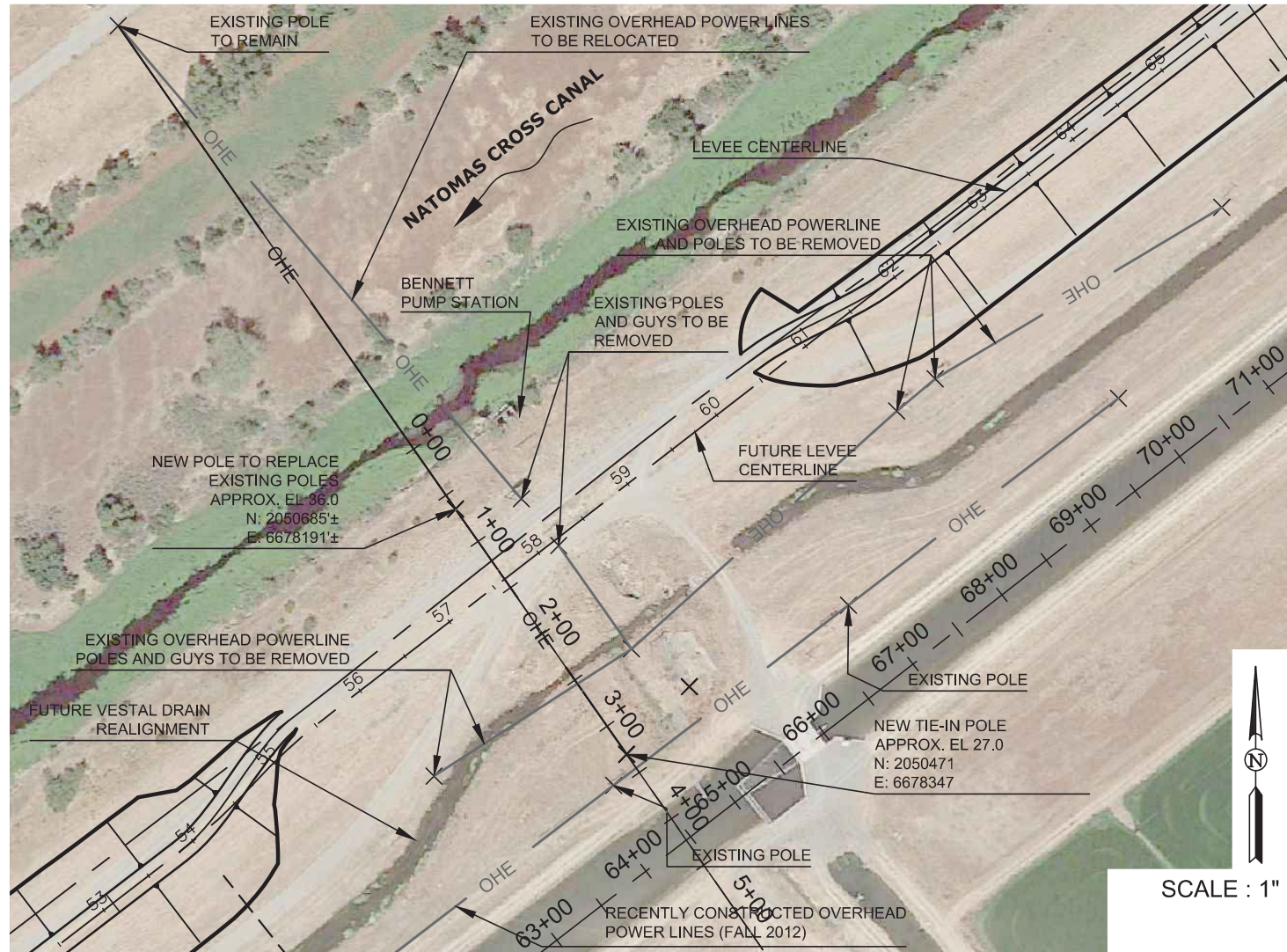
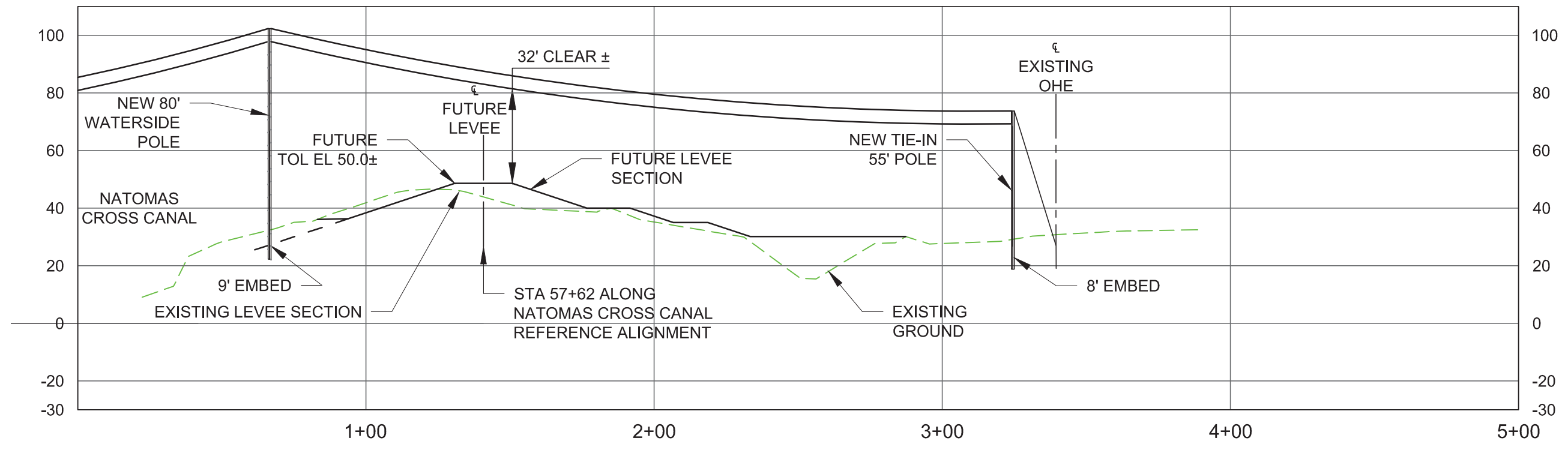
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AMERICAN RIVER COMMON FEATURES NATOMAS BASIN REACH D WINDOWS	NORTHERN WINDOW (NOR) GRADING PLAN & PROFILE STATIONS 9+00 TO 20+00
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SHEET ID
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C-102

SCALE : HORIZ. 1" = 40'
VERT. 1" = 40'

Plate 5



NOTES:

1. ALL ELEVATIONS ARE NAVD88.
2. EXISTING GROUND FROM WOOD RODGERS SURVEY.
3. FUTURE LEVEE BASELINE AND GEOMETRY FROM USACE AMERICAN RIVER COMMON FEATURES NATOMAS BASIN REACH D 05/16/2016 60% DESIGN PLANS.

SCALE : 1" = 150'



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SACRAMENTO AREA FLOOD CONTROL AGENCY

PG&E POWER POLES
NATOMAS CROSS CANAL AT BENNETT

DATE

08/26/16

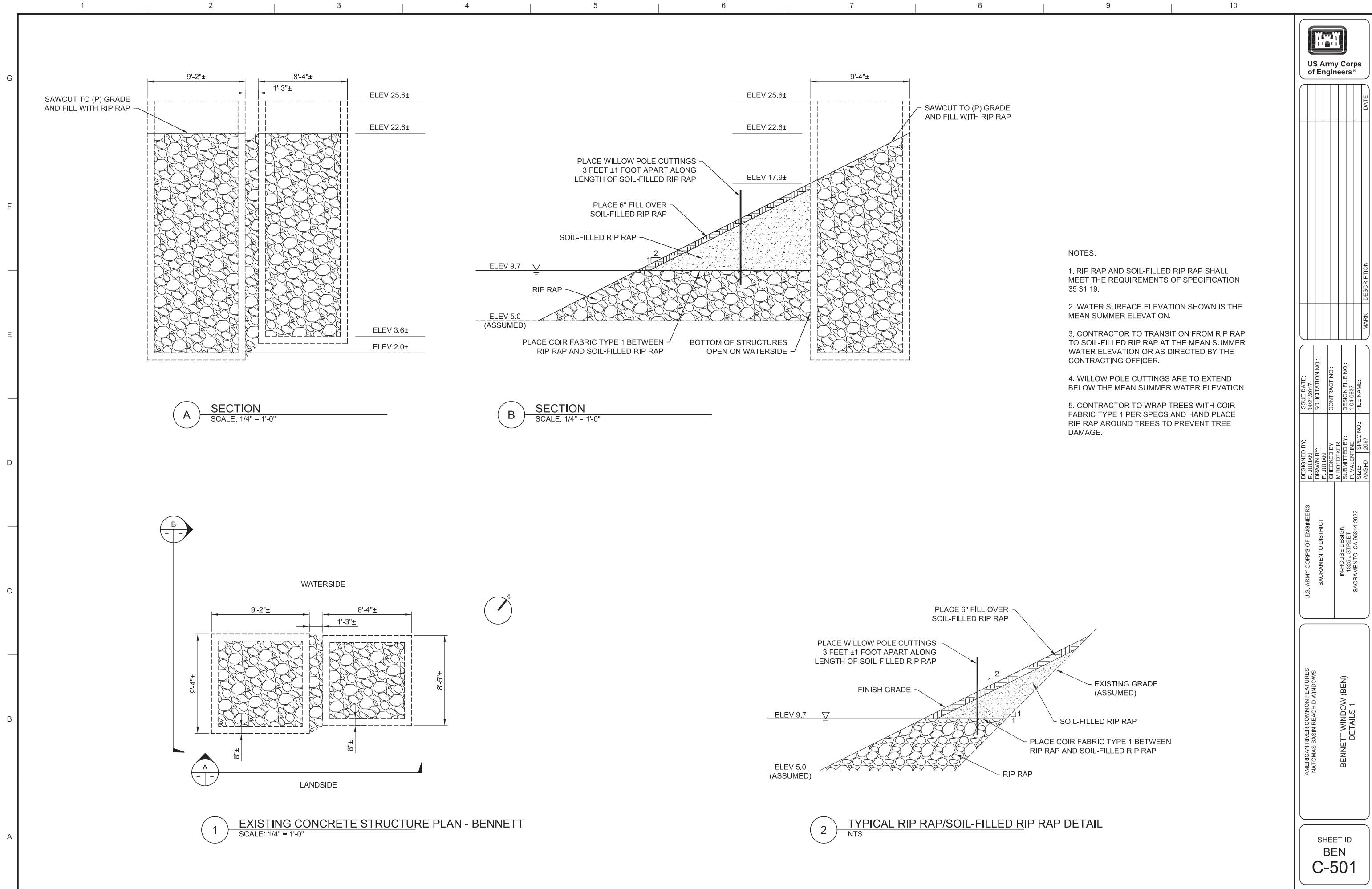
FIGURE

1

S:\19415-00\080001\TECH\Draw\Veestal Drain\PG&E POLES ALONG NCC AT BENNETT.dwg Sep 01, 2016 - 10:37am



US Army Corps of Engineers



MARK	DESCRIPTION	DATE

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DRAWN BY: E. JULIAN	CHECKED BY: M. BOEDTKER	CONTRACT NO.:
CONTRACT NO.:	DESIGN FILE NO.:	FILE NAME:
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SIZE: ANSI D	SPEC NO.:	
2067		
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AMERICAN RIVER COMMON FEATURES NATOMAS BASIN REACH D WINDOWS	BENNETT WINDOW (BEN) DETAILS 1
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GENERAL NOTES

1. UNLESS OTHERWISE NOTED, ALL SHEET REFERENCES ON THIS SHEET ARE PUMPING PLANT 4 PLANS (PP4 B-, PP4 V-, PP4 C-, PP4 S-, PP4 A-, ETC.).
2. REFER TO G- SHEETS FOR GENERAL NOTES AND INFORMATION APPLICABLE TO ALL WINDOWS OF REACH D PROJECT.
3. SEE SHEET G-010 FOR SURVEY CONTROL POINTS AND REFERENCE ALIGNMENT "R" LINE DATA.
4. SEE SHEET G-006 AND G-007 FOR HAUL ROUTES AND CONTRACTOR STAGING AREAS.
5. SEE SHEET CD111 FOR GENERAL SITE DEMOLITION FOR PUMP PLANT 4 CONSTRUCTION.
6. SEE ENLARGED SITE PLANS C-131 THRU C-132 FOR ADDITIONAL INFORMATION/REQUIREMENTS OF SITE FEATURES.

⊗ BORING LOCATIONS. SEE SHEET B-101 FOR STICK LOG PROFILES.

KEY NOTES #

1. RD1000 PUMPING PLANT #4 (PP4) MODIFICATION CONSTRUCTION LIMIT.
2. PIPE RAISE/MODIFICATION AREA. SEE SHEETS C-121 AND C-122 FOR PLANS AND PROFILES.
3. (E) PUMPING PLANT #4.
4. (N) ELECTRICAL BUILDING AND TRANSFORMER PAD.
5. PP4 PERIMETER SECURITY FENCE.
6. (E) LEVEE ROAD ACCESS RAMP TO BE RELOCATED. GRADE TO MATCH ADJACENT LEVEE SLOPE.
7. (N) LEVEE ROAD ACCESS RAMP.
8. REALIGNED LEVEE TOE ROAD.
9. (N) ACCESS RAMP TO SANKEY CANAL ROAD.
10. (N) DRIVE-THRU ACCESS TO TRASH RAKE.
11. (E) VESTAL DRAIN TO BE RELOCATED TO SOUTH OF SANKEY CANAL. SEE VESTAL DRAIN RELOCATION PLANS.



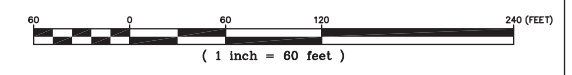
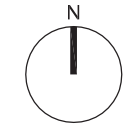
**NOT FOR CONSTRUCTION
FOR REVIEW ONLY**

ISSUE DATE: 21 APR 2017	SOLICITATION NO.:	CONTRACT NO.:	DESIGN FILE NO.:	FILE NAME:
DESIGNED BY: D. SHIN	DRAWN BY: DS	CHECKED BY: M. BOEDTKER	SUBMITTED BY: P. VALENTE	SPEC NO.:
				2067

U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT	IN-HOUSE DESIGN 1325 J STREET SACRAMENTO, CA 95814-2922
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AMERICAN RIVER COMMON FEATURES
NATOMAS BASIN REACH D WINDOWS
PUMPING PLANT 4 (PP4)
OVERALL SITE PLAN AND SHEET INDEX

SHEET ID
**PP4
C-101**





VESTAL DRAIN

EXISTING ALIGNMENT

FUTURE ALIGNMENT

Bennett Pumping Plant

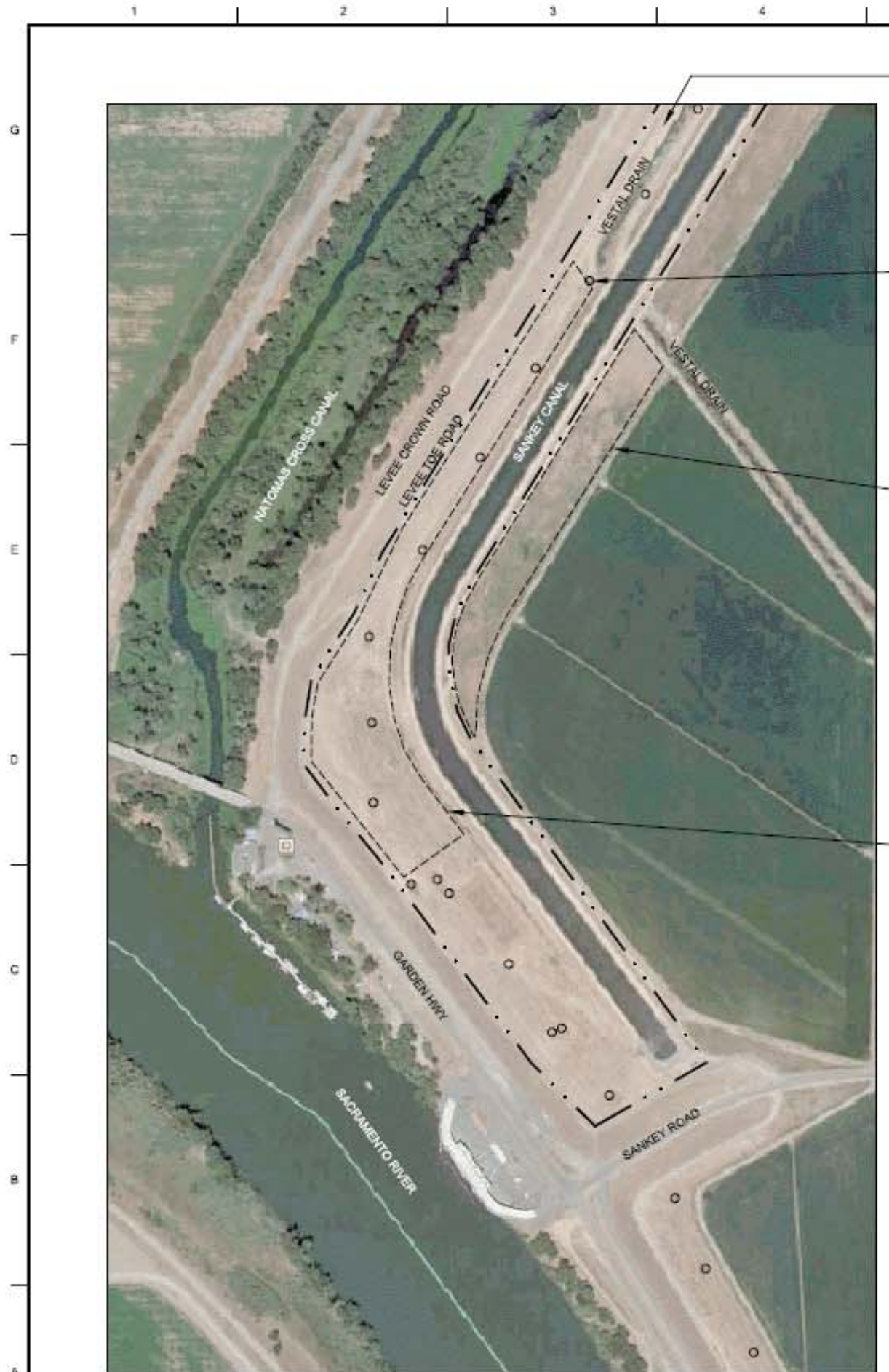
Pump Plant 4

Howsley Rd

Power-Line Rd

© 2016 Google

Google earth



MAIN STAGING AREAS
SCALE: 1" = 200'

ADDITIONAL STOCKPILING AREA BETWEEN LEVEE TOE ROAD AND SANKEY CANAL EMBANKMENT, EXTENDS NORTHEAST TO BENNETT WINDOW.

EXISTING POWER POLE PROTECT IN PLACE (TYP)

MAIN STAGING AREA EAST: APPROX. 3.2 ACRES IN THE AREA BETWEEN SANKEY CANAL EMBANKMENT TOE ROAD AND FARM ROAD; APPROX. 125' WIDE x 1100' LONG.

MAIN STAGING AREA WEST: APPROX. 6.0 ACRES IN THE AREA BETWEEN LEVEE TOE ROAD AND SANKEY CANAL EMBANKMENT; APPROX. 85' TO 260' WIDE x 1900' LONG STARTING APPROX. 1025' NORTHWEST OF THE INTERSECTION OF GARDEN HWY AND SANKEY ROAD.

LEGEND

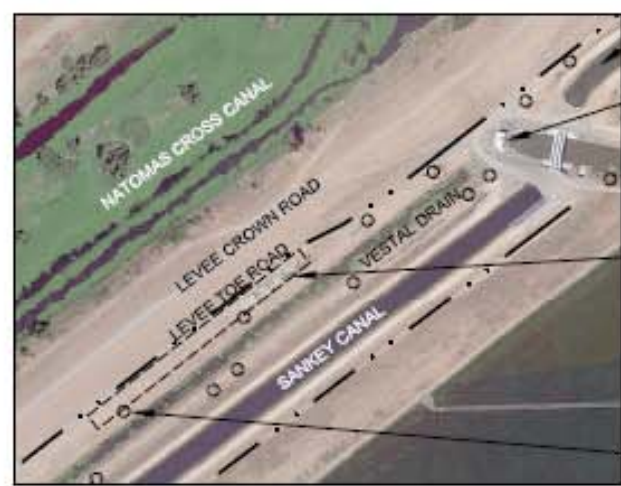
- STAGING AREA
- HAUL ROUTE
- POWER POLE



NORTHERN STAGING AREA
SCALE: 1" = 200'

NORTHERN STAGING AREA: APPROX. 0.38 ACRES IN THE AREA BETWEEN LEVEE TOE ROAD AND SANKEY CANAL EMBANKMENT; APPROX. 30' WIDE x 550' LONG STARTING APPROX. 50' NORTHEAST OF THE SOUTHWESTERN POWER POLE.

EXISTING POWER POLE PROTECT IN PLACE (TYP)



PUMPING PLANT 4 STAGING AREA
SCALE: 1" = 200'

NORTHERN MAIN CANAL

PUMPING PLANT 4

PUMPING PLANT 4 STAGING AREA: APPROX. 0.45 ACRES IN THE AREA BETWEEN EXISTING POWER POLES/OHE AND LEVEE TOE ROAD; APPROX. 35' WIDE x 560' LONG STARTING APPROX. 450 FEET SOUTHWEST OF PUMPING PLANT 4.

EXISTING POWER POLE PROTECT IN PLACE (TYP)



BENNETT STAGING AREA
SCALE: 1" = 200'

EXISTING POWER POLE PROTECT IN PLACE (TYP)

BENNETT STAGING AREA: APPROX. 0.35 ACRES IN THE AREA BETWEEN EXISTING VESTAL DRAIN AND LEVEE TOE ROAD; APPROX. 40' TO 75' WIDE x 285' LONG STARTING APPROX. 235' NORTH OF SANKEY CANAL CROSSING.

SANKEY CANAL CROSSING SHALL NOT BE USED FOR HAULING. PROTECT IN PLACE.

US Army Corps of Engineers

MARK	DESCRIPTION	DATE

DESIGNED BY: L. J. ALLEN	ISSUE DATE: 04/22/2017
DRAWN BY: L. J. ALLEN	SCALE: 1" = 200'
CHECKED BY: M. B. SMITH	CONTRACT NO: 44-4800
SUBMITTED BY: P. VALENTE	DESIGN FILE NO: 44-4800
DATE: 04/22/17	SPEC FILE NO: 44-4800

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

PROJECT DESIGN
1208 J STREET
SACRAMENTO, CA 95811-4502

AMERICAN RIVER CHINA FEATURES
NATOMAS BASIN REACH 0 WINDOWS

STAGING MAP ENLARGED

SHEET ID:
G-007

Working Name: \\Aren\Projects\Projects\4800\Sacramento\Drawings\01\17\17042017\070505.dwg
Last Saved: Apr 13, 2017 4:44pm by [redacted]

City of Sacramento - Project: Brookfield California Land Holdings, LLC, et al. - 19415-00-08001 - 09/13/2016 - 90% SUBMITTAL



SAFCA
35-080-031

BROOKFIELD CALIFORNIA
LAND HOLDINGS, LLC, ET AL.
35-080-032

BORROW EXCAVATION
FINISH ELEVATION = 26.8

BORROW EXCAVATION SUMMARY:
 SURFACE LAYER REMOVAL = 5,000 CY
 SOIL PILES = 9,600 CY
 FIELD EXCAVATION = 41,300 CY

NOTES:
 1. CONTOURS SHOWN ARE EXISTING GRADE, SURVEYED BY PSOMAS ON AUGUST 10, 2016. VERTICAL DATUM: NAVD88
 2. YIELD QUANTITY ASSUMES 6" SURFACE LAYER REMOVAL AND NO SURFACE LAYER REPLACEMENT FOLLOWING BORROW MATERIAL EXCAVATION.



BROOKFIELD BORROW SITE FIELD 2B



AMERICAN RIVER COMMON FEATURES
NATOMAS BASIN REACH D WINDOWS

BROOKFIELD BORROW SITE - FIELD 2B
EXCAVATION PLAN

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814-2122

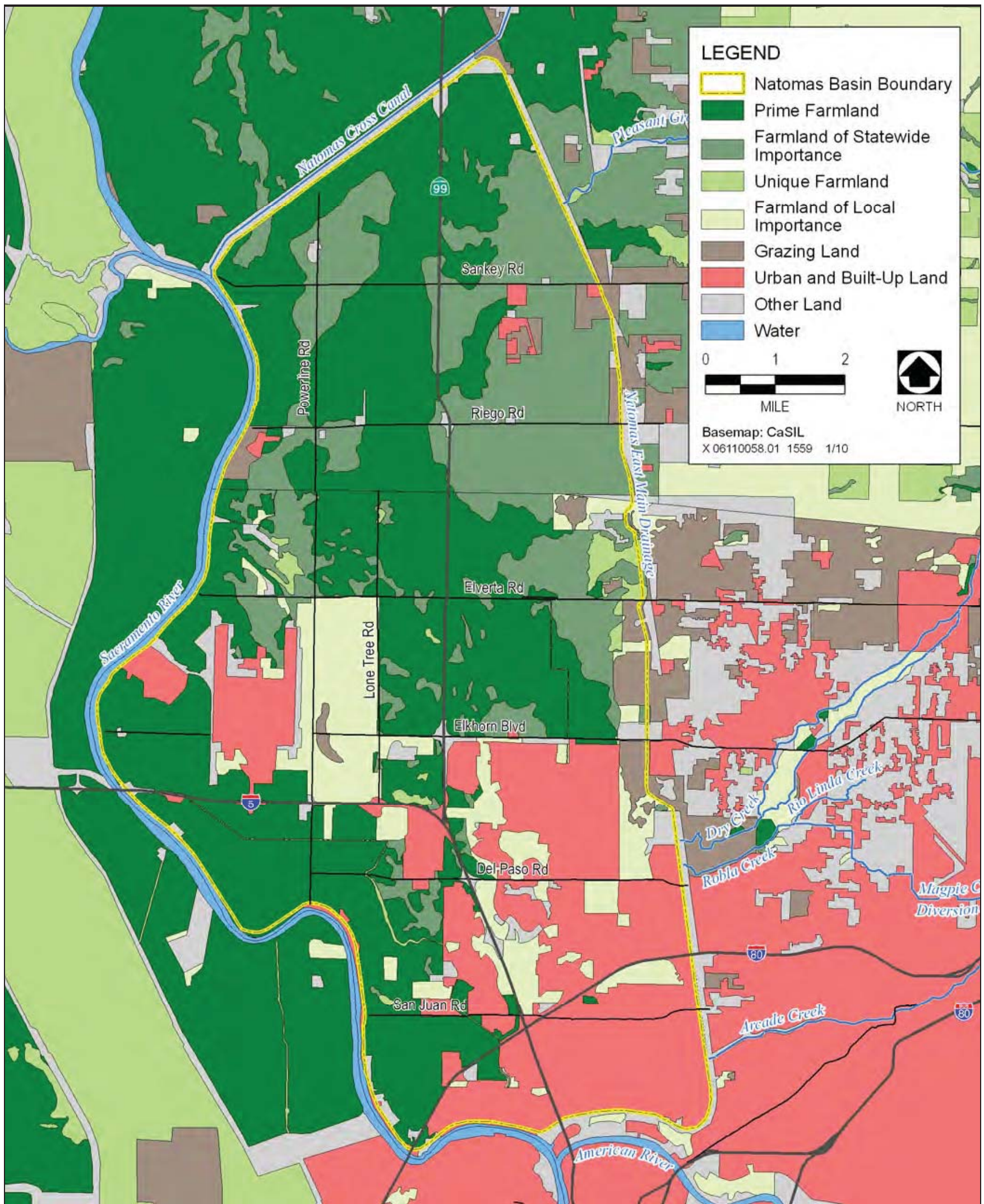
DESIGNED BY: E. J. JAV	ISSUE DATE: 04/21/2017
DRAWN BY: E. J. JAV	SOLICITATION N/C
CHECKED BY: M. BOETTNER	CONTRACT N/C
SUBMITTED BY: P. VALENTINE	DESIGN FILE NO.: 1544-0337
SPEC: ANSI-D	SPEC N/C 2017
	FILE NAME:

MARK	DESCRIPTION	DATE



90% SUBMITTAL

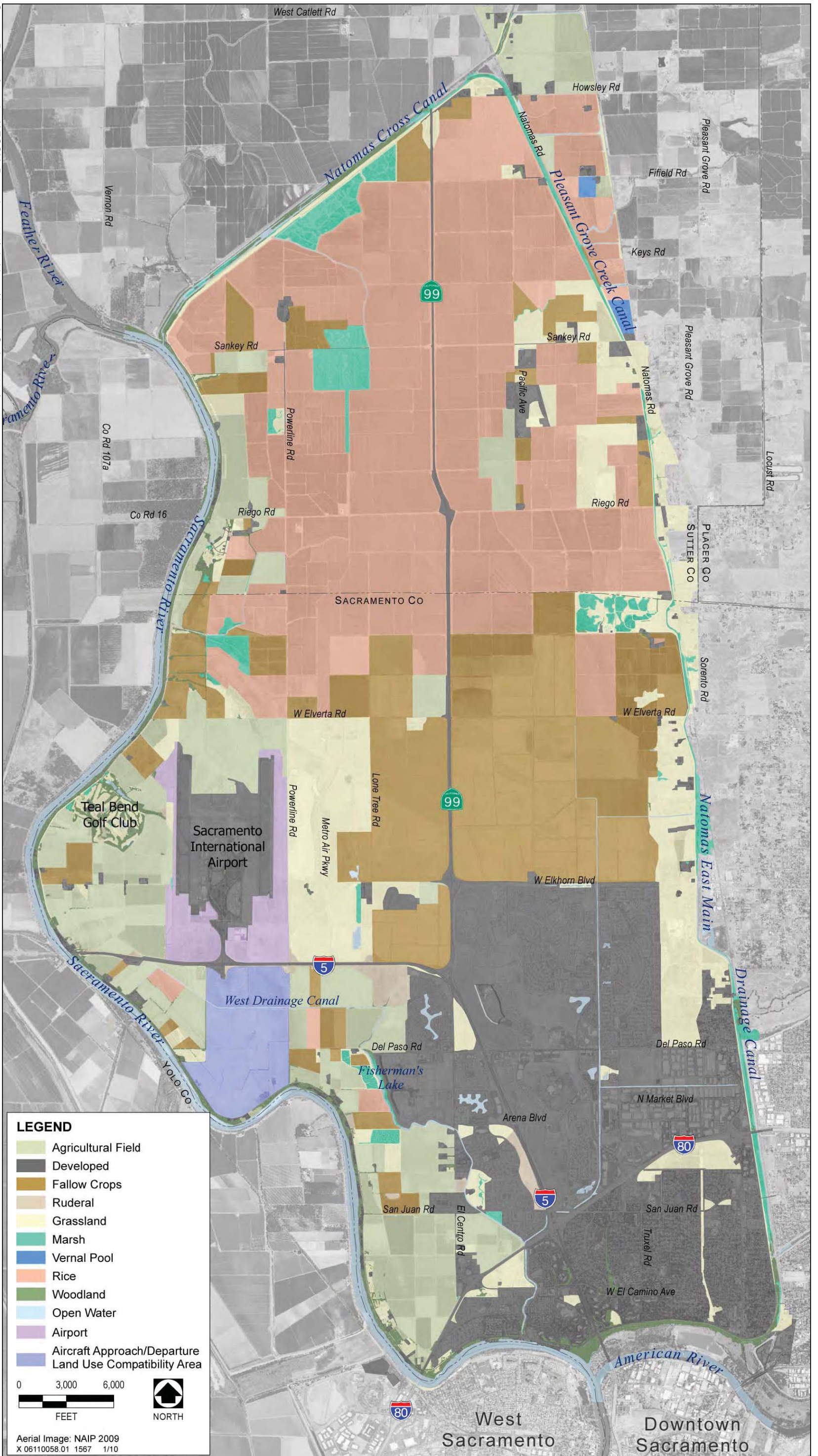
G-009
SHEET 10



Source: California Department of Conservation 2008

Important Farmland in the Project Area

Plate 3-1



Habitats in the Natomas Basin

Plate 3-3

Appendix A

Correspondence Regarding Special Status Species

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United States Department of the Interior



In Reply Refer to:
08ESMF00-
2010-F-0949-R002

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846

AUG 11 2016

Ms. Alicia E. Kirchner
Chief, Planning Division
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95814

Subject: Reinitiation of Formal Consultation on the Natomas Levee Improvement Program's
Landside Improvements Phase 4b Project, Sacramento and Sutter Counties, California

Dear Ms. Kirchner:

This is in response to your June 20, 2016, request to reinitiate formal consultation with the U.S. Fish and Wildlife Service (Service) on the Natomas Levee Improvement Program (NLIP), Landside Improvements Project, Phase 4b (Phase 4b) in Sacramento and Sutter Counties, California. Your request was received in our office on June 22, 2016. The Phase 4b biological opinion (81420-2010-F-0949-1) was completed on October 12, 2010, amended on December 8, 2014, and tiered off a programmatic biological opinion (81420-2008-F-0195-5) for the entire NLIP project that was issued on October 9, 2008. The U.S. Army Corps of Engineers (Corps) has requested to reinitiate consultation on Phase 4b due to changes to the project description and in order to analyze effects to the federally listed as threatened western yellow-billed cuckoo (*Coccyzus americanus*) and endangered least Bell's vireo (*Vireo bellii pusillus*). In order for plans and specifications for the project to proceed, the Corps must conduct geotechnical borings. While this activity was included in the previous consultation, it was described as occurring during the active season of the federally-threatened giant garter snake (*Thamnophis gigas*). The Corps is now proposing to conduct geotechnical borings during the inactive season (October thru April). This biological opinion is issued under the authority of section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This biological opinion is based on: (1) your June 20, 2016, biological assessment requesting reinitiation; (2) electronic mail sent from the Corps to the Service; and (3) other information available to the Service.

To provide ease of reading, language changed within a paragraph from the original biological opinion will be underlined. Therefore, the Phase 4b biological opinion is now amended as follows:

Page 2: Add the following paragraph just before **Consultation History for Phase 4b**:

Western Yellow-Billed Cuckoo

Nesting habitat for the yellow-billed cuckoo is comprised of large areas (at least 50 acres) of riparian habitat composed of cottonwood and willow trees. Due to the urbanization of the Sacramento area large amounts of riparian habitat have been lost along the Sacramento River. However, habitat does occur within the surrounding area along the lower American River and in the Yolo Bypass. Yellow-billed cuckoos have been observed along the lower American River as close as 3 miles to the action area in 2013 and 2015. Currently habitat in the action area exists on levees and consists of narrow, poorly connected habitat patches. It is unlikely that cuckoos would use this habitat for nesting. However, cuckoos could use the woody vegetation as stopover habitat during their spring migration to areas further north in the Sacramento Valley. The Corps has proposed to remove vegetation during the non-breeding season in order to avoid disturbing any birds that may be migrating through the area. The Corps will continue creating a woodland corridor on the western portion of the Natomas Basin as it parallels the Sacramento River. The project will double the amount of vegetation that is being removed through the creation of the corridor. Because there is other available habitat for the cuckoo to use during its migration and the habitat will be replaced, the Service concurs with the Corps finding of may affect, not likely to adversely affect the yellow-billed cuckoo.

Least Bell's Vireo

Least Bell's vireo uses early successional, dense, variable height structure, riparian habitat for nesting and foraging. While this habitat exists just outside the action area, construction will not occur in suitable nesting habitat for the vireo. Woody vegetation exists on the levee and landside toe, but is maintained for an open understory in order to conduct levee inspections. Vegetation in the action area will be removed prior to March when birds begin to migrate into California. Dense riparian habitat is available for the vireo in the lower American River Parkway as well as in the Yolo Bypass. There have been a small number of least Bell's vireo observed in the Yolo Bypass and in southern Sacramento County at the Bufferlands, however there are no known recent occurrences of breeding of least Bell's vireo in the Sacramento Valley. Given the recent occurrences 2010, 2011, and 2013 (eBird 2016) in the surrounding area it is possible that over the course of the project timeframe vireos may use the surrounding area more frequently. However, the habitat quality makes it unlikely that they would use the riparian vegetation that is being removed as part of the project. The Corps is planning to continue creating a woodland corridor on the western portion of the Natomas Basin as it parallels the Sacramento River. The project will double the amount of vegetation that is being removed through the creation of the corridor. Given the avoidance measures that the Corps intends to include (vegetation removal prior to the nesting season) and the few occurrences in the Sacramento Valley, the Service believes that adverse effects to the least Bell's vireo are unlikely to occur, and are therefore discountable for the purposes of this consultation.

Page 2: Add the following under **Consultation History for Phase 4b:**

June 20, 2016. The Corps reinitiated section 7 consultation on Phase 4b due to changes in the project description and an analysis for western yellow-billed cuckoo and least Bell's vireo.

Page 5: Add the following paragraph in the **Project Description** under **Levee Modifications and Seepage Remediation:**

Eighty geotechnical borings will be conducted along Reaches E, F, and G in order to identify utilities and refine final designs of the project. All of the borings will be done with a drill rig and occur between November and March of 2016/2017 in upland giant garter snake habitat.

Page 8: Add the following paragraph under **American River North Levee Reach I: 1-4:**

A portion of Discovery Park will serve as a staging area for construction of Reach I. The levee crown will also serve as additional staging areas during construction. No woody vegetation will be removed in the staging area. The area is currently in annual grassland.

Page 10: Add the following paragraph under **Natomas East Main Drainage Canal West Levee, Reaches F-H:**

Staging for Reach H will occur on both the landside and the waterside toe of the levee. The waterside staging will occur between the West El Camino and San Juan Bridges. It is a large annual grassland and will be used for soil storage. Storm water pollution prevention measures will be installed, including sediment fencing which will prevent spills of soil into the channel. Due to high amounts of urbanization on the landside of the levee and presence of woody vegetation along the channel it is unlikely that giant garter snakes will use this portion of the Natomas East Main Drainage Canal.

Page 33: Change the following paragraph in the **Conservation Measures** under *Giant Garter Snake* from:

Some components of the proposed project may occur prior to the beginning of the defined GGS active season. Activities such as utility relocations, removal of residential or agricultural structures, or certain geotechnical borings (38 borings along the NEMDC between the American River Parkway and the Pump Station) will be conducted before May 1. Typically, this work will occur farther than 200 feet from suitable aquatic habitat for GGS or in areas unsuitable for estivation such as roads. Twenty-seven hand borings will occur in areas where GGS may be overwintering. A Corps biologist will survey the area prior to hand boring site selection. Boring locations will be selected that are at least 30 feet from any crack or burrow in the levee that could be used by the snake for overwintering. A biologist will be present on site during boring activities occurring outside the active season of the GGS. All other borings will occur between May 1 and October 1.

To:

Some components of the proposed project may occur prior to the beginning of the defined GGS active season. Activities such as utility relocations, removal of residential or agricultural structures, or certain geotechnical borings (38 borings along the NEMDC between the American River Parkway and the Pump Station and 80 borings along the Reaches E, F, and G) will be conducted before May 1. Typically, this work will occur farther than 200 feet from suitable aquatic habitat for GGS or in areas unsuitable for estivation such as roads. Twenty-seven hand borings and 80 drill rig borings will occur in areas where GGS may be overwintering. A Corps biologist will survey the area prior to hand boring site selection. Boring locations will be selected that are at least 30 feet from any crack or burrow in the levee that could be used by the snake for overwintering. A biologist will be present on-site during boring activities occurring outside the active season of the GGS. All other borings will occur between May 1 and October 1.

Page 38: Change the following paragraph in the **Effects of the Project** under Giant Garter Snake from:

Components of Phase 4b work that will occur outside of the GGS's active season include utility relocation, removal of residential or agricultural structures, and transplantation and planting of trees and elderberry shrubs. These will be conducted before April 15. GGS have been observed to overwinter as far as 250 meters from aquatic habitat (Wylie *et al.* 1997). Given that GGS are generally inactive during the winter months, SAFCA's working during the inactive season will kill GGS that may be overwintering within the construction footprint. To reduce disturbing and/or killing GGS that may be overwintering due to the 38 borings the Corps/SAFCA will have a biologist survey the proposed hand auger site and select sites that are at least 30 feet from a crack or burrow that could be used by an overwintering GGS. This should reduce the likelihood of the hand augering killing or injuring an overwintering snake. For other activities, to reduce disturbing and/or killing GGS that may be overwintering in uplands that will be affected by working out of season, SAFCA has proposed to place exclusionary fencing which will be erected prior to October 1 in areas in which GGS may overwinter and SAFCA is proposing to remove/plant trees or elderberries. The fencing will exclude GGS from entering the area where SAFCA will be construction during the winter. This fence will be monitored daily prior to and during construction to insure that there are no breaches that a snake could get through. Excluding snakes from these areas will affect the GGS by limiting its ability to utilize suitable upland habitat for winter hibernation and by changing its dispersal behavior. Increased construction activity in areas where GGS are known to occur could expose snakes to increased risks of injury and mortality from predation, exposure, vehicular traffic, and construction equipment. It may be forced to disperse through and/or around the construction sites in response to habitat changes and seasonal indicators at a time when snakes are slower moving due to temperatures. Areas that are unlikely to have overwintering GGS include areas, which have active construction or agricultural activities occurring on them.

To:

Components of Phase 4b work that will occur outside of the GGS's active season include utility relocation, removal of residential or agricultural structures, and transplantation and planting of trees and elderberry shrubs. These will be conducted before April 15. GGS have been observed to overwinter as far as 250 meters from aquatic habitat (Wylie *et al.* 1997). Given that GGS are generally inactive during the winter months, SAFCA's working during the inactive season will kill GGS that may be overwintering within the construction footprint. To reduce disturbing and/or killing GGS that may be overwintering due to the 118 borings, the Corps/SAFCA will have a biologist survey the proposed hand auger site and select sites that are at least 30 feet from a crack or burrow that could be used by an overwintering GGS. This should reduce the likelihood of the hand augering killing or injuring an overwintering snake. For other activities, to reduce disturbing and/or killing GGS that may be overwintering in uplands that will be affected by working out of season, SAFCA has proposed to place exclusionary fencing which will be erected prior to October 1 in areas in which GGS may overwinter and SAFCA is proposing to remove/plant trees or elderberries. The fencing will exclude GGS from entering the area where SAFCA will be construction during the winter. This fence will be monitored daily prior to and during construction to insure that there are no breaches that a snake could get through. Excluding snakes from these areas will affect the GGS by limiting its ability to utilize suitable upland habitat for winter hibernation and by changing its dispersal behavior. Increased construction activity in areas where GGS are known to occur could expose snakes to increased risks of injury and mortality from predation, exposure, vehicular traffic, and construction equipment. It may be forced to disperse through and/or around the construction sites in response to habitat changes and seasonal indicators at a time when snakes are slower moving

due to temperatures. Areas that are unlikely to have overwintering GGS include areas, which have active construction or agricultural activities occurring on them.


Page 48: Add the following to the Literature Cited:

eBird. 2016. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: <http://www.ebird.org>. (Accessed: August 10, 2016).

The remaining portions of the December 8, 2014, biological opinion remain the same. This concludes formal consultation with the Corps on the Natomas Levee Improvement Program, Landside Improvements Phase 4b Project. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the proposed action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species or critical habitat is designated that may be affected by the proposed action.

If you have any questions regarding this biological opinion on the Natomas Landside Improvements Project, please contact Jennifer Hobbs (Jennifer_hobbs@fws.gov), Senior Fish and Wildlife Biologist at (916) 414-6541.

Sincerely,



Jennifer M. Norris
Field Supervisor

cc:

Robin Rosenau, Corps, Sacramento, CA
Tanya Sheya, CDFW, Rancho Cordova, CA
Peter Buck, SAFCA, Sacramento, CA

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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:

April 21, 2017

Consultation Code: 08ESMF00-2017-SLI-1845

Event Code: 08ESMF00-2017-E-04669

Project Name: Natomas Basin Project Reach D

Subject: 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

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office:

San Francisco Bay-delta Fish And Wildlife

650 Capitol Mall

Suite 8-300

Sacramento, CA 95814

(916) 930-5603

Project Summary

Consultation Code: 08ESMF00-2017-SLI-1845

Event Code: 08ESMF00-2017-E-04669

Project Name: Natomas Basin Project Reach D

Project Type: LAND - FLOODING

Project Description: Construction proposed includes levee improvements and modifications to pump plants and the excavation of a new drain along the Natomas Cross Canal in southern Sutter County in the northwest corner of the Natomas Basin. Project area includes staging and borrow site with an additional 1 mile surrounding perimeter. Work is expected to occur 1 May through 1 November 2018 and would likely continue through the spring of 2019.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/38.79354840430143N121.58080606596809W>



Counties: Sutter, CA | Yolo, CA

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on your 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. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

Birds

NAME	STATUS
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>) Population: Western U.S. DPS There is a proposed critical habitat for this species. Your location is outside the proposed critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Giant Garter Snake (<i>Thamnophis gigas</i>) 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 (<i>Rana draytonii</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander (<i>Ambystoma californiense</i>) Population: U.S.A. (Central CA DPS) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
<p>Delta Smelt (<i>Hypomesus transpacificus</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/321</p>	Threatened
<p>Steelhead (<i>Oncorhynchus (=Salmo) mykiss</i>)</p> <p>Population: Northern California DPS</p> <p>There is a final critical habitat designated for this species. Your location overlaps the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/1007</p>	Threatened

Insects

NAME	STATUS
<p>Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/7850</p>	Threatened

Crustaceans

NAME	STATUS
<p>Conservancy Fairy Shrimp (<i>Branchinecta conservatio</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/8246</p>	Endangered
<p>Vernal Pool Fairy Shrimp (<i>Branchinecta lynchi</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/498</p>	Threatened
<p>Vernal Pool Tadpole Shrimp (<i>Lepidurus packardii</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/2246</p>	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area.

NAME

STATUS

Steelhead (*Oncorhynchus* (=Salmo) *mykiss*)

Final
designated

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CALIFORNIA DEPARTMENT OF
FISH and WILDLIFE RareFind

Query Summary:

County **IS** (Sutter)
 AND Quad **IS** (Verona (3812175))

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	949	3	None	Candidate Endangered	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1937	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	755	1	Threatened	None	G3	S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland, Vernal pool, Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2427	17	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	320	2	Endangered	None	G4	S3S4	null	IUCN_EN-Endangered	Valley & foothill grassland, Vernal pool, Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	433	2	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Nycticorax nycticorax	black-crowned night heron	Birds	ABNGA11010	26	1	None	None	G5	S4	null	IUCN_LC-Least Concern	Marsh & swamp, Riparian forest, Riparian woodland, Wetland
Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	3	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Oncorhynchus tshawytscha	chinook salmon - Central Valley spring-run ESU	Fish	AFCHA0205A	13	1	Threatened	Threatened	G5	S1	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Pogonichthys macrolepidotus	Sacramento splittail	Fish	AFCJB34020	15	1	None	None	GNR	S3	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered	Aquatic, Estuary, Freshwater marsh, Sacramento/San Joaquin flowing waters
Riparia riparia	bank swallow	Birds	ABPAU08010	297	1	None	Threatened	G5	S2	null		

												BLM_S-Sensitive, IUCN_LC-Least Concern	Riparian scrub, Riparian woodland
Thamnophis gigas	giant gartersnake	Reptiles	ARADB36150	363	31	Threatened	Threatened	G2	S2	null	IUCN_VU- Vulnerable	Marsh & swamp, Riparian scrub, Wetland	

Appendix B

Construction Emissions Estimates

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Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Natomas Basin Reach D														
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	6.16	51.02	64.80	53.45	3.45	50.00	13.57	3.17	10.40	0.08	7,593.26	1.76	0.08	7,661.60
Grading/Excavation	4.75	42.56	51.92	52.64	2.64	50.00	12.74	2.34	10.40	0.08	8,087.44	1.28	0.13	8,158.22
Drainage/Utilities/Sub-Grade	5.10	36.30	47.10	52.64	2.64	50.00	12.85	2.45	10.40	0.06	5,403.05	1.17	0.05	5,447.42
Paving	4.64	36.67	46.46	2.52	2.52	0.00	2.32	2.32	0.00	0.05	5,138.74	1.06	0.06	5,181.65
Maximum (pounds/day)	6.16	51.02	64.80	53.45	3.45	50.00	13.57	3.17	10.40	0.08	8,087.44	1.76	0.13	8,158.22
Total (tons/construction project)	0.84	6.83	8.56	7.59	0.45	7.14	1.90	0.41	1.49	0.01	1,140.79	0.21	0.02	1,150.60

Notes:
 Project Start Year -> 2018
 Project Length (months) -> 12
 Total Project Area (acres) -> 50
 Maximum Area Disturbed/Day (acres) -> 5
 Water Truck Used? -> Yes

Phase	Total Material Imported/Exported Volume (yd ³ /day)		Daily VMT (miles/day)			
	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	350	0	144	0	560	0
Grading/Excavation	1,460	0	588	0	1,120	0
Drainage/Utilities/Sub-Grade	40	0	18	0	560	0
Paving	240	0	96	0	560	0

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 -> Natomas Basin Reach D														
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	0.10	0.86	1.09	0.90	0.06	0.84	0.23	0.05	0.17	0.00	127.57	0.03	0.00	116.77
Grading/Excavation	0.36	3.22	3.93	3.98	0.20	3.78	0.96	0.18	0.79	0.01	611.41	0.10	0.01	559.52
Drainage/Utilities/Sub-Grade	0.26	1.83	2.37	2.65	0.13	2.52	0.65	0.12	0.52	0.00	272.31	0.06	0.00	249.07
Paving	0.12	0.92	1.17	0.06	0.06	0.00	0.06	0.06	0.00	0.00	129.50	0.03	0.00	118.46
Maximum (tons/phase)	0.36	3.22	3.93	3.98	0.20	3.78	0.96	0.18	0.79	0.01	611.41	0.10	0.01	559.52
Total (tons/construction project)	0.84	6.83	8.56	7.59	0.45	7.14	1.90	0.41	1.49	0.01	1,140.79	0.21	0.02	1,043.82

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.

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Road Construction Emissions Model
Version 8.1.0

Data Entry Worksheet

Note: Required data input sections have a yellow background. Optional data input sections have a blue background. Only areas with yellow or blue background can be modified. Program defaults have a white background. The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project type. Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project

Input Type

Project Name	Natomas Basin Reach C	
Construction Start Year	2018	Enter a Year between 2014 and 2025 (inclusive)
Project Type	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee constructi
Project Construction Time	12.00	months
Working Days per Month	28.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 <small>(for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)</small>	2	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the lone formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	3.00	miles
Total Project Area	50.00	acres
Maximum Area Disturbed/Day	5.00	acres
Water Trucks Used?	1	1. Yes 2. No



To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd ³) (assume 20 if unknown)	Import Volume (yd ³ /day)	Export Volume (yd ³ /day)
Soil	Grubbing/Land Clearing	15.00	0.00	350.00
	Grading/Excavator	15.00	730.00	730.00
	Drainage/Utilities/Sub-Grade	15.00	20.00	20.00
	Paving	15.00	240.00	0.00
Asphalt	Grubbing/Land Clearing	0.00	0.00	0.00
	Grading/Excavator	0.00	0.00	0.00
	Drainage/Utilities/Sub-Grade	0.00	0.00	0.00
	Paving	0.00	0.00	0.00

Mitigation Options

On-road Fleet Emissions Mitigator	2010 and Newer On-road Vehicles Fleet	Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	20% NOx and 45% Exhaust PM reduction	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml).
	All Tier 4 Equipment	Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Stand

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F

Construction Periods	User Override of Construction Months	Program Calculatec Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		1.20		1/1/2018
Grading/Excavator		5.40		2/7/2018
Drainage/Utilities/Sub-Grade		3.60		7/22/2018
Paving		1.80		11/9/2018
Totals (Months)		12		

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F

Soil Hauling Emission:		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculatec Daily VMT
User Input						
Miles/round trip: Grubbing/Land Clearing		6.00			24	144.00
Miles/round trip: Grading/Excavatio		6.00			98	588.00
Miles/round trip: Drainage/Utilities/Sub-Grad		6.00			3	18.00
Miles/round trip: Paving		6.00			16	96.00
2010+ Model Year Mitigation Option Emission Rate:						
	ROG	CO	NOx	PM10	PM2.5	SOx CO2 CH4 N2O CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,589.59 0.00 0.05 1,605.25
Hauling Emissions						
	ROG	CO	NOx	PM10	PM2.5	SOx CO2 CH4 N2O CO2e
Pounds per day - Grubbing/Land Clearing	0.02	0.11	0.48	0.03	0.01	0.00 504.85 0.00 0.02 509.83
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00 8.48 0.00 0.00 8.57
Pounds per day - Grading/Excavatio	0.09	0.46	1.96	0.13	0.05	0.02 2,061.49 0.00 0.07 2,081.80
Tons per const. Period - Grading/Excavatio	0.01	0.04	0.15	0.01	0.00	0.00 155.85 0.00 0.01 157.38
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.01	0.06	0.00	0.00	0.00 63.11 0.00 0.00 63.73
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00 3.18 0.00 0.00 3.21
Pounds per day - Paving	0.01	0.08	0.32	0.02	0.01	0.00 336.43 0.00 0.01 339.74
Tons per const. Period - Paving	0.00	0.00	0.01	0.00	0.00	0.00 8.48 0.00 0.00 8.56
Total tons per construction project	0.01	0.04	0.17	0.01	0.00	0.00 175.99 0.00 0.01 177.72

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F

Asphalt Hauling Emission:		User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculatec Daily VMT
User Input						
Miles/round trip: Grubbing/Land Clearing					0	0.00
Miles/round trip: Grading/Excavatio					0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade					0	0.00
Miles/round trip: Paving					0	0.00
2010+ Model Year Mitigation Option Emission Rate:						
	ROG	CO	NOx	PM10	PM2.5	SOx CO2 CH4 N2O CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,590.26 0.00 0.05 1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02 1,589.59 0.00 0.05 1,605.25
Emissions						
	ROG	CO	NOx	PM10	PM2.5	SOx CO2 CH4 N2O CO2e
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Pounds per day - Grading/Excavatio	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Tons per const. Period - Grading/Excavatio	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Pounds per day - Drainage/Utilities/Sub-Grad	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Tons per const. Period - Drainage/Utilities/Sub-Grad	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00
Total tons per construction projec	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00 0.00 0.00

Note: Worker commute default values can be overridden in cells D113 through D11

Worker Commute Emissions										
User Input	User Override of Worker Commute Default Values		Default Values							
Miles/one-way trip	28									
One-way trips/day	2									
No. of employees: Grubbing/Land Clearin	10			20			560.00			
No. of employees: Grading/Excavatio	20			40			1,120.00			
No. of employees: Drainage/Utilities/Sub-Grad	10			20			560.00			
No. of employees: Paving	10			20			560.00			
Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Grading/Excavation (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Draining/Utilities/Sub-Grade (grams/mile)	0.03	1.33	0.15	0.05	0.02	0.00	393.83	0.01	0.01	395.91
Paving (grams/mile)	0.03	1.32	0.15	0.05	0.02	0.00	393.22	0.01	0.01	395.28
Grubbing/Land Clearing (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Grading/Excavation (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Draining/Utilities/Sub-Grade (grams/trip)	1.17	3.21	0.26	0.00	0.00	0.00	87.83	0.02	0.01	91.49
Paving (grams/trip)	1.17	3.19	0.26	0.00	0.00	0.00	87.74	0.02	0.01	91.38
Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearin	0.09	1.78	0.19	0.06	0.02	0.00	490.09	0.01	0.01	492.82
Tons per const. Period - Grubbing/Land Clearin	0.00	0.03	0.00	0.00	0.00	0.00	8.23	0.00	0.00	8.28
Pounds per day - Grading/Excavatio	0.17	3.56	0.38	0.12	0.05	0.01	990.18	0.03	0.02	985.63
Tons per const. Period - Grading/Excavatio	0.01	0.27	0.03	0.01	0.00	0.00	74.10	0.00	0.00	74.51
Pounds per day - Drainage/Utilities/Sub-Grad	0.09	1.78	0.19	0.06	0.02	0.00	490.09	0.01	0.01	492.82
Tons per const. Period - Drainage/Utilities/Sub-Grad	0.00	0.09	0.01	0.00	0.00	0.00	24.70	0.00	0.00	24.84
Pounds per day - Paving	0.09	1.77	0.19	0.06	0.02	0.00	489.33	0.01	0.01	492.04
Tons per const. Period - Paving	0.00	0.04	0.00	0.00	0.00	0.00	12.33	0.00	0.00	12.40
Total tons per construction projec	0.02	0.43	0.05	0.01	0.01	0.00	119.37	0.00	0.00	120.03

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions										
User Input	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Vehicle/Day	Default Values Miles Traveled/Vehicle/Day	Calculated Daily VMT					
Grubbing/Land Clearing - Exhaust					0.00					
Grading/Excavation - Exhaust					0.00					
Drainage/Utilities/Subgrade					0.00					
Paving					0.00					
2010+ Model Year Mitigation Option Emission Rate:	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Grading/Excavation (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Draining/Utilities/Sub-Grade (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.93
Paving (grams/mile)	0.07	0.36	1.51	0.10	0.04	0.02	1,590.26	0.00	0.05	1,605.25
Emissions	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Pounds per day - Grubbing/Land Clearin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavatio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavatio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction projec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust	User Override of Maximum Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearin			50.00	0.84	10.40	0.17
Fugitive Dust - Grading/Excavatio			50.00	3.78	10.40	0.79
Fugitive Dust - Drainage/Utilities/Subgrad			50.00	2.52	10.40	0.52

Values in cells D183 through D216, D234 through D267, D285 through D318, and D336 through D369 are required when 'Other Project Type' is select

Off-Road Equipment Emissions					Emissions reflect reduction due to 20% NOx and 45% Exhaust PM reduction Mitigation Option Select										
Grubbing/Land Clearing	Default	Mitigation Option	Default		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
	Number of Vehicles	Override of Default equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
		Model Default Tie	Model Default Tie	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2.00		Model Default Tie	Model Default Tie	Generator Sets	1.01	7.49	6.58	0.29	0.29	0.01	1,246.07	0.09	0.01	1,251.11	
		Model Default Tie	Model Default Tie	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Rubber Tired Dozers	2.15	17.93	18.71	0.59	0.55	0.02	1,792.45	0.56	0.02	1,810.98	
		Model Default Tie	Model Default Tie	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1.00		Model Default Tie	Model Default Tie	Scrapers	1.13	8.67	11.20	0.30	0.28	0.02	1,504.03	0.47	0.01	1,519.64	
		Model Default Tie	Model Default Tie	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2.00		Model Default Tie	Model Default Tie	Skid Steer Loaders	0.18	2.78	1.94	0.07	0.06	0.00	415.77	0.13	0.00	420.08	
		Model Default Tie	Model Default Tie	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Model Default Tie	Model Default Tie	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4.00		Model Default Tie	Model Default Tie	Tractors/Loaders/Backhoes	1.08	9.44	8.50	0.41	0.38	0.01	1,264.00	0.39	0.01	1,277.10	
1.00		Model Default Tie	Model Default Tie	Trenchers	0.47	2.75	3.38	0.18	0.16	0.00	352.66	0.11	0.00	356.31	
		Model Default Tie	Model Default Tie	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
User-Defined Off-road Equipment					If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment 1'										
	Number of Vehicles		Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		Grubbing/Land Clearing		pounds per day	6.02	49.07	50.32	1.84	1.72	0.07	6,574.97	1.75	0.06	6,635.22	
		Grubbing/Land Clearing		tons per phase	0.10	0.82	0.85	0.03	0.03	0.00	110.46	0.03	0.00	111.47	

Grading/Excavation	Default		Mitigation Option		Emissions reflect reduction due to 20% NOx and 45% Exhaust PM reduction Mitigation Option Select										
	Number of Vehicles	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
			Model Default Tie	Model Default Tie	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Cement and Mortar Mixer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Concrete/Industrial Saw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tie	Model Default Tie	Excavators	0.60	6.76	5.11	0.17	0.16	0.01	1,072.06	0.33	0.01	1,083.19
			Model Default Tie	Model Default Tie	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tie	Model Default Tie	Generator Sets	1.01	7.49	6.58	0.29	0.29	0.01	1,246.07	0.09	0.01	1,251.11
			Model Default Tie	Model Default Tie	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tie	Model Default Tie	Rubber Tired Dozers	2.15	17.93	18.71	0.59	0.55	0.02	1,792.45	0.56	0.02	1,810.98
			Model Default Tie	Model Default Tie	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tie	Model Default Tie	Skid Steer Loaders	0.09	1.39	0.97	0.03	0.03	0.00	207.88	0.06	0.00	210.04
			Model Default Tie	Model Default Tie	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tie	Model Default Tie	Tractors/Loaders/Backhoes	0.54	4.72	4.25	0.21	0.19	0.01	632.00	0.20	0.01	638.55
			Model Default Tie	Model Default Tie	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipment	If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" 1					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles		Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavator			pounds per day	4.39	38.29	35.63	1.29	1.21	0.05	4,950.46	1.24	0.04	4,993.87	
	Grading/Excavator			tons per phase	0.33	2.89	2.69	0.10	0.09	0.00	374.25	0.09	0.00	377.54	

Drainage/Utilities/Subgrad	Default		Mitigation Option		Emissions reflect reduction due to 20% NOx and 45% Exhaust PM reduction Mitigation Option Select									
	Number of Vehicles	Override of Default Number of Vehicles	Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
		Program-estimate	Model Default Tie	Model Default Tie	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2.00		Model Default Tie	Model Default Tie	0.12	0.62	0.59	0.02	0.02	0.00	101.03	0.01	0.00	101.55
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.56	2.47	5.34	0.16	0.15	0.01	568.03	0.18	0.00	573.92
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.30	3.38	2.56	0.09	0.08	0.01	536.03	0.17	0.00	541.59
	2.00		Model Default Tie	Model Default Tie	0.36	2.42	2.52	0.14	0.13	0.00	307.58	0.10	0.00	310.77
			Model Default Tie	Model Default Tie	1.01	7.49	6.58	0.29	0.29	0.01	1,246.07	0.09	0.01	1,251.11
	1.00		Model Default Tie	Model Default Tie	0.84	4.69	6.69	0.26	0.24	0.01	629.41	0.20	0.01	635.92
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.05	0.25	0.26	0.01	0.01	0.00	39.09	0.00	0.00	39.29
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	896.22	0.28	0.01	905.48
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.27	2.36	2.13	0.10	0.10	0.00	316.00	0.10	0.00	319.27
			Model Default Tie	Model Default Tie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00		Model Default Tie	Model Default Tie	0.44	1.86	1.35	0.06	0.06	0.00	207.48	0.04	0.00	208.99
User-Defined Off-road Equipment	If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' 1				ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles		Equipment Tier	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00		N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Drainage/Utilities/Sub-Gradi		pounds per day	5.01	34.50	37.36	1.42	1.33	0.05	4,846.94	1.16	0.04	4,887.91
		Drainage/Utilities/Sub-Gradi		tons per phase	0.25	1.74	1.88	0.07	0.07	0.00	244.29	0.06	0.00	246.35

Paving	Default	Mitigation Option	Default	Emissions reflect reduction due to 20% NOx and 45% Exhaust PM reduction Mitigation Option Select										
	Number of Vehicles	Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Override of Default Number of Vehicles	Program-estimate				pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Model Default Tie	Model Default Tie	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Cement and Mortar Mixer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Concrete/Industrial Saw	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Model Default Tie	Model Default Tie	Generator Sets	1.00	7.49	6.55	0.29	0.29	0.01	1,246.07	0.09	0.01	1,251.10
1.00		Model Default Tie	Model Default Tie	Graders	0.83	4.69	6.66	0.26	0.24	0.01	628.88	0.20	0.01	635.39
		Model Default Tie	Model Default Tie	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Other General Industrial Equipmen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Other Material Handling Equipmer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Model Default Tie	Model Default Tie	Rubber Tired Dozers	2.15	17.88	18.66	0.59	0.54	0.02	1,791.04	0.56	0.02	1,809.57
		Model Default Tie	Model Default Tie	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Model Default Tie	Model Default Tie	Tractors/Loaders/Backhoes	0.53	4.72	4.23	0.21	0.19	0.01	631.47	0.20	0.01	638.02
		Model Default Tie	Model Default Tie	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Model Default Tie	Model Default Tie	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
User-Defined Off-road Equipmen					ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Number of Vehicles	If non-default vehicles are used, please provide information in "Non-default Off-road Equipment" 1			pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00		N/A			0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Paving			pounds per day	4.52	34.78	36.10	1.34	1.26	0.04	4,297.46	1.04	0.04	4,334.07
	Paving			tons per phase	0.11	0.88	0.91	0.03	0.03	0.00	108.30	0.03	0.00	109.22
Total Emissions all Phases (tons per construction period) =					0.80	6.33	6.33	0.23	0.22	0.01	837.30	0.21	0.01	844.58

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F4

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET